ABSTRACTS.

To the normal, the four horses were tested with mallein, and all of them had a very pronounced reaction. The fever and prostration lasted till the 12th June, and the swelling at the seat of inoculation till the 13th or 14th June.

With the exception of horse (C) none of the animals developed any external symptom of glanders. On the 7th June the submaxillary glands of horse (C) began to swell, and they quickly acquired the characters indicative of glanders. These horses were killed on the 18th and 23rd June 1898, and in each of them both lungs were found to contain a great number of recent miliary tubercles, the majority being opaque and caseated towards the centre, but some still quite homogenous and translucent. But, while the lungs of the control horse did not contain any fibrous or calcified tubercles, a great number of these were found in the other three horses, and especially in horse (C). In this last animal there was also three ulcers on the right vocal cord, in addition to the swelling of the glands observed during life. None of the others showed any lesion of the respiratory mucous membrane or of the lymphatic glands belonging to it.

Nocard holds that these experiments justify the conclusion that in the horse, as in the dog, recovery from a first attack does not leave the animal immune, or even with an increased resistance to the glanders bacillus or its toxines.

ANTHRAX IN THE DOG.1

In a general way the dog is refractory to anthrax, but, according to some authors, an exception must be made in the case of young dogs. Moreover, young dogs quickly succumb to anthrax when bacilli are injected into the pleura, and the resistance which adult dogs offer to anthrax is not absolute, for a good many cases of infection of the dog after eating raw anthrax flesh have been recorded. A fatal infection may also be set up in adult dogs by multiplying the attempts, and by inoculating with very large quantities of the virus. They may also be infected in circumstances altogether special, such as after extirpation of the spleen, withholding of water, etc.

Martel has succeeded in greatly exalting the virulence for the canine species by inoculating in series from dog to dog. In order to enfeeble the natural resistance of the dogs used for these experiments Martel gave subcutaneous injections of phloridzin in alkaline solution, or of pyrogallol, twenty-four hours before inoculating with the anthrax virus. This was found to facilitate infection, but, nevertheless, it was always difficult to continue the inoculations from dog to dog. He obtained greater success in this direction by using for his experiments dogs that were the subject of rabies. A single passage through a rabid dog increases the virulence of anthrax to such a degree that inoculation from it to dogs will kill in over 70 per cent. of the cases. A rabid dog inoculated with 1 cc. of an anthrax culture in bouillon which is inoffensive for a healthy dog, will die in less than twenty-four hours with bacilli in all its organs. In another series of experiments Martel started with bacilli from a cow dead of anthrax, and he succeeded in effecting thirty-six successive passages from dog to dog. The first dog of this series was an adult animal which died twenty-eight hours after subcutaneous inoculation with 1 c.c. of an emulsion from the spleen of a cow.

In 135 dogs inoculated in this way the mortality was 77.9 per cent. from the first to the tenth passage, 85.5 per cent. from the eleventh to the twentieth passage, 86.6 per cent. from the twenty-first to the thirtieth passage, and 100 per cent. from the thirty-first to the thirty-sixth passage.

A measure of the exaltation of the virulence is also furnished by the shortening of the period of incubation. To begin with this was from twenty-four to thirty-six hours, and it fell to ten hours, and even to six hours, after the twenty-sixth passage.

The duration of the illness also diminished with the number of passages. Whereas in the first thirty experiments made with virus of the first passage death did not occur till from the fourth to the sixth day, it took place from the twenty-fourth to the thirtieth hour in the last fifty experiments of the series, that is to say, in the last fourteen passages from dog to dog.

The sensibility to the exalted virus was found to vary with the breed, and in a general way the better kept dogs are more susceptible than the ordinary dogs of the streets. The mortality also varied according to the method of inoculation. It was 68 per cent. with subcutaneous inoculation, 85·6 per cent. when the injection was made into the pleura, 87·5 per cent. when practised into the veins, and 96 per cent. after inoculation into the muscles. Susceptibility was also found to vary with age, adult dogs being the more resistant. In these the mortality was 80 per cent., while in dogs of a year old and under it was 85 per cent. Very old dogs are also very susceptible, 87·5 per cent. of them dying, and in the case of very young dogs (a day or two old) all die.

It was observed that after a series of passages through dogs of a particular breed, some difficulty was always experienced when an endeavour was made to continue the inoculations to dogs of another breed.

After the first few passages in the dog the virus is much exalted for the guinea-pig, death occurring in from twenty-four to thirty hours. After some twenty passages in the dog it is less for guinea-pigs, these dying after from thirty-six to forty hours.

