

Guinea-pig No. 3 (inoculated 27th June from gland pipette) died sixty-four hours after inoculation. *Post mortem* similar to above as regards swollen glands, &c., but the spleen, though larger than normal and very dark in colour, did not exhibit the mottled appearance, which was also typical, as the mottled condition rarely appears before the lapse of three days. All the organs, and even the blood, contained large numbers of the typical bacilli, this infection of the blood having evidently been the cause of the rapid death.

Cultures were made on agar, serum (coagulated), and other media from all of these animals, and later on other experiments were conducted on rats and guinea-pigs with sub-cultures, the result being invariably the same, viz., the development of a bubo above the seat of inoculation, and death in from three to five days (unless later when cultures of less virulence were used), and the typical *post-mortem* appearance as described above. Every experiment proved that the contents of the tubes forwarded by Dr. Baldwin, from the case Kelly contained the bacillus of bubonic plague. The experiments detailed above were conducted in the presence and with the assistance of Dr. Kingdon Fyffe, Health Commissioner for the Wellington District, and, in so far as the effect on guinea-pigs was concerned, were controlled by Dr. Mason's independent experiments in Auckland with material which had been retained there in a Pasteur pipette by Dr. Baldwin. They also bore out the opinion expressed by Dr. Challoner Purchas, of Auckland, as a result of the *post mortem* on Kelly and the microscopic appearance of the bacilli in the pus and spleen.

PLAGUE AMONG RATS.

Auckland.—The day after our arrival in Auckland we were informed by the harbour authorities that a sickly rat had been observed in broad daylight crawling along the floor of one of the sheds on the outer tee of the wharf, and had been kicked to death by some of the wharf labourers. On visiting the shed in question we found the body had been kept for our examination by the foreman. The rat was killed between 7 and 8 a.m., and we received it about 12.30. *Post-mortem* examination showed that the animal was well developed, and fairly well nourished. There was a severe contusion with hemorrhage in the inferior and posterior portions of the abdomen, as a result of the kick, with considerable displacement and laceration of the abdominal viscera. The lymphatic glands of the precrucial and subscapular region were larger than normal, and congested, notably the right subscapular lymphatic gland, which was about the size of a pea, inflamed, and degenerating in the centre. The liver was lacerated, congested, and exhibited small whitish points about the size of a pin's-head. The spleen was enlarged and dark in colour. On making a microscopical examination of smearings, enormous numbers of bacilli, short, with rounded ends, staining readily with weak fuchsine and carbol-theonine, but not by the method of Gram, were found in the right subscapular lymphatic gland. Large numbers of bacilli exhibiting the same characteristics were found in the liver and spleen, accompanied in the latter cases by a few long putrefactive organisms, which had evidently gained entrance more readily than usual through the lacerations in the abdominal tissues. Besides the characteristics mentioned above, in less heavily stained specimens, many bacilli could be seen stained most distinctly at the ends, although this was not a general feature. Tubes of ordinary nutrient agar-agar media (which I had brought from Wellington) were inoculated from the spleen and gland pulp, and immediately conveyed with all precaution to the hospital, where they were placed in the incubator at 37° C., by the kind permission of Dr. Baldwin, the Medical Superintendent. A guinea-pig was procured and inoculated under the skin of the thigh with a small quantity of spleen pulp, while more of the same material was preserved in a previously sterilised Pasteur pipette, hermetically sealed, for subsequent inoculation into a rat. At the conclusion of the examination the remains of the rat were burned in a furnace.

Next day (the 20th April, 1900), a live rat was procured from the country, some miles from Auckland. This animal was apparently healthy and in good condition. It was inoculated with some of the spleen pulp from the pipette, and placed in a cage. The guinea-pig now showed signs of illness, hair standing on end, &c., and only partaking of food sparingly. The inoculated tubes of nutrient media practically remained sterile, though in one a very slight indication of growth was evident.

On the 21st there was little change in the guinea-pig, while the rat was observed to be breathing rapidly, but still lively. The inoculated tubes showed a number of faint, almost circular points of nearly transparent growth, possessing, as a whole, an almost powdery appearance. Microscopical examination of these colonies showed them to consist of short bacilli similar to those found in the rat, but staining more distinctly at the end and non-mobile.

On the morning of the 23rd, the experimental rat was found dead. Examination showed considerable swelling with œdema at the seat of inoculation, while the gland of the region (the precrucial) was much enlarged. The liver was congested, and the spleen slightly enlarged. Enormous numbers of bacilli similar to those already described were found in the gland, while they were also numerous in the spleen and blood. On this day the guinea-pig was very much worse, being huddled in a corner, and refusing to eat or move.

On the morning of the 24th, the guinea-pig was found dead in the corner of the box, death having occurred over four days after inoculation.

Post-mortem examination: Slight swelling around seat of inoculation, with very much enlarged precrucial gland (about twice the size of a pea). The other glands were slightly enlarged and œdematous. The peritoneum contained a small quantity of clear effusion. The liver was congested, the lungs normal, the intestines slightly congested. The most striking pathological change was in the spleen, which organ was enlarged to four or five times its normal size, dark in colour and mottled with peculiar greyish-white patches, varying in size from a pin-point to twice the size of a pin's head. The tissues at the seat of the inoculation, the bubo, and the spleen contained very large numbers of the same bacilli as those found in the rat, these being also present in considerable quantity in the liver and blood.