

The hereditary character of the above conditions in the three animals appears undeniable. The dam seems to have transmitted to her offspring that pathological condition which has been described under the name of the arthritic diathesis, and which is characterised by the complexity of its symptoms. The relations between arthritis, cutaneous eczema, rheumatism in all its forms (affecting both the general muscular system and the muscle of the heart), and enteralgia are beyond dispute. The occurrence of arthritis and its hereditary transmission having been carefully studied in human medicine, in which observation is easier, it appears interesting to cite this observation, which well shows the varying character of the affections arising from the arthritic diathesis in the horse. The three foals showed all the following forms:—

Abandon: Herpes (eczema with cracks in the skin); enteralgia; muscular rheumatism.

Badin: Herpes; enteralgia; cardiac rheumatism.

Castor: Herpes and enteralgia.—(*Revue générale de Médecine Vétérinaire*, 1st February 1903, p. 138.)

THROMBOSIS OF THE ANTERIOR VENA CAVA IN A HORSE.

By Professor ALBRECHT.

On the 5th of June the writer was called in consultation to a carriage horse belonging to Prince Hohenzollern.

History.—The horse (a Mecklenburger), six years old, had shown no signs of disease during the two years he had been in his present owner's possession. The first symptoms were noticed on the 18th of April, and developed as follows: A slight painless swelling at first appeared on the right knee (a few days before a similar swelling had occurred on the left knee, but had again disappeared). The swelling extended upwards towards the right elbow; it remained painless and showed the appearance of oedema. The left knee was swollen. The fore-arm, arm, and left shoulder exhibited oedematous swelling, which extended over the chest region as far as the right scapulo-humeral joint. The swelling increased, extending in both limbs from the foot to the elbow, chest, and sub-sternal region. Finally the two jugular furrows were invaded.

On the 15th May the swelling slightly diminished, but movement was still difficult. The general state of health remained excellent. There was no fever. Nothing could be detected on auscultation or percussion except an increase in the zone of cardiac dullness. No venous pulse, urine normal. Venous stasis appeared in the glosso-facial vessels. The horse became dull and did not lie down. On the 3rd June the swellings were larger than ever, and extended under the abdomen. Appetite failed. On the 5th of June the consultation occurred.

State on Examination.—The animal was in fair condition and the coat brilliant. The swellings were as above described; they were so extensive about the region of the neck that the jugular veins could no longer be raised by compression. The head itself was not swollen, but the veins appeared prominent. The conjunctiva and pituitary mucous membranes were red; the pupil slightly dilated; temperature 38.4° C. The extremities were moderately warm, as were the oedematous patches. Pulse 42, slightly intermittent. The zone of cardiac dullness extended about an inch and a half backwards. The heart sounds were normal. Nothing could be detected on percussion and auscultation of the lungs. Rectal examination revealed nothing. The

digestive apparatus seemed normal. The urine was high coloured, turbid, holding crystals of carbonate of lime in suspension, mucilaginous, and of a strongly alkaline reaction. It deposited little sediment, and contained neither albumen nor colouring substances of a biliary or sanguineous nature. Blood drawn from the jugular appeared normal on microscopic examination. Movement caused the horse extreme pain.

These appearances, and particularly the swelling of the jugular veins and those of the head, suggested some diseased condition of the anterior vena cava, interfering with the return of venous blood. It seemed possible to go even further, and to localise the lesion behind the opening of the axillary veins into the vena cava.

There was nothing indicating disease of the heart (the hypertrophy which existed was not functional). There was no tricuspid insufficiency, no atony of the myocardium, and the pulse was strong. In addition, the normal condition of the heart and of its functions was confirmed by microscopic examination of the blood, which contradicted any idea of hydræmia, leukæmia, or pernicious anæmia. Similarly, microscopic examination and analysis of the urine disposed of the question of disease of the kidneys as a primary cause of the edema.

The stasis in the circulation being recognised, and the position of the lesion in the vein fixed, it was only possible to regard the case as one of thrombosis of the vessel. As to its nature, the absolutely normal function of the lung disposed of the idea of pathological changes in the bronchial glands, or of an extensive new growth in the mediastinum exerting pressure on the vena cava. Such a tumour developed in the neighbourhood of the vein could not have failed to exercise equal pressure on the trachea, lung, and vagus nerve, and have provoked other symptoms.

The animal, being regarded as beyond hope, was kept under observation for five days longer, during which time its condition became aggravated, and it was then slaughtered.

