would certainly reduce the great annual loss to horse owners from this cause.

Finally, it appears that veterinary nosology is in an eminently unsatisfactory state. Nothing but confusion can be expected to reign as long as diseases regarded as distinct are spoken of as types or forms of influenza. Would it not be better, following the example of Dieckerhoff, to abolish the term influenza altogether? It originated in error, and it is at present employed in altogether different senses by different authors. And if new terms should be found necessary to distinguish distinct diseases hitherto grouped together under the designation influenza, care ought to be exercised in their selection. Nothing worse in its way can be imagined than the term epizootic fever, and catarrhal and bilious fever are but little better. And such vicious terms are not confined to equine diseases. Witness, for example, the term swine-fever, which is just as objectionable as it would be to speak of human fever, or dog or ox fever. The nosology of human diseases is unsatisfactory enough, but compared with veterinary systems of classification it is well nigh perfect.

THE CASTRATION OF CRYPTORCHIDS.¹

By J. OSTERMANN,

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IN my former sphere of operations in Ostfriesland, where the rearing of horses forms a principal branch of agriculture, I have had the opportunity to collect a great many observations regarding castration both of normal animals and of cryptorchids. The practice of this operation lies in great part in the hands of itinerant castrators, inasmuch as the veterinary practitioners during the spring months, at which time according to local custom castration must be carried out, are otherwise engaged. The castration of cryptorchids is also carried out by empirics. In view of the fact that these persons operate without antiseptics and yet obtain good results, one is led to the conviction that a penetration into the abdominal cavity, which in this operation is essentially necessary, is not so dangerous to life as is generally supposed.

In spite of that, hitherto only a few veterinary surgeons have risked an operation which appears so critical; the castration of cryptorchids in large numbers is practised only at the veterinary schools, and consequently the record of cases of castration of cryptorchids occurs only sparingly in our literature. In the latest edition of Hering's work on Operations, there is described the hereafter-mentioned methods of Stockfleth and Dégive, whereas in the previous edition the operation is deprecated.

Professor Stockfleth was certainly the first to describe a precise method of operating, based on an anatomical foundation. The Danish veterinary surgeons have practised this method of castration

¹ Translated from the *Berliner Thierärztliche Wochenschrift*, 6th June 1889.

for a long time. According to Nielsen,¹ the best method is as follows :—

The horse is cast with the Danish apparatus, and is placed with the side to be operated on uppermost. The inguinal region is very carefully cleansed with soap and a brush, and rinsed with lukewarm carbolic lotion. An incision of 10 cm. (about 4 inches) in length is then made in the skin immediately in front of the edge of the pubic bone, pretty near the thigh, but always a little removed from the scrotal region, at the place where the abdominal wall feels thinnest. With both fore-fingers the connective tissue, down to the abdominal wall, is then to be completely divided, and from the wound thus made the inguinal canal is to be examined. Should the testicle not be found, the muscular tissue of the abdominal wall at the seat of operation is to be pierced with the fore and middle fingers of the right hand, and at the same moment the peritoneum is to be ruptured by a sudden thrust with the finger points, so as not to detach it from the muscles. The wound canal ought to be as straight as possible. The testicle is now to be sought with both fingers. If it cannot be found in this way, the whole hand is to be introduced, the testicle drawn into the wound, and the spermatic cord placed in a disinfected clam without any caustic material. The skin wound is fastened by a deep button suture before and behind the clam. After twenty-four hours the clam is removed and the end of the spermatic cord set free. The latter must cicatrise in the wound in order to prevent a prolapse of bowel. Nielsen operates under chloroform narcosis, and with the observance of the strictest antiseptic precautions.

Professor Dégive proceeds in a similar way :² The skin incision is made on a transverse fold which is formed on the scrotal integument at the place where the testicle ought to be. The incision ought to be a finger's breadth from the raphe, and it ought to have a length of about 15 cm. (6 inches nearly). After the skin and dartos have been separated for a short distance from their connections, the operator introduces his hand into the pouch thus formed, and with it, by means of a rotatory movement, he bores a passage through the inguinal canal into the abdominal cavity. The testicle is then searched for, and pulled into the wound ; and the spermatic cord is severed by means of the ecraseur, and replaced in the wound. The wound is closed with suture, and treated with antiseptic lotion. After twenty-four to thirty-six hours the sutures are cut, but the threads are not removed.

