Infirmery June 26th, 1902. Torticollis dealt with, and at same time brachial plexus exposed. Cicatricial mass at junction of fifth and sixth cervical nerves. Mass excised and suture of fifth and sixth nerves to the three distal ends. On November 13th (five months after operation) distinctly improved contractions in deltoid by faradic stimulation. Faradic irritability also present distinctly in biceps. No improvement in movements.

CASE III.—M. T., female, born February, 1902, fifth child. Transverse presentation, version. Arms slipped above head, and in bringing them down, left arm fractured at middle of humerus. Arm placed in splints on account of fracture. After splints removed arm hung useless by side. Defect attributed to the fracture involving nerves in the arm. Sent to me in June. Typical Duchenne's paralysis; extreme inward rotation, no abduction, no flexion of forearm, no supination, no loss of cutaneous sensation. Involvement of nerves at seat of fracture therefore excluded. Operation delayed till child six months old, by which time there was still no sign of faradic irritability in the affected muscles. Operation in Western Infirmary on August 14th. Junction of fifth and sixth cervical nerves found cicatricial and excised together with affected portions of the nerves centrally and peripherally to the junction. Wound healed in fourteen days. Examined November 10th (twelve and a-half weeks after operation). Arm no longer rotated inwards, but no apparent improvement in the voluntary movements. Electrical reactions showed distinct faradic irritability in deltoid and biceps. Fig. 3 (p. 300) shows the child previous to operation.

The degree of recovery which has taken place in the first case is so nearly perfect in the nine months which have elapsed since the operation was performed that complete restoration may be anticipated. The commencing restoration of movements was first noticed about twelve weeks after the operation. In the third case the recovery cannot be expected to commence so soon as in the first case, on account of the longer interval which was allowed to elapse between the birth of the child and the performance of the operation. Yet already—at twelve and a-half weeks from the date of the operation—signs of improvement are exhibited in the development of the faradic responses in the affected muscles, and in the disappearance of the very marked inward rotation of the arm, although so far no improvement is exhibited in the voluntary movements. This case, therefore, will probably also be successful.

The second case belongs to a different category, as the operation there was performed so long after the injury—namely, fourteen years. The operation was undertaken in this case on the ground that there was evidence from the electrical examination that the affected muscles were not totally destroyed, as good contractions were obtained by stimulation with the galvanic current, and therefore it was decided to restore the affected nerves by operation. Improvement in the electrical reactions is now, at five months from the date of operation, undoubted, but whether any appreciable voluntary control will be required is, I admit, doubtful. At best this case can only be expected to make slow progress, on account of the profound alteration in the muscles caused by the long interference with their nutrition. Judging, however, from the recovery which has taken place in the first case, and the improvement exhibited in the electrical reactions in the third case in so short a period, operative intervention has certainly been fully justified; and in consideration of the hitherto unsatisfactory prognosis of these cases and of the safety of modern surgical procedure, I think that operation is the right course to follow in all cases which do not very early show spontaneous improvement.

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SPINAL HYDATID CYSTS CAUSING SEVERE "COMPRESSION MYELITIS."

OPERATION, WITH SUCCESSFUL RESULTS.

BY

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"COMPRESSION MYELITIS" due to spinal hydatid cysts is an extremely rare affection; but, if recognized early, it is a disease particularly suitable for surgical treatment. A case of this disease has been under our care at the Ancoats Hospital, Manchester, and, as two and a-half years have elapsed since the operation was performed, we are now in a position to judge fairly of the permanent results. The following is the report of the case:

"Compression Myelitis" in the Dorsal Region: Complete Paralysis of Both Legs: Anaesthesia of the Legs and Lower Half of the Trunk: Complete Paralysis of Bladder and Rectum.—Removal of Fifteen Spinal Hydatid Cysts (Extradural): Gradual Improvement: Complete Recovery of Sensation and of Control of Bladder and Rectum, marked Recovery of Motor Power in Legs: Two and a-half Years after the Operation Legs Spastic, but Patient able to Walk Alone with the Aid of One Stick.

Sarah A. M., aged 27, was admitted as a medical in-patient at the Ancoats Hospital, June 29th, 1900, on account of paralysis of both legs.