Autopsy.—Three pints of liquid escaped from the mediastinum. The vena cava an inch in front of the opening into the auricle was surrounded by a swelling the size of a man's fist and of fibrous appearance. Its interior was dotted over with little abscesses containing thickened pus. At this point the wall of the vein was greatly thickened. It contained a thrombus about $4\frac{1}{2}$ inches in length, circular in shape, and red in colour, with a central canal three-eighths of an inch in diameter, but with numerous projections into this canal. In consistence it was dense, firm, and slightly elastic. In front of the thrombus the vein was greatly dilated. The auricle showed several projections of the same character as the thrombus. The other three cardiac cavities and the valves were normal. The heart was slightly hypertrophied.

The formation of the thrombus could be explained in two ways: by compression resulting from the tumour, or by the direct action on the walls of the vein of the micro-organisms contained in the swelling. A bacteriological examination was not made. As to the origin of the lesion, Albrecht was inclined to refer it to strangles, although the horse had shown no symptoms of this disease for two years. The nature of the swelling and the changes in the venous walls, however, were quite in keeping with the view that the disease was of old standing.

The absence of venous pulse during the disease is easily explained by the fact that the tricuspid valves were healthy. The prolonged stasis of venous blood strongly charged with carbonic acid had no more serious effects on the patient than the increase in blood pressure in the aorta. The fact that the nervous centres continued to act normally is explained by their having gradually become accustomed to the new state of things. Thanks to this, the venous stasis produced neither excitation of the respiratory centres nor

acceleration of the breathing movements. The curious fact that the pulse was not increased in frequency in spite of the obstacle to the flow of blood is explained by the regulation of pressure due to the more extensive flow towards the posterior aorta. It is more difficult to explain the intermittency of the pulse, which appears to have been due to nervous atony. There is nothing surprising in the fact that no disturbance occurred in the circulation of the posterior vena cava, pressure in which was not in the least increased. On the contrary, the fact that the anterior vena cava was bringing less blood to the auricle resulted in an increase in circulation in the posterior vena cava. There ought to have been an increase of pressure in the thoracic canal, but not sufficient to produce disturbance. The horse did not show any enlargement of the hind limbs.—(*Zeits. f. Thiermed.*, December 1902.)

THE TREATMENT OF FOOT-AND-MOUTH DISEASE BY A PROTECTIVE SERUM.

By E. NOCARD.

Two years ago M. Jean Dupuy, then Minister of Agriculture, instructed Dr Roux and Professor Nocard to undertake a scientific study of the difficult problem of preventing foot-and-mouth disease. In this laborious investigation the two gentlemen named were assisted by two of their most brilliant pupils, MM. Valée and Carré. For two years they have pursued the subject, but unfortunately have made only modified progress.

The microbe of foot-and-mouth disease has up to the present evaded all attempts at isolation; although it is so abundant in the discharges that the serum of affected animals diluted with 10,000 parts of sterilised water is still capable of conveying the disease, these investigators have neither been able to see it nor to cultivate it outside the living body. That they have failed to identify it is not surprising, for it is so small that it passes through the pores of the densest porcelain filters. It may therefore possibly be beyond the limits of vision. This, however, would not be of great importance if it could be cultivated outside the body and caused to multiply in artificial cultures. Unfortunately, all attempts at culture have remained unfruitful, and this check is the more to be regretted, because when one is master of the specific agent, the microbe of a contagious disease, one has a much better chance of becoming master of the disease itself, of succeeding in attenuating the virulence of the microbe, and thus of transforming it into a vaccine. Even although one fails to produce a vaccine (which is the ideal of prophylaxis), the possibility of obtaining large quantities of virulent cultures makes it easy to prepare a really efficacious serum, either of a protective or of a curative nature. It would be superfluous to recall the remarkable results obtained by serum treatment in diphtheria, bubonic plague, cattle plague, swine erysipelas, and tetanus.

The investigators, therefore, have not attained the principal object of their researches—the discovery or culture of the microbe, which alone would render easy the preparation of a vaccine, or of an efficient serum in quantities sufficient for all requirements. Possibly they will never succeed. One of the first bacteriologists in Germany, Professor Löffler, has for the past seven years been seeking the same object, and up to the present has not found a solution. The efforts of the French investigators, however, have not been completely sterile. They, like Löffler and many others, found that the serum of animals which had recovered from a severe attack of foot-and-mouth disease possessed a certain action on the virus of that disease. Inoculated