

knee, but of course to a less extent (unless the step measures in depth the length of the leg when both are also flexed at a right angle), also takes place. The instrument figured in the annexed woodcut was made by Messrs. Arnold from a rough model I supplied them for the purpose. It is so contrived that when the hip is either flexed or extended by means of its flexor or extensor muscles, the knee, by means of the side levers (showed enlarged on the right of the figure), is also flexed or extended to a like degree. Hence, when the patient sits down, and consequently flexes his hip, the knee, by means of the levers, also becomes flexed to the same angle as the hip; and, again, in rising from the sitting posture, as the hip is straightened, so, by the same means, is the knee. As long as the hip is kept extended the joint at the knee is rendered fixed, and a rigid limb is thus provided for supporting the body. In walking, however, during the pendulum-like movement of the limb as it swings forward, while the opposite limb is on the ground, the knee should not entirely follow the movement of the hip. To allow for this a double stop-joint is further provided at the hip, permitting flexion and extension of the hip to take place to several degrees before the levers which act upon the knee are brought into action. At first it may be necessary, whilst the hip muscles are gaining power, to fix the knees completely by means of a screw nut. The instrument shown in the woodcut sufficiently explains itself, and any minute account of the mechanism seems hardly necessary. It was made for a little girl who was sent to me in the orthopædic department with complete paralysis of the extensors and flexors of the knee on both sides, and with more or less paralysis of the left arm. She had never been able to stand on her feet, but managed to get about by walking on her flexed knees. At the present time she can walk on her feet when aided by someone taking hold of her unparalysed hand. (July 23rd: Since this was written, she can now walk alone with only one knee fixed by the screw nut.)

Weymouth-street, W.

SOME FURTHER NOTES ON THE ETIOLOGY OF ULCERATIVE STOMATITIS OR CANCROUM ORIS.

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IN a previous communication I have described the occurrence of what appeared to me to be the same disease in the human subject, monkeys, and calves. The disease which I described previously affects the tongue and cheek, and secondarily the lungs, both in human subjects and in animals. A form of gangrenous pneumonia, apparently produced by similar micro-organisms, has also been observed by me in the lungs of five horses. Portions of the affected tissues inoculated in calves produced a disease resembling noma in all respects. The essential characters of the micro-organisms in all cases were similar. They consisted of long thread-like growths, the individual threads being made up of small bacilli varying in length from 0.004 mm. or less, to 0.008 mm. or more, and about 0.001 mm. in thickness. These organisms were found in great numbers at the line of extension of the necrotic patch. Cultivations have been made from five cases in the human being, in one case in a monkey, in two cases in young pigs, in numerous cases in calves, and in the lungs of horses. It was then demonstrated that the inoculated disease is characterised by appearances precisely similar to those seen in the original disease. I wish here simply to enumerate the lesions found in the heart at death in the human subject, and in animals inoculated from other animals of different species, suffering from ulcerative stomatitis or noma. The most serious conditions are those presented by rabbits after inoculation in the ear with the affected tissues from the young pig and calf. These animals die on the tenth or eleventh day after inoculation. The ear is found to be very much increased in size from the inflammatory process, and has been found to weigh fifty-one grammes when the healthy ear only weighed twelve. As in the two cases some differences were observed at the necropsy, I will give a short account of the condition of the pericardium and heart in each.

CASE 1. *Rabbit inoculated from the affected tissue of the pig.*—On slitting up the pericardium the heart was found to be enveloped by a thick, pale-coloured false membrane one-eighth of an inch in thickness, which on microscopical examination was discovered to be composed of long bacillar threads matted together. Under this membrane in the muscular substance of the heart were found yellow necrotic patches, the largest was seven-eighths of an inch in length by three-quarters of an inch in breadth, forming the apex of the heart. On section this necrosis was proved to involve the whole thickness of the left ventricular wall. The left coronary artery was distended, and gave the impression to the touch of a thick and hard piece of cord. The lungs and liver were similarly affected.

CASE 2. *Rabbit inoculated from the affected tissues of the calf.*—The pericardium contained little or no fluid, but a membrane covered the surface of the heart about one-twelfth of an inch in thickness, which on microscopical examination was proved to be formed of fibrin, while numerous cells were entangled in its meshes containing large numbers of granules, also very numerous ammonio-magnesian phosphate and oxalate crystals. On removal of the membrane from the surface of the heart, several masses of yellow necrotic tissue became visible, involving the muscular structure of the apex of the left ventricle; and others were found, smaller in extent, over the upper portion of the left ventricle anteriorly and posteriorly. On section, as in the previous case, the necrosis was found to involve the whole thickness of the muscular wall, and so extend into the interior of the left ventricle. After hardening these tissues in Müller's fluid, different portions were submitted to microscopical examination. It was then found that, as in the case of the mouth¹ so in the heart substance, the necrotic process was coextensive with the advance of a mass of bacilli.