Previous History.—About three or four years previous to admission a swelling had developed on the back, just to the inner side of the lower angle of the left scapula. This was removed by Dr. Tytler, and found to be a hydatid cyst. She remained quite well until May, 1900. She then began to suffer from severe pain in the back (mid-dorsal region), and in the region of the base of the right lung. The pain continued more or less for two or three weeks; it then diminished, and there has only been occasional pain since. There had been no girdle sensation. Two weeks before admission she first noticed weakness of the legs when coming home from her work. The weakness gradually increased, and at the end of two days she was unable to continue her work on account of difficulty in walking. By the end of one week she was quite unable to walk, and the legs remained paralysed. There had been no pain in the legs. There had been loss of control over the rectum for four days, and difficulty in micturition for two days; the latter symptom had gradually increased.

State on Examination.—On July 1st, the day after admission to the hospital, the condition was as follows: The patient was fairly well nourished, and the general appearance was healthy. The temperature was normal. Both legs were completely paralysed. There was no wasting and no rigidity of the legs. The knee-jerks were present and slightly increased. There was no ankle clonus. The plantar reflexes were present, and of the "extensor" type. The abdominal and epigastric reflexes could not be obtained. The movements of the chest appeared normal. The bladder was distended. The urine could not be passed voluntarily, and had to be drawn away with a catheter. There was incontinence of faeces. The touch with the head of a pin was not felt on the legs and abdomen and lower part of the chest up to the level of the fifth rib. In the fourth intercostal space on each side the touch with a pin's head was felt distinctly; but in the fifth space on each side it was not recognized. Over this anaesthetic region of the legs and abdomen a light touch with the finger was not felt, but a firm touch was just recognized. Below the fifth rib (on legs and trunk) a pin prick was felt if deep, but the sensation was much less distinct than on the body above the level mentioned. Also on the anaesthetic part of the trunk and on the legs the patient was unable to distinguish between heat and cold. Above the fifth rib, on each side, sensations of heat, cold, and pain were recognized normally. The arms and cranial nerves were not affected. No signs of disease of the heart, lungs, liver, or abdominal organs could be detected. There was no spinal curvature, no localized spinal pain or tenderness on percussion. Just to the inner side of the lower angle of the left scapula was a small scar at the region where the hydatid cyst had been removed three or four years previously. In the dorsal region, just to the left of the third and fourth vertebral spines, was a small round swelling about the size of a half-penny. This could be moved slightly under the skin and felt like a sebaceous cyst. On July 7th the swelling just mentioned was punctured, and a small amount of clear colourless fluid withdrawn. On microscopical examination the fluid contained scolices and hydatid hooklets. The urine was alkaline; specific gravity, 1015; no sugar; no albumen; deposit of triple and amorphous phosphates. July 11th. Urine ammoniacal: it contained a few pus cells and a deposit of phosphates. July 12th. Anaesthesia more marked. Below the fifth rib, sensation lost to tactile and painful impressions, to temperature, and to the faradic current. Above the fifth rib, on each side all the forms of sensation just mentioned were preserved.

Diagnosis.—From the history of the development of the symptoms—the localized pain in the back, followed by loss of power in the legs which gradually increased until there was complete paraplegia, with anaesthesia, and bladder and rectal symptoms—it appeared probable that the case was one of "compression myelitis." From the presence of the small subcutaneous hydatid cyst, which was found to contain clear colourless fluid and scolices, and which was situated on the back just to the left of the third and fourth dorsal vertebral spines, it appeared probable that there was another hydatid cyst within the vertebral canal which was causing the compression myelitis. The upper limit of the anaesthesia also indicated a lesion at this part—at the fifth spinal segment and at the level of the third dorsal spinous process. Operative treatment was strongly recommended. After considerable hesitation the patient consented and the operation was performed by Dr. Tytler on July 14th, 1900.

Operation.—Chloroform was administered, and the patient was placed prone on the table. An incision was made from the seventh cervical spine along the spinous processes of the vertebrae, to about an inch below the upper level of the anaesthesia of the trunk. The skin was reflected to either side, and then the fasciae and muscles filling the grooves. The spinous processes were next nipped off with a pair of bone forceps. Then an attempt was made to divide the laminae with a Hey's saw, but the ligaments and soft tissues so clogged the teeth of the saw that it was laid aside. A $\frac{1}{2}$ -in. trephine was then applied to one of the laminae, and a piece removed. Then with a gouge forceps the vertebral canal was easily unroofed for about 2 in. Fifteen hydatid cysts were found outside the dura mater, and situated at the posterior aspect. These cysts were easily scraped out. The dura mater was not divided. The largest cyst was about the size of a gooseberry; two others were about half that size, and the rest were about the size of peas. The muscle flaps were then replaced

and stitched together; a loop of catgut was inserted at the lower end to prevent the accumulation of oozing. Then the skin was sutured, and a small gauze drain inserted at the top of the wound. The wound healed satisfactorily, the only incident being the appearance of a dampness on the bed sheet about the third day, which gradually extended down to the level of the loins. It was colourless, there were no constitutional symptoms, and, being aseptic, the dressing was not interfered with; only the sheet was changed. It never gave any trouble afterwards.

