Son and Sons, Aldersgate Street, who have made the apparatus) for supervising many trials and experiments which have been made in carrying out my ideas.

A, B, C, funnel, with lid, neck, and diaphragm. D, E, the tube shortened in the diagram, the central portion covered with felt. R, one of the rubber corks. F, the flask. G, the cap to fit over the neck of the flask when not in use.

NOTE.

¹ Glass or flexible tubes to contain metal instruments may be substituted, but to use the former some modification of the connections is necessary.

A CASE OF ALMOST UNIVERSAL ANKYLOSIS.

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FROM the time when the patient came more closely under my observation, about nine years ago, until his death in January, 1900, the condition of his joints underwent but little change. He had had whooping-cough, measles, and scarlatina in childhood, and also, it would appear, typhus at the age of 10 or 11 years. Otherwise he had enjoyed very good health in his earlier days. He was an iron turner by occupation when the articular affection set in at the age of 18. He would not wear flannels, and often got wet when going to and from his work. The first symptom was extreme pain in the left hip, but for a time this did not keep him from his work. When he rose in the morning he would have the part rubbed, and after walking about in his room for a little he felt able to go out for the day. From the first, severe shooting pains would run down the left leg from the affected joint. After a couple of years he had to give up work (at the age of 20) because the pain had come to involve almost all the joints of the lower limbs (including the right hip), as well as the back, and very specially the back of the neck. Speaking generally, the disease in each joint began with pain, which was soon followed by swelling and ultimately by fixation. The pain was greatest in the case of the knees. The hip-joints, however, were not swollen, and there was no considerable pain in the wrists or elbows. For about eighteen months after stopping work he was able, with assistance, to move about in the house, but from the age of 22 till his death at 46 he was completely confined to bed. Loss of flesh was noticed after he took to bed. For the first year or two thereafter, and before his legs were permanently drawn up, these limbs jerked terribly; the "sinews started suddenly," he said; so much so that he once fell out of bed. This starting was apt to be worst just as he was falling asleep, and greatly aggravated the pain in the joints that were affected at the time. He found most ease when the

legs were drawn up, but the limbs did not of themselves tend to be drawn up towards the abdomen. In the early stages of his illness, while the disease was active, patient sweated profusely, though not constantly, but he had no pyrexia at that time.

Thus, after a time, the articular disease became almost universal. As a rule, a joint ceased to be painful only after its fixation was complete. The pain was aggravated by the slightest movement, but friction of the overlying surface with oil was tolerated, and perhaps gave some relief. On one occasion in the course of the disease the right knee (the next joint to be affected after the left hip) was, it is said, dislocated by a movement of the body. Agonising pain ensued for several days. His doctor reduced the dislocation and put up the joint in a stiff bandage, under which circumstances ankylosis took place. The lower limbs became fixed years before the upper limbs. The right arm was the last limb to be disabled. Till this happened—about sixteen years before he died—he could feed himself, and at that time he could still open his mouth for about half an inch. After he became a prisoner in bed, he noticed that his mouth would not open so wide as formerly. After he lost the power of feeding himself, through the disease affecting the right upper limb, the jaws became quite locked. But by this time a gap had already become available for feeding purposes through the spontaneous falling out (or breaking at their necks) of two teeth on the left side, one above and the other below, at corresponding places. At one time, patient suffered a good deal from toothache, but not more, he thought, than other people. After the jaw became fixed, however, he had little or no such pain. Other teeth gave way, but his mother (his devoted nurse, who still survives him) continued to supply him with the solid part of his diet through the aperture just described. Though toothache ceased to trouble him, he once had an abscess in the roof of his mouth, which caused him much pain. Shortly after this evacuated itself, the right eye became the seat of intermittent but severe pain with redness, followed by dimness, and ultimately loss of vision, and shrinking of the globe. Dr. George Hunter, who saw him at that time, informs me that the condition was an acute iridocyclitis which rapidly went on to atrophy of the globe, with subsequent ossification of the choroid. In the autumn of 1891 (at the age of 37) he had less acute pain in the left eye, which was blind for a day and a-half but afterwards regained its normal condition. In July, 1892, he had severe pain in the left eye, with photophobia and lachrymation, for two hours only. In May, 1897, he had pain for two days over the right eyebrow, with tenderness of the eyeball—a slight reminder of what he had suffered in those parts long before.