On section of the muscular wall of the heart some small necrotic foci were observed, but there were many that could not be recognised macroscopically. These small foci, when examined with a power of 200 diameters, are found to be circular in shape. In the centre of the patch are a large number of thread-like organisms, which have rapidly increased, probably, from one or two deposited there in the first instance. Neither structure nor nuclei were to be observed in this area, owing to the nourishment having been abstracted at the expense of the cells as the bacilli gradually invaded the healthy tissue. Just outside the principal zone of bacilli there were stray or single ones between the muscle fibres, and in this situation were a few leucocytes dotted about, while still more externally was seen an extensive zone of leucocytes surrounding the patch, which was evidently due to the inflammatory process which had started there. In many places I found these organisms in varying numbers infiltrating the intermuscular tissue and surrounding the capillaries and lymphatics. In these cases they appear like long bundles or leashes of circular contour passing along the lumen of the vessel. I also found various collections of leucocytes in the intermuscular spaces, in groups varying in size according as they contained only a number which could be counted, or as they contained so many as to make it impossible to number them. I always found one or more elements of the threads, either well-formed bacilli or round dots, which were obviously spores. In the coronary arteries and their smaller branches supplying the cardiac structures I came across vessels of different calibre, the walls of which were more or less infiltrated by bacilli. In the larger the lumen of the vessel was occupied by a granular substance which did not stain, evidently the remains of a blood-clot. In the centre of this clot were seen knotted skeins of threads, which readily absorbed the aniline dye. There were also seen solitary bacilli, as well as groups of the specific bacilli, in different parts of the clot in immediate contact with the intima of the vessel. The intima and elastic laminae were not invaded by these organisms; but all the rest of the arterial coat was destroyed, and consequently all definite structure lost, its place being entirely occupied by myriads of wavy threads.

In the human heart, in consequence of the early death of the patient, such serious lesions are not met with. In the five necropsies I have made on children dying of noma I have only once found heart lesion, and that was characterised by the presence of petechial spots, about from ten to twelve in number, of a dark-red colour, dotted over the surface of

¹ THE LANCET, May, 1883; and Micro-organisms and Disease, by E. Klein M.D., F.R.S.

the heart immediately beneath the exocardium. On closer examination these spots were found to be slightly elevated above the surrounding tissue. Microscopically, these petechial elevations presented a small hæmorrhage raising up the exocardium, whilst the apposed portion of the muscular bundles of the heart was surrounded by a varying number of blood-corpuscles. On very careful examination I was able to verify the presence of organisms—always micrococci or diplococci,—which had gained entrance to the circulatory system from the grumous material always found in the cavity of the mouth &c. in such cases. In no instance was I able to discover the thread-like growth or bacillus *nomæ*.

Although I have not yet completed my investigations of cancrum oris in the human subject and the above-mentioned animals, the facts I have detailed justify me in publishing them as far as they go. We should hardly expect an animal to live with necrotic areas of tissue in the substance of the heart; that it can do so is a new and startling fact in the history of pathology. We should have been prepared to find the necrosed portion give way, and death ensuing rapidly.

This is the only organism yet described that appears to be purely and simply a tissue destroyer, invading and reproducing itself in its course over healthy areas, and leaving nothing in its wake but a mere skeleton of what previously existed. The tissue thus invaded is sucked dry as if were, the organisms in contact with the necrotic parts in like manner undergoing similar changes, their centrifugal advance depending upon fresh formation at their periphery. As in the case of a fly sucked by a spider, the fly is dead, but its outward visible form is present, and capable of easy recognition, though the protoplasmic elements entering into its composition have been deprived of their vitality by the process. The fly is present, but at the expense of its attributes. So in the case of the tissue changes observed in animals. We are able to distinguish muscle fibres, but *minus* their striæ, areolar tissue, fibrous tissue, and the several coats of vessels, though the outline of the special elements entering into their composition is wanting, the elastic lamina, however, remaining intact. All are present in a more or less perfect condition, yet sapped to their vitals by the devastating horde invading their territory. That the small veins and capillaries are seriously affected by the immediate presence of these organisms is evidenced by the inflammatory changes noted—changes induced to stem the tide and offer a barrier to impending invasion, but all in vain. The occurrence of ammonio-magnesian phosphate and oxalate crystals in the pericardial false membrane is unique, and possibly accounted for by the fact that these crystals are always found when pure cultivations of these organisms are made in fluid media.

I hope, in a future communication, to illustrate all the morbid conditions described above by drawings which I have had carefully prepared at intervals during the past five years, as well as to show cultivations illustrating the *materies morbi* in each animal.