In the summer of 1887 I had the opportunity to try the Danish method on a five-year-old animal. By rectal examination I was able to definitely ascertain the presence of the right testicle, which presented itself as a freely floating body in the abdomen. Three days after this examination the operation was undertaken by my colleague, Veterinary Surgeon Peters of Emden, and myself, the animal having previously fasted for twenty-four hours. The castration was pretty quickly accomplished, but I was assisted by the action of Mr Peters, who from the rectum pushed the testicle into the wound. The peritoneal fold which surrounds the testicle sprang from the lumbar region, and was so short that it was barely possible to draw the testicle so far out of the abdomen as was necessary for the application of the clam. Sub-

¹ *Deutsche Zeitschrift für Tiermedecin*, 1884, p. 363.

² Compare Schmidt on Castration of Cryptorchids, *Berl. Archiv.*, 1885, p. 77.

sequently the before-described method of Nielsen was strictly followed, save that the treatment was in so far varied that the wound during the first three days after the operation was continually irrigated with cold water. Within a few hours after the operation the animal exhibited signs of colicky pains. After twenty-four hours, judging by all appearances, a fatal result was to be apprehended; the pulse was frequent and the artery tense. Food was refused. On the day after the operation the clam was removed, the spermatic cord was so far replaced that its lower end corresponded with the lower edge of the wound, and the seat of operation was afterwards irrigated with cold water. Up till the sixth day after the operation the general condition remained equally bad. Morphia injections were repeatedly administered in order to relieve the animal of pain for some hours. With the seventh day the symptoms of pain abated, but under the animal's belly there showed itself a strong diffuse swelling of the subcutis, stretching from the sternum to the pubis. The further treatment of the patient consisted in washing the wound and swelling every half-hour with acetate of lead and alum lotion. Up till the tenth day after the operation the course was favourable, but on that date a prolapse of bowel suddenly took place through the distended wound. After a thorough disinfection this was replaced, without determining any dangerous symptom. But as a consequence of this the animal contracted an inguinal hernia, which rendered it altogether unfit for service as a carriage horse.

In numerous cases I have operated according to Dégive's method on one- and two-year-old foals in which one or both testicles lay in the inguinal canal, or were still in the abdomen while only the epididymis had passed through the internal abdominal ring. Although I always succeeded in finding the testicle without using the fingers to dilate the internal abdominal ring, and always operated under strict antiseptic precautions, the animals still showed some days after the operation such a marked swelling in the neighbourhood of the wound, combined with high fever and failure of strength, that an unfavourable prognosis had regularly to be given at the outset, and I came to the conviction that burrowing through the inguinal canal of the animal is less advantageous than the plain division of the abdominal musculature in the artificial way.

I may now sketch a method of operating which was practised by Mr Peters and myself, and which after numerous trials may be highly recommended. To my knowledge it has not yet been anywhere described.

The animal to be castrated (a unilateral cryptorchid), after the position of the testicle has been ascertained by rectal exploration, is cast on the side opposite to that on which the remaining testicle is placed. The animal is chloroformed, and the upper hind limb is freed from the hobble and pulled backwards by two persons, by means of a girth fastened around the leg. The skin in the region of the flank is freed of hairs by shaving, and then thoroughly cleansed by washing with lukewarm soap and water, and subsequent rinsing with sublimate lotion.

The horse having been covered with an oil-cloth having a hole the size of the two hands at the purified piece of skin, a longitudinal incision of about 10 cm. (4 inches) long is made in the previously

folded skin. This incision is made about a handbreadth under the external angle of the ilium, running downwards and forwards, parallel to the course of the fibres of the internal oblique muscle of the abdomen, and reaching only to the muscular tissue. The latter is separated by means of rotatory movement of the previously thoroughly disinfected hand, and the peritoneum is then ruptured by a short thrust. The hand once more disinfected is then carried through the wound into the abdominal cavity. In order to prevent the entrance of air into the cavity it is well to wrap a hand-towel soaked in sublimate lotion around the arm, and by the aid of an assistant to allow this to press upon the wound.