After-progress.—July 21st. The temperature has remained normal since the operation. General condition good. Urine no longer ammoniacal. Urotropin prescribed. Patient is able to flex each thigh slightly; she could not do so before the operation. The prick of a pin is felt on each leg as a tactile sensation, but is not painful. The touch of a finger is felt on the right leg but not on the left. July 23rd. Knee-jerks present, no ankle clonus. Patient has still no control over the urine. July 26th. Urine drawn off by catheter three times a day and bladder washed out with boric acid lotion. Urotropin given internally. She can feel the touch of a finger on the right leg but not on the left. The head of a pin is not felt on either leg. August 25th. Operation wound quite healed. She can flex at the hip and knee on each side, but cannot move the feet or toes. September 3rd. The catheter is still used; but the urine is occasionally passed spontaneously. She has now a slight sensation at the anus when faeces are passed. September 20th. Considerable rigidity of the legs has developed, and there is a great tendency for them to be flexed at the hips and knees. October 15th. Patient can now dorsiflex feet and extend the toes. There is great rigidity of the legs to passive movements. January 20th, 1901. Catheter passed for the last time. January 25th. Urine and faeces passed normally. Urine only contains a few pus cells. Legs very rigid. She can feebly flex and extend at all of the joints of the leg, but she is quite unable to stand. The knee-jerks are increased; ankle clonus is present on both sides; the plantar reflexes are present, and of the extensor type. The abdominal and epigastric reflexes are absent. The sensation, which has gradually improved since the operation, is now practically normal. The touch with the head of a pin, the prick of a pin, the sensations of heat and cold are felt in the normal manner all over both legs, and all over the abdomen and chest. The patient was discharged from the hospital on January 25th, 1901. She remained at home until the end of the year, when she was again admitted to the hospital. On January 7th, 1902, the patient is able to stand on the toes when supported with both hands on a table or chair back: but she is not able to walk alone. The movements of the right leg are feebler than those of the left. She cannot get the heels to the ground when standing supported. The right leg is very rigid; the left slightly rigid; both knee-jerks are increased; there is ankle clonus on the right side, but not on the left. Sensation normal. The patient left the hospital in a few weeks, and remained at home until June, 1902. June 26th, 1902. Patient can walk alone with the assistance of a walking stick in each hand. She can perform all the coarse movements of the legs, but the legs are still spastic, especially the right. The movements are much better than when she was in the hospital last. In July, 1902, a small cyst, about 1 in. in diameter, was found at the upper end of the operation scar where the gauze drain had been inserted. The cyst contained clear fluid. To remove this cyst the skin was punctured at about an inch distance, and the cyst wall ruptured subcutaneously. The fluid removed was clear and water-like. The cyst was so opened to allow of interstitial drainage afterwards, a method considered by one of us (P. T.) to be safer than the excision usually recommended in meningocoele. On December 2nd, 1902, the patient could walk alone with the aid of one stick. She was able to walk about the ward and to walk for a short distance in the street with the aid of one stick. She could perform all the coarse movements of the legs. There was, however, considerable rigidity of the legs, with increase of the reflexes. But sensation was normal. There was no affection of the bladder or rectum, and the patient felt quite well.

Owing to the spastic condition of the legs the recovery cannot be regarded as quite complete; but when we consider that before the operation there was total paralysis of both legs, paralysis of the bladder and rectum, and anaesthesia of the legs and lower part of the trunk, the results must be regarded as very satisfactory.

With reference to surgical treatment, the pathological anatomy of spinal hydatid cysts has revealed two points of great importance concerning their situation: (1) That the cysts causing the "compression myelitis" are usually external to the spinal dura mater (20 out of 24 cases, Colman¹); (2) that in the majority of cases the cysts are on the posterior surface of the spinal dura mater (Maguire²). In the majority of cases, therefore, the cysts are situated on the surface of the dura (posterior) which is most easily exposed surgically; also the cysts, