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PIROPLASMOSIS IN FOX-HOUNDS IN INDIA.

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EIGHT and a half couple of fox-hounds were bought by officers of a regiment in Secunderabad. Four and a half couple were bought in Outacamund and Mysore, arriving in Secunderabad in June and July 1905; the remaining four couple were also bought in Outacamund, and arrived here in September.

Those from Outacamund and Mysore which arrived in June and July were hunted here regularly two days a week, as soon as they had recovered from their railway journey, up to the end of the first week in October. Those which arrived from Outacamund in September were also taken out about a week after their arrival.

They all hunted well and kept exceptionally fit up to the before-mentioned date, only one or two being left in on each hunting day, suffering from such trivial affections as sore pads from thorns, slight dysentery, etc. Dysentery is an exceptionally common disease out here in a pack, and with a regular course of treatment it occasions comparatively little mortality.

After the first week in October hounds began to sicken one after the other, commencing with the latest arrivals; and hardly a day passed without some hound going sick, with a temperature varying from 103° F. to 105° F., and from the commencement of this outbreak of disease no hound whose temperature went up and remained up for two or three days recovered.

Owing to the steady mortality which commenced on the 7th October, hunting was stopped almost immediately and hounds merely exercised. The symptoms displayed by all those which sickened and died were almost identical, viz., high temperature, respirations greatly accelerated, disinclination to move about, and refusal of all

food. If a hound lived in this condition for a few days rapid wasting and loss of flesh took place, continuing up to the time of death. In one or two there was occasionally a little dysentery or diarrhoea present; and, although at first I considered that this might be a prominent feature of the disease, I later came to the conclusion that in these latter symptoms there was nothing pathognomonic, and that it was nothing more than the ordinary variations in the nature of the fæces which always take place in a healthy pack. Another lesion which I noticed to be present in many of the hounds which went sick was the presence of a cutaneous eruption, most easily seen on the skin of the abdomen and inside of the thighs. This eruption, which commenced as a vesicle, ended in a crustaceous stage, and in appearance was indistinguishable from the eruption seen in dogs suffering from distemper. I am inclined to believe that there was nothing specific in this lesion, and I have observed a similar one present in almost all febrile and debilitating diseases of dogs.

The following hounds died during the months of October and November. Of those which came from Mysore in June, one died on the 16th October, one on 17th October, and two on the 2nd November. Of those which came from Outacamund in July, one died on the 24th October, one on 6th November, and one on 11th November. Of those which came from Outacamund in September, one died on the 7th October, one on 8th October, one on 15th October, and one on the 24th October. This makes eleven deaths out of a sum total of seventeen bought.

It will be seen from the above that the disease commenced amongst the latest arrivals, which evidently arrived at the most unfavourable season, and were attacked before they had a chance of becoming acclimatised.

The following are notes taken of the symptoms of one hound, "Harlequin," which was taken ill after hunting on the 5th October, died on the 7th October, and may be taken as a type of the symptoms of those which died after a similar short period of visible illness.

General condition good; temperature, 105° F. on the 5th October, and varying between that and 103° F. up to the time of death; respirations very much accelerated; mucous membranes very pale in colour, and not markedly yellow; fæces yellow and of a normal consistency; no dysentery or vomiting.

In one or two of those which died the disease was a little more protracted, and diarrhoea with occasional dysenteric evacuations was present. In these latter rapid loss of flesh took place.

In all of them from the commencement of visible illness all food was refused. When the first case occurred enteritis was suspected, and the animal was treated accordingly, but on *post-mortem* examination there was no evidence of this lesion. With the exception of one or two which died at inopportune hours *post-mortems* were made on all of them, and not in one of these examinations could any acute lesion be detected which might account for the rapid course of the disease and death. In one or two ecchymoses and patches of congestion of the mucous membrane were found at intervals along the course of the small intestine, and on two occasions small patches the diameter of a sixpence, showing superficial loss of substance of the mucous membrane, were found in the jejunum.

