

to prevent Black Quarter ; but I am not quite so sure that a jury of twelve good men and true would consider an inoculation test for Anthrax or Rabies not an experiment coming within the meaning of the Vivisection Act.

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## A CASE OF SPONTANEOUS TUBERCULOSIS IN A CAT.

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IT is generally accepted that the dog, the cat, and other carnivorous animals have a remarkable immunity from tuberculosis. It is true that there have recently been placed on record a few cases in which such animals have been the subject of undoubted tubercle, but in these instances the exposure to infection, although not intentional, was so very great that they can not be held to run counter to the general opinion that the carnivora are very insusceptible to this disease. The following case, however, is in several respects remarkable, and in none more so than in the fact that there is no history of the animal having been placed in any such exceptional circumstances as regards exposure to the risk of infection.

In the month of February last I had occasion to make a *post-mortem* examination of a cat which belonged to my colleague Professor Baird. This animal had been given to Professor Baird as a kitten. When a few months old it was castrated, and until within a few months of its death (the animal being then about a year old) it appeared to enjoy the most perfect health. It was, in fact, greatly admired for its size and beauty by all who saw it. In the month of February, however, it somewhat suddenly became ill. It lost appetite, had a cough, and rapidly fell off in condition. At the end of some three weeks or a month the condition of the animal was such that its recovery was despaired of, and it was therefore poisoned to cut short its misery.

The autopsy was made by me almost immediately after death, and it need hardly be said that there was not the least expectation on my part that the lesions of tubercle would be found anywhere. With the exception of the liver and kidneys, which were notably congested, all the abdominal organs appeared to be healthy.

On opening the chest my attention was at once arrested by the condition of the lungs, both of which were most extensively diseased. Almost the entire mass of both organs was beset with pale patches of consolidation ; the consolidation indeed was so extensive that there did not appear to be more than one-third of the pulmonary tissue permeable by air. Underneath the pleura, which appeared quite normal, the solid parts were thickly distributed, and between them there were little spots of emphysema. The consolidated areas were of variable size, but the majority were distinctly larger than a miliary tubercle ; and, as was more plainly seen on section, they had an ill-defined periphery, shading gradually off into the vesicular tissue. They appeared to be of a catarrhal nature, but I was much struck by their uniform distribution throughout the whole of both lungs ; and this, combined with the state of the bronchial glands, suggested to my mind the possibility of tubercle. These glands were much increased in size, the largest

being as big as a hazel nut, and they appeared to be caseating towards the centre. The glands and a piece of lung were placed in absolute alcohol, and as soon as they were hardened sections were made and mounted for microscopic examination, which revealed the following changes.

*Lungs.* The pleura is for the most part normal, but over the solid patches it is at places slightly thickened, this change affecting its deeper part.

Throughout the lung tissue it is impossible to find a perfectly healthy alveolus. Where these are least affected the alveolar epithelium is swollen, and a few catarrhal cells lie in the lumen of the air-cell. Passing from these towards the solid areas, the condition of catarrhal pneumonia becomes more and more pronounced until the alveoli are entirely filled with large tolerably uniform catarrhal cells, and the epithelium of the walls is swollen, and evidently actively proliferating. Finally, towards the centre of the pneumonic parts the structure becomes so dense that the alveolar walls are with difficulty to be distinguished from their catarrhal contents. In these latter parts, and even in the less compact structure, the nuclei do not stain well, the cells being evidently bordering on degeneration. Underneath the pleura there are areas that appear to have become solid from collapse, and here the pulmonary vessels are greatly distended with blood. Between these again there is marked emphysema. The smaller bronchi share in the catarrhal change, but the larger are perfectly healthy. At a few points in the lung (mostly peribronchial) there are foci of small round cells, but with this insignificant exception there is absolutely nothing in the lung to indicate tuberculosis. There is not a single giant cell to be found, and there is no caseation.

Sections were next stained by Ehrlich's method for tubercle bacilli, which were thus found to be very numerous present. In the denser catarrhal parts they are very abundant, forming groups which appear to correspond to degenerated catarrhal cells. In parts where the alveolar structure is still perfectly distinct the bacilli are also numerous, almost every catarrhal cell in the case of some alveoli containing one or several rods in its substance. But the position in which the bacilli are most abundant of all is underneath the pleura, in the areas which appeared to have become solid by collapse rather than by catarrh. Here in sections in which the tissue elements are thoroughly decolorised the bacilli appear under a low power of the microscope as solid violet patches, which a higher magnification resolves into close-packed bacilli.

*Bronchial Lymphatic Glands.* A microscopic examination shows here again as the chief point of interest a total absence of what is regarded as the typical structure of tubercular lesions. The blood-vessels of the outer part of the gland are full of blood, and the lymph sinuses are distended. Throughout a great part of the gland the normal structure is obscured, the whole being dense, and the closely packed round-celled elements being more or less degenerated. At one or two points the structural elements are quite unrecognisable, and the part appears on the point of caseating. As was to be expected after examination of the lung, tubercle bacilli are numerous in the glands. In the deeper degenerating parts they are very abundant. In the cortical part of the gland they are generally confined to the

lymph channels, and are almost without exception contained in the leucocytes.

The first question to suggest itself as soon as a positive diagnosis of tuberculosis was made was—How did the cat become infected? Professor Baird informed me on inquiry that the cat had not been once out of doors since the day it came into his possession, a circumstance which materially narrowed the inquiry. It was further elicited that the cat had never had raw meat to eat. Occasionally it had pieces of liver (bullock's or sheep's) to eat, but invariably boiled. The cat got no milk, but occasionally it got a little cream. Lastly, there was not the barest suspicion that any member of Professor Baird's household was tubercular. It was of course not impossible that the cat might have had tubercular liver or other material imperfectly cooked, but the fact that the abdominal viscera were free from the disease, and the nature of the pulmonary lesion appeared to make it almost certain that infection had taken place by the air-passages. Now, it cannot be denied, in fact we must admit, that this animal must have had introduced into its air-passages or alimentary canal one or more tubercle bacilli; but it appears equally certain that there was not in this case any oft repeated chance of infection by the ingestion or inhalation of the bacilli in large numbers. The possibility of the cat having been infected before it came into Professor Baird's possession need hardly be considered, for it is scarcely possible that it could have been the subject of tuberculosis for nine months during which it appeared to enjoy perfect health. Moreover, both the lung and gland lesions were of a recent character.

But in the case of the most susceptible species, individual infection appears generally to depend more upon the presence of the so-called tubercular constitution or diathesis than upon exposure to extraordinary risks of infection. In other words, if a human being has a strongly marked tubercular diathesis, the chances are a hundred to one that he will sooner or later fall a prey to the tubercle bacillus; on the other hand, an individual without that diathesis is constantly exposed to the same risk (or certainty) of inhaling or ingesting some of these organisms, and yet the chances are a hundred to one that he will escape. In this case, as is the rule with human victims of phthisis, it was impossible to trace the exact date and manner of infection; but it is clear that there was not on the part of the animal any marked natural resistance to the invasion of the bacillus, such as the feline species is usually credited with.

A question which I ought perhaps to have touched upon sooner is—Was this the tubercle bacillus? a question which may very naturally be asked, since tuberculosis, as has been said, was not or very obscurely indicated by the nature of the lesions. To that I can only reply that the size, form, mode of grouping, and, above all, the staining reactions of the germs here present, were identical with those of the tubercle bacillus. The sections were stained in methyl-violet dissolved in aniline water, and they were decolorised with strong nitric acid solution, a 3 per cent. solution in alcohol being used in some instances, and a 33 per cent. solution in water in others.