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A CASE OF

FATAL HÆMORRHAGE ASSOCIATED WITH JAUNDICE IN A CHILD SEVEN DAYS OLD; WITH REMARKS ON THE PROBABLE CAUSES OF ICTERUS NEONATORUM AND HÆMOPHILIA IN THE NEWLY BORN.

BY G. STEEL SCOTT, M.B., C.M. GLAS.

IN the early part of last March I attended Mrs. C—, wife of a millowner near Halifax, during her second confinement. On making an examination I found that the breech presented. Labour was very rapid and easy, and no complication of any kind occurred, the mother making a rapid recovery. The infant, a male, seemed healthy, and was well developed. The first child, a female, is still living, and has never been under a doctor's care. However, on the evening of the fourth day I received an urgent message requesting me to see the newly-born child as soon as possible, as the stump of the cord had just separated, and the blood, which was oozing profusely from the umbilicus, could not be stopped by the nurse. I hastily put some lint, plaster, tincture of perchloride of iron, &c., into my pocket, and

accompanied the messenger on his way back. At first sight the child looked as if nothing ailed it, but on the nurse removing the clothes &c. in which it was enveloped, it was apparent that considerable hæmorrhage had taken place. On questioning the nurse, I could not discover that there had been any premonitory symptoms, excepting the fact that up till that morning the child was one of the quietest she had ever nursed. During the day it became restless and cried a good deal, but readily took milk from the spoon, and dark motions had been passed regularly from birth. The child so far presented no symptoms of jaundice beyond the usual icterus after birth. When it was completely stripped of clothing, it became evident that the umbilicus was not the only source of hæmorrhage. A large, dark, roundish, slightly elevated ecchymosis, about two inches in diameter covered the prominence of each shoulder. They seemed quite tense to the touch, as if the effusion of blood into the subcutaneous tissue had been considerable. Smaller patches appeared over each of the spinous processes and the ilium, while broad stripes of discolouration were spread over the ribs as if the simple pressure of the binder or nurse's fingers had been quite sufficient to cause rupture of the brittle capillaries. I applied some lint soaked in the perchloride of iron to the umbilicus, which of course was somewhat open, strapping it firmly over with adhesive plaster, and at the same time ordered the child to be placed in a cool room and the bony prominences and ecchymoses to be protected by pads of wool. On the following day the infant seemed considerably worse; it looked more shrunken and pinched, and was decidedly jaundiced. The yellowness of the conjunctivæ was well marked, though not severe. During the night the child passed a dark motion; the dark colour might have been due to internal hæmorrhage or meconium, or the very small but frequently repeated doses of the perchloride of iron tincture which I had ordered to be given during the night. The loss of blood from the umbilicus had ceased for a while, but at the time of my visit (about 10 A.M.) it was oozing freely. I removed all the dressings, dried blood, &c., and to the bleeding floor of the umbilicus I applied the tip of a piece of caustic. This application had the effect of checking the flow for a few hours, but it came on again, as I learned on the following day. Then the infant looked very pinched and shrivelled indeed. The jaundice was more intense than on the previous day, and a very small quantity of urine passed in the morning had stained the linen. The child seemed rapidly dying from sheer exhaustion, and the feeble wail it gave forth from time to time plainly indicated that the end was not far distant. On the following morning death took place.

I consider this case interesting, not only on account of the rarity of the disease, but also, after the most careful inquiries, because of the absence of all the usual recognised causes. Neither of the grandparents had ever heard of any of their relatives being affected with a similar disease. Both parents are healthy, stout, plethoric persons, and their first child has always enjoyed excellent health. There is no history of syphilis or previous miscarriage; careful examination of the husband verifies this fact. His father, however, has suffered for many years from an intractable form of skin disease, for which he has consulted many eminent specialists, living and dead, among them Erasmus Wilson, who called it chronic eczema. This is the only suspicious point in the family history. The infant did not suffer at any time during its short existence from any affection of the umbilicus of an inflammatory nature, though cases of such have been described, associated with phlebitis, pyæmia, peritonitis, &c. Besides, from the fact that the child passed abundance of meconium, even during labour (being a breech presentation), I may safely conclude that the common bile duct was intact; though cases of fatal jaundice have been reported to have occurred in children in whom a congenital defect of this structure has been discovered, arising probably from syphilitic perihepatitis (Dr. Finlayson). Seeing there is no discoverable external cause for the disease, our attention is naturally turned towards the child itself. Such cases are said to arise *de novo*; but as this explanation throws no light on the causes &c. of the affection, we are still confronted with the query—What is the pathology of hæmophilia of newly-born infants arising *de novo*? So far as I am aware, this has never been satisfactorily described; and, in consideration of the above facts, I venture to advance a theory in the following very brief remarks which will perhaps explain the nature of the affection, and a closely allied though harmless and evanescent one—icterus neonatorum.