After the first two or three deaths had occurred, as a result of the indefinite nature of the *post-mortem* lesions, I was led to believe that the disease must be of the nature of a malarial infection. This conclusion was come to in spite of the fact that up to that time, although specimens of blood had been frequently examined, no malarial parasites could be detected. Another strange feature was that from the beginning to the end of the outbreak not in one single instance could either bacilli or malarial parasites be detected in blood specimens taken from hounds whilst living, the staining methods used at these examinations being Leishman's modification of Romanowsky's method and Giemsa's stain. Also out of all those which died only in one case could parasites be discovered in the blood after death. In this case the picture of the blood examined after staining by Leishman's method appeared to me to be of such exceptional interest that I was led to write these few notes.

The hound in question was one called "Norman," and he arrived here from Mysore in June. He went sick on the 10th October, and died on the 17th October in a very emaciated condition. His tem-



Piroplasms in red corpuscles of dog.

perature varied from 102° F. to 105° F., and there was continual diarrhœa. Other symptoms were similar to those already mentioned in the case of "Harlequin," being those attendant on high fever. *Post-mortem* appearances were simply those of excessive anæmia and emaciation. I took specimens of blood at the *post-mortem* examination, which took place about four hours after death.

On examination of these specimens, after staining by Leishman's method, numerous intracorpuseular bodies were seen in every field examined. All these bodies varied in outline from round to oval and pear-shaped. In some corpuscles only one body was present, in others two, and in others again four or six. The presence of two, four, etc., from the symmetrical arrangement of the parasites was evidently due to their method of division.

The accompanying illustration shows the appearance of the parasites in ten corpuscles selected from different fields. A remarkable feature of many of the piroplasms was that they were provided with relatively long slender out-runners, or pseudopodium-like processes. Where twin parasites occurred in a corpuscle they were generally joined by such a process, but, as shown in the figure, single piroplasms also showed one or more processes.

Although the *post-mortem* was made four hours after death, and

the blood was taken from the tail by amputating that organ owing to the difficulty of obtaining any from the ears, yet there were numbers of putrefactive organisms present, showing the rapidity with which putrefaction takes place in this hot climate.

As to the treatment carried out, nothing seemed to be of any avail as a curative agent. Quinine was given in the form of the sulphate by the mouth, and when this was found to have no effect subcutaneous injections of the soluble bihydrochlorate of quinine were tried, also without avail, not one single hound which sickened recovering.

This station I am given to understand is by no means an exceptional one as an unhealthy place for dogs during a certain season of the year. Dogs seem to do very well during the hot weather months of March, April, May and June, and the unhealthy season appears to commence some time after the monsoon has broken, when the grass is beginning to get high. This also would be the most favourable season for the activity of such parasites as mosquitoes, ticks, etc. Regularly every morning the kennel boy was in the habit of collecting a breakfast cup half full of ticks from the hounds' bodies, the two chief varieties of them being a large leaden-coloured tick and a very small red tick. I surmised that probably these hounds were inoculated with the disease by the ticks, this season when the grass is long being a particularly favourable one for ticks to get on the animals' bodies.

One of the first steps taken as a prophylactic measure was to cause the hounds to be exercised on bare ground, and as far as possible to be kept away from grass altogether. By the adoption of this measure the number of ticks found was markedly decreased, but they still found a medium of transmission to the hounds in the bedding straw, and so as a secondary measure all bedding was dispensed with, the hounds sleeping on their bare wooden benches. A large yard was also fenced in and cleaned of all herbage for the purpose of their being let loose for defæcation, etc., instead of their being let loose in an unenclosed space as formerly.

These precautions, although they did not reduce the disease to a minimum, had a favourable influence in checking the rapidity with which one case followed another.

Besides this outbreak of disease amongst the hounds, I also had several other patients from amongst dogs of different breeds belonging to various residents.

Although I do not claim that there is anything new in this mortality amongst well-bred dogs at this season of the year, either in this or any other "plains" station where it may take place, yet there is a scarcity of literature on the subject, and the disease is unlike any met with in England in my experience.

To sum up, the chief features are :—

- (1.) The sudden onset of the disease in an apparently healthy hound in good condition.
- (2.) The short period of visible illness.
- (3.) The absence of any definite *post-mortem* lesions. The heavy mortality—practically 100 per cent. of those which became visibly sick.
- (4.) Also, if a malarial infection, the absence of jaundice as a marked symptom.