

admissions for influenza and epizootic fever, 208 cases being admitted, as against 43 in 1894. The admissions for adenitis (strangles) are 67 less than the previous year, being 258, as compared with 325. No cases of glanders or farcy occurred during the year, and the last case among army horses was in October 1888, at Hounslow.

The number of persons for which lymph was cultivated in the Army Vaccine Institute during the year was 44,295, and, with the balance remaining from last year, amounts to 45,295; of this, lymph for the vaccination of 43,459 persons was issued, leaving a balance on hand of 1836.

The number of calves vaccinated during the year was sixteen, giving an average of 2830 persons to each calf. The greatest amount of lymph obtained from one calf was sufficient for 3906 persons, and the smallest amount obtained was for 1021 persons. The average daily issue of lymph was for 118 persons. During the year 1837 boxes, 3567 tablets, and 2 tubes were issued. The total amount of expenses for the year, including cost of calves, instruments, etc., was only £75 7s. 0½. Since the opening of the Institute on the 21st January 1889, to the 31st March 1896, lymph has been prepared for 260,596 persons.

In the Report great credit is given to Veterinary-Major Seaward Longhurst and Veterinary-Captain, E. R. C. Butler for so ably carrying on their duties as Instructors at the Army Veterinary School, and for their excellent management of the Vaccine Institute.

CLINICAL ARTICLES.

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THE TREATMENT OF TETANUS IN THE HORSE BY TETANUS ANTITOXIN.¹

By Professor DIECKERHOFF and Dr PETER.

IN a former article appearing in the *Berliner Thierärztliche Wochenschrift* (No. 47, page 555) we called attention to the great therapeutic importance of Behring's tetanus antitoxin in the treatment of tetanus of the horse. It only remains to report that the course of the disease in the cases there described proved exactly as had been predicted. Since then three other cases of tetanus in the horse have been treated with Behring's tetanus antitoxin in the Medical Clinique of the Berlin Veterinary College, and the result in these cases will be briefly recorded in this article. In the first place, however, it will be well to refer again to the already published cases.

CASE I.—Black mare, about ten years old, which was treated with antitoxin on the 10th November, had so far improved on the 16th November that a favourable course of the disease, in a relatively short time, could be foreseen. As a matter of fact, the tonic muscular contractions gradually declined, so that on the 4th December the last traces of tetanus were scarcely observable. On this day the mare was discharged from the clinique. It is worthy of

¹ Translated from the "Berliner Thierärztliche Wochenschrift," 10th December, 1896.

notice that some days after intravenous injection of the dissolved antitoxin a diuretic effect of the agent was observed. The mare frequently placed herself in a position to urinate, but passed only a small quantity of urine of a clear watery character. Owing to the nervous behaviour of the animal while suffering from the tetanus, it was impossible to carry out an accurate examination of the urine.

The observation showed, however, beyond any doubt that the antitoxin exercises a diuretic effect, but, on the other hand, it was not observed by us that it had any other action. Up to the 4th December the horse was daily submitted to an accurate examination in the clinique, and during the whole time the pulse was normal in frequency, the rectal temperature was normal, and the breathing quiet.

CASE II.—A well-bred Hungarian chestnut mare, which had been docked three weeks previously. The subsequent examination did not reveal the existence of any other wound. The report was that the animal had been attacked on the 21st November with symptoms of slight stiffness of the body, especially noticeable in the way in which the head was held. It was brought to the clinique on the 22nd November at 11 A.M., and the examination then showed that it was suffering from well-marked trismus, with stiffness of the whole back and continual twitching movements of the tail. The animal displayed great timidity, and tried to avoid any attempts to touch it. The head was held in a stiff position owing to strong contraction of the cervical muscles, and it could not be bent either to the right side or the left.

The trismus was so great that the incisor teeth could be separated only about 1 cm. Respirations 36, pulse 40, temperature 38.40°. On the evening of the 22nd November the mare received by intravenous injection a curative dose of Behring's antitoxin in watery solution. She was placed in a large loose-box in which she could move freely about. The amputation wound of the tail was treated with caustic. On the 23rd November symptoms of tetanus were very well marked, abundant saliva was discharged from the mouth, and the horse could take only a little food owing to the strong trismus. Respirations 20, pulse 34, temperature 38.1°. On the 24th November the mare moved her legs more freely, and was also less timid than on the date of admission, while the twitching of the tail was less marked.

During the following days the mare still moved with the head held in a stiff position, but did not display the timidity and excitement characteristic of a severe case of tetanus. She was also able to masticate food. On the forenoon of the 26th November she lay down quietly in the loose-box, but owing to the stiffness of the muscles of the neck, and the consequent inability to elevate the head, she could not get up. However, she quickly sprang to her feet when the head was supported by the attendant, and was not in any way excited in consequence of having been down. Up to the 30th November the improvement was rapid; the trismus had so far abated that the mare ate oats, carrots, and hay as well as a healthy horse. She was also able to bend the neck in feeding, although in moving in the loose-box the head was still kept stretched out. From this date onwards the condition of the animal gradually improved. On the 3rd December the mare, after she had lain down, was able to get up without assistance,

and by the 6th December the symptoms of tetanus had so far receded that the only trace of them observable was a stiffness in the way in which the head was held. There can be no doubt that in a short time the mare will have made a complete recovery.