The pigeon is susceptible to the virus exalted by passage through the dog. A trace of splenic pulp, rich in bacilli, from a dog of the twenty-sixth passage, when inoculated into the pectoral muscles of a pigeon killed it in three days, with some necrosis at the point of inoculation and bacilli in the blood.

The cat is very susceptible to the exalted virus, death occurring in from twenty-four to forty-eight hours after subcutaneous inoculation with 0·5 cc. of virus.

A goat infected by feeding with spores of the twenty-fifth passage died after having exhibited symptoms of intense fever. The bacilli were present in all the organs, and an extensive oedema of one of the intestinal loops and of the mesentery marked the place where the virus had penetrated.

Some interesting morphological peculiarities are observable in the bacilli after successive passages from dog to dog. The rods became shorter and thicker. They grow well in all the usual culture media at from 30° to 33° C. At 25° C. growth is always very vigorous, but the virulence is diminished.

The bacilli of the first passage grow well in meat bouillon and in solutions of peptone in the form of long threads united together in characteristic flocculent masses. The bacilli of the eleventh passage grow rapidly in liquid media, but the filaments are fragile and the segments have a tendency to separate, so that the flocculent aspect of the cultures tends to disappear. With bacilli of the thirteenth to the sixteenth passage liquid media become turbid in from three to five hours at 33° C., and the cultures do not clear up until after the sixth or eighth day. The filamentous form has disappeared, and the bacilli retain the shape of a short rod of variable length. The bacilli grow well on gelatine, which they slowly liquify. On agar the filamentous form predominates, and the colonies have nothing peculiar in their appearance.

The disease when experimentally induced is ushered in by rigors, intense thirst, and dryness of the nose. A considerable oedema appears at the point of inoculation, and it varies in extent according as the bacilli used for inoculation have undergone a larger or smaller number of passages through
throughout the course of the disease there is marked prostration and great muscular feebleness. The temperature may rise to 40°5' or 41° C., the pulse becomes frequent, the respiration difficult, and the gait unsteady.

When the disease lasts five or six days a sanguinolent and odourless diarrhoea sets in, but this symptom is absent when death occurs within thirty hours after the inoculation.

The urine is always abundant, sometimes albuminous, and it rarely contains blood. A considerable degree of emaciation always sets in.

The lesions found at the post-mortem examination are always haemorrhagic. The subcutaneous veins are gorged with blood, and the connective tissue at the point of inoculation is always oedematous, the oedema being red towards the centre and white at the periphery. There is abundant infiltration between the neighbouring muscles. The muscular tissue is firm and brown in colour. The lymphatic glands near the point of inoculation are infiltrated, succulent, and haemorrhagic. Sometimes oedematous collections are present in various parts of the body. The oedema in these cases forms a whitish gelatinous material, sometimes slightly haemorrhagic in the deeper parts.

In many cases the mucous membrane of the stomach and small intestine shows large hemorrhages, and the contents of the stomach and intestine are largely mixed with blood. The liver is large and friable. The spleen is firm and rarely increased in size.

The bacilli are always to be found in the lesions. Sometimes they are present only in small numbers, but in the majority of cases they occur in considerable masses, obstructing the capillaries. The red corpuscles of the blood are deformed, viscous, and agglutinated. The poly-nuclear white corpuscles exist in great numbers in the blood along with the bacilli. The phagocytic reaction is always very distinct in the dogs which are only slightly susceptible, and in the subjects which have received large doses of virulent blood by subcutaneous inoculation. The leucocytes are abundant at the point of inoculation, and many of the bacilli have been taken into their interior. The reaction is feeble when the disease evolves rapidly and terminates fatally.

A NEW PATHOGENIC STREPTOTHRIX FROM THE HORSE.

Source and Isolation of the Organism.—The streptothrix was obtained by Dr Dean from a horse which was undergoing diphtheria immunisation. Before admission the mallein test had been applied with a negative result. Some time after the animal was discovered accidentally to have a hard nodule below and near the angle of the jaw. The swelling was about the size of a walnut, and appeared to be an enlarged indurated sub-maxillary gland. The animal seemed to be in excellent health, but, as a precautionary measure, it was again tested with mallein and also with tuberculin, in both cases no reaction being obtained.

The nodule remained apparently unaltered for about three months, and was then observed to be increasing in size. In a week or two from this time it reached the size of a walnut, and distinct fluctuation could be made out.

The skin over the swelling was shaved and disinfected, and a sterile hypodermic needle introduced. The pus obtained in this way was mixed with neutral beef tea, and from it a dozen agar, agar-glycerine, and blood-serum tube cultures were made. Dr Dean then freely opened and scraped the abscess cavity with a Volkmann's spoon.

The pus which escaped was pale yellow in colour, and the material evacu-