When a detailed examination of the joints was made some years ago, there was still considerable mobility (including some voluntary movement) at the right shoulder. The joints at the right elbow were quite fixed. The right wrist was almost if not absolutely rigid. The right middle finger was rigid at all its joints; but the metacarpo-phalangeal joints of the four remaining digits of the right hand were free; and, indeed, patient was able to hold a piece of stick between the thumb and forefinger. The nails were exceedingly long and thick, and one or two of them were twisted. Patient would not allow them to be cut, but pieces would break off spontaneously. Every joint of the left upper limb was completely ankylosed. The lower limbs also were quite rigid. Patient lay on his back with the knees drawn up. The head was absolutely fixed. The fixity of the vertebral column was illustrated at one time in a curious way. In summer, 1898, the skin at the back of the head felt sore, and the pillow was therefore withdrawn for a time. When the latter was replaced, the head did not touch it, and patient considered that a month elapsed before the two came in contact. He fed and slept quite comfortably in that unusual attitude. Breathing was chiefly abdominal, but the lower part of the chest wall moved in respiration. Sensation was unaffected. There was no ataxy in the early stages. With the exception of retention of urine, which troubled him shortly before his death, there was no disorder of micturition. Many years ago he had occasional slight attacks of diarrhoea, but he never lost control of the bowel. At a later period, the bowels were moved once a week without difficulty by colocynth, which, given at night in pill, induced a motion about six hours afterwards. The skin re-

maintained sound. Patient generally slept about six hours out of the twenty-four, but he wakened two or three times an hour. Intelligence was perfectly preserved, and he was ordinarily quite cheerful, and took a remarkably shrewd and eager interest in external affairs. His hearing was good. He could move his tongue freely, and his speech was like that of any healthy person speaking with closed teeth. A well-marked systolic murmur was audible at the apex and base of the heart, and along the sternum. Otherwise, under ordinary circumstances, nothing noteworthy was detected in the front of the chest. There was nothing of importance, and in particular, no rheumatism, in the family history.

The patient suffered occasionally from a feverish cold which, though it would have been trifling to an ordinary individual, was a formidable thing to him. The power of coughing and expectorating was extremely limited, and the bronchial secretion was apt to cause great distress before it could be coughed up. His last illness set in on January 1st, 1900, with pain in the left side and cough. Pleural friction and bronchial rales were subsequently heard. There was retention of urine for some days in this attack. Death took place on January 6th, apparently through accumulation of bronchial secretion. Permission was refused even for an external examination of the body after death.

As the case came under my observation only after the active disease had died out, and as there was no necropsy, it would not be well for me to dogmatise too much as to the pathology of the affection. It appears, however, to correspond to the subacute type of the very rare disease described by Dr. Joseph Griffiths in 1897 as "universal bony ankylosis or arthritis ossificans." Dr. Griffiths was able to collect twenty cases.¹ Cases of this kind correspond to what are popularly known as "ossified" men.²

REFERENCES.

- ¹ *Journal of Pathology and Bacteriology*, 1897, iv, 468-483. ² Gould and Pyle, *Anomalies and Curiosities of Medicine*, 787-8.

STRANGULATION OF MECKEL'S DIVERTICULUM.

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As a corollary to the Notes on the Anatomy and Surgery of Meckel's Diverticulum, by Mr. George A. Clarkson, in the *BRITISH MEDICAL JOURNAL* of March 23rd, the following notes of a case of intestinal obstruction due to strangulation of this diverticulum may be of surgical as well as of pathological interest.