If the testicle, by the aid of an assistant, can be pressed outwards from the rectum towards the operation wound, it is easy to seize it in the abdomen; in the contrary case the vas deferens, which lies in the fold of Douglas on the upper wall of the bladder, is searched for with the finger, in order in this way to reach the testicle. The latter is drawn into the wound, the spermatic cord is placed in a wooden clam, and the testicle is separated by the actual cautery, care being taken that only a very slight scurf is formed. After thorough disinfection the stump is replaced in the abdomen. Up till this moment the upper hind limb is kept constantly stretched backwards; it is now freed, and again fastened on the hobble; and in consequence of the slackening of the external and internal oblique muscles, the wound made in these while in a tense condition almost completely closes of itself. The edges of the wound are now closed accurately with button suture, and the wound itself is smeared with iodoform collodion. I have not castrated an animal with bilateral cryptorchism, but I know of various cases in which by the employment of the flank incision both testicles were removed through the one wound, and in which recovery took place.

The further treatment consists in energetic cooling of the flank region, which I have best secured by constantly wetting the skin by means of an irrigator. This procedure is kept up for forty-eight hours, after which the sutures are removed, the wound from that onwards being carefully treated by washing with acetate of lead and alum lotion. After the course of eight days the wound is so far healed that the animal can be exercised without danger. Eventual cedematous swelling quickly disappears, but this in my experience never reaches the same extent as when the abdomen has been opened from below.

Inasmuch as I always operated in summer, my patients have always had green fodder; in every case easily digested food is to be recommended. Besides, I consider it useful to prepare the animals by a twenty-four hours' fast before the operation, and I might also advise that the rectal examination ought always to be made at least three days before the operation, as it would otherwise be very difficult to thoroughly disinfect the hand.

The advantages of this operation are:—

1. The animal is operated upon in the side position, whereas in the before-mentioned methods the back position is necessary.
2. The wound is not so much distorted by the pressure of the intestines as when it is made beneath the abdomen. Prolapse of the bowel is not to be apprehended.

3. The after treatment is much easier, since the flank region can be better treated by washing than the region of the scrotum.

The artificial perforation of the abdominal wall by the Danish method is dangerous, and it would, in my opinion, be best to altogether give it up. In the cases where the testicle or the epididymis has its position in the inguinal canal Dégive's method is to be practised ; but in all other cases the method which I have sketched might be recommended as the least dangerous.

By numerous examinations I have been able to prove that the assertion in books that the non-descended testicle lies in most cases either in the internal abdominal ring or in its neighbourhood is erroneous. It might much rather be asserted that in most cases the testicle is fastened by a peritoneal fold in the lumbar region.

TUBERCULAR MASTITIS IN THE COW.

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THE channel by which the udder becomes infected with tubercular disease is as yet a matter of speculation. In all the cases that I have had the opportunity to examine the lesion had already invaded a large part of the gland before the death of the animal. The microscopic examination of the gland in such cases, while enabling one to trace clearly enough the manner in which the disease extends when once it has obtained a foothold, throws no light on the starting-point of the lesion.

On theoretical grounds we may admit three possible channels by which the bacilli might gain access to the gland, viz. by the blood stream, by the lymph stream, or through the teat canal. As I shall presently show, the milk cistern, and even the teat canal itself, is not rarely the seat of a tubercular process, and this might be held to indicate direct infection from the exterior. But in general a comparison of the disease in the milk cistern with that in the higher parts of the udder shows clearly enough that the former has not been the initial lesion.

I am inclined to believe that in most, if not all, cases, the blood is the vehicle of infection. So far as I am aware there is not on record any case in which the udder lesion was the only evidence of tuberculosis in the body. But, at the same time, it must be admitted that the tubercular lesions elsewhere than in the gland may be of unimportant extent, and certainly the infection of the udder is not explainable as part of a general tuberculosis, using that term in the sense in which it is employed in human pathology. Instances of the sudden and simultaneously development of tubercles throughout the body (lung, liver, spleen, kidney, etc.) are very rare in cattle—much more rare than cases of mammary tuberculosis. And even although the udder were thus infected as the result of an abundant irruption of bacilli into the blood stream, the fact would not explain the ordinary udder lesion, for the progress of the disease in other organs would certainly entail the death of the animal long before the