CASE III.—On the 25th November, a black, heavy, draught gelding, twelve years old, was brought to the clinique with a report that in consequence of a prick of the foot the animal had been attacked with tetanus eight days previously, and had been treated for the same by a private veterinary surgeon. Owing to the non-delivery of some antitoxin previously ordered, nothing could then be done except put the animal in a loose-box and give it the necessary attention. On the day of admission the respirations were 12, the pulse 40, and the temperature 37.7° . The horse could eat pretty well, so that judging by the symptoms the disease appeared likely to run a mild course, but, as is often observed in cases of tetanus, a notable increase of the trismus set in on the eighth day of the disease; on this day the horse was no longer able to take food. With the greatest force the incisor teeth could not be separated for more than 2 cm. At 11 A.M. the horse received, by intravenous injection, a dose of Behring's antitoxin, but that agent was no longer capable of averting the consequences of the extreme trismus. The horse was unable to take any food at all, and owing to the stiffness of the tongue the saliva could neither be swallowed nor expelled from the mouth. Pulse 45, respirations 70, temperature 38.8° . The conjunctival mucous membrane was of a venous tinge. As it was now to be feared that the animal might lie down it was placed in slings. However, it was attacked with putrid broncho-pneumonia in consequence of the entrance of saliva into the air passages, and it died on the forenoon of the 30th November. The *post-mortem* examination, which was carried out in the Pathological Institute of the College, confirmed the diagnosis made in the clinique.

CASE IV.—A brown, heavy, cart gelding, fifteen years old, had been pricked in the frog of the off fore foot by a knitting needle; this had been removed by a veterinary surgeon on the 26th November, and according to the report the first symptoms had set in on the 30th November. The horse was brought to the clinique on the forenoon of the 1st December, and it was then manifest that the disease was far advanced. Respirations 18, pulse 38, temperature 38° . The whole four limbs were stiffened when the animal moved, the hind feet could scarcely be raised so high as to permit of the removal of the shoes, the tail was slightly elevated and carried towards the right. Marked trismus was present; the upper and lower incisors could scarcely be separated to the distance of 1 cm. There was a great accumulation of saliva in the mouth. On the 1st December, two hours after admission to the clinique, a curative dose of antitoxin in watery solution was injected into the veins. No abatement of the trismus occurred, but on the 2nd December the horse moved its legs very freely. It could also lie down and get up without assistance, but there was no diminution of the stiffness of the muscles of the head, and in spite of the daily irrigation of the mouth with water the consequences of the inability to swallow the saliva could not be prevented. The trismus did not in the least degree abate, and on the 4th December gangrene of the lung developed, as

was evidenced by the stinking odour of the expired air and of the saliva removed by irrigation. The horse died from broncho-pneumonia on the forenoon of the 5th December.

Having described the course of the four cases treated in the clinique with Behring's antitoxin, we confine ourselves here to the remark that this agent in the treatment of the horse does all that Geheimrath Behring has claimed for it.

To everyone who has treated a large number of cases of this disease in the horse it will be apparent that after the early administration of the antitoxin the further development of the disease is retarded, and that thereafter the tonic contractions of the skeletal muscles gradually abate. The horses recover within three weeks, whereas, as is well known, the course of the disease in non-fatal cases in the horse extends over from five to six weeks. It will also be evident that Case II., and also the horse first treated, would have died without the administration of antitoxin.

It will be seen, however, from Cases III. and IV., that when trismus is already strongly developed the administration of the antitoxin is no longer capable of averting the dangerous and invariably fatal complication of gangrenous pneumonia. It is therefore advisable, as Behring has pointed out, to employ the agent as soon as possible after the tetanus has been recognised.

SOME CLINICAL CANINE NOTES.

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ENLARGED PROSTATE GLAND TREATED BY CASTRATION.

CASE I.—7th August. The patient, a pampered toy black-and-tan terrier, said by the owner to be about four years old, was brought to the clinique suffering from strangury; the urine was very scanty in amount and only passed with difficulty. An unsuccessful attempt was made to pass the catheter; examination per rectum revealed the prostate gland to be about the size of a large marble and very hard; no pain was expressed on pressure. Castration was advised and performed under chloroform. Antiseptic treatment was followed out until the wounds had healed. On the 13th urination was free and regular, and the catheter could be passed without any difficulty; examination per rectum revealed the prostates to be decidedly less. On the 20th the dog appeared to be all right, and the prostates had resumed their normal size. Since then there has been no further trouble.

CASE II.—3rd December. Was a collie, about nine years old, brought to the clinique suffering from enlarged prostate. The symptoms presented were those of a peculiar gait of the hind legs, inability to walk more than about 10 yards without resting, difficulty in rising after sitting down, and pain when pressure was applied over the region of the loins and flank. This latter was probably due to over-distension of the bladder, as when urination was attempted a certain amount of difficulty was evinced at the commencement, this being followed by the passage of an abnormally large quantity. Examination per rectum