The patient was an old and very feeble man of over 70, suffering from senile dementia, who had long been known to have a right-sided oblique inguinal hernia which was always reducible. When the hernia was returned to the abdominal cavity there still remained, in the interval between the sac and the testicle on that side, a cystic swelling, which, from its close connection with the cord, was diagnosed as a hydrocele of the cord. There had never been any former symptoms of strangulation, and there was no appearance of swelling at any of the other hernial regions. He was always inclined to be constipated. On the occasion now referred to he had not had a motion for thirty-six hours. Castor oil was given but without result within twelve hours. Owing to his mental state he did not give any other marked indication of abdominal obstruction. On the second day, however, he vomited once or twice, and the hernial regions were examined. The right inguinal region was as usual, and there was no indication here of strangulation. Over the left femoral region a slight fulness was noticed, but no subjective symptoms were elicited. He had enemata, with slight effect, on the evening of the second day. The temperature was 100° F., and the pulse, which was always bad, began to intermit. He vomited again once or twice in the early part of the night, and collapsed suddenly in the early morning. When seen then he was still not wholly unconscious, and he moaned when the abdomen was palpated. It was noticed also that the left thigh was flexed, and there was a more distinct swelling, rather tense by this time, over the left femoral area. The diagnosis came to was strangulated left femoral hernia with peritonitis. The question of operation was discussed in consultation, but decided against on account of the patient's general condition. He died late on the evening of the third day.

Necropsy.—Left femoral region: On dissecting from without the crural canal was found occupied by an indurated gland, attached at its lower extremity to the superficial tissues of the leg by lymphatics and fibrous tissue. Above, it was adherent to what appeared to be the sac of a hernia, evidently containing bowel. This was constricted, not very tightly, just at Poupart's ligament. On opening into the sac just below Poupart's ligament, it was found to be adherent to the gut at its lower part; also the gut could not be pulled further down, though the constriction at the neck of the sac was relieved. The piece of gut did not look like a knuckle. In the right inguinal region a dissection was made from the internal ring to the lower part of the scrotum, exposing the whole length of the cord—lying posteriorly—and the testicle, which appeared normal. There was a swelling at the lower part of the cord, separate from the testicle, evidently

cystic, which on puncture yielded to crichms of a translucent slightly blood-stained fluid, and collapsed. The upper part of the canal contained what was obviously a hernial sac, but no gut. The abdomen was then opened by a median incision, a second transverse one being made from the right anterior superior spine to join it. There was found to be considerable recent adhesive peritonitis, the omentum being matted and adherent to the viscera and to the parietal peritoneum. On examining the right internal ring from this aspect a well-marked hernial sac was found

a, Lymphatics and superficial fascia of thigh; b, indurated gland; c, the blind end of the diverticulum which was adherent to the gland; d, deeply congested part marked off by the twisting of the diverticulum in two places; e, the origin of the diverticulum from the ileum, which is seen with part of its mesentery preserved.

in the upper part of the inguinal canal, measuring about 3 inches in depth. It contained no gut, and the internal ring was abnormally large. The small intestine was considerably distended, and congested in its lower part. On tracing the piece of bowel from the left crural canal upwards, it was found to join the ileum at right angles, being attached fully 2½ feet from the ileo-caecal valve, and arising from the lower and anterior aspect of the intestinal tube. In circumference it was smaller than the ileum, and at its blind end, adherent to the gland in the canal, no trace of anything like a fibrous cord could be found. (See figure.) The whole surface of the diverticulum was exactly like that of the bowel, altered by the fact of its being in a state of strangulation. It measured about 4½ ins. long. The sac of parietal peritoneum, which had been pushed into the canal in front of the diverticulum, was adherent to the sides of the canal and to the gland situated in it. It was also adherent to the diverticulum itself, but could be fairly easily separated. There was a distinctly constricted ring, evidently just on the point of perforation, where the diverticulum was gripped by Gimbernat's ligament. Then came an intensely congested portion, about 2 ins. long, marked off above by a constriction where the diverticulum was twisted one and a-half time on its longitudinal axis, and below by a slighter twisting. The part between the twists was quite black, but still glistening. The proximal end of the diverticulum was congested in a less degree. There was fluid in the pouch of Douglas.

Apart from the diagnostic difficulties of the condition, and the fact that it would have been impossible to complete the operation for relief of the strangulation, or even to have been sure of the pathological anatomy without opening the abdomen, the following points are interesting:

1. That this foetal relic should have persisted in such considerable proportions. Its point of origin from the intestine was within the average distance from the ileo-caecal valve, but the diverticulum was 1½ inch longer than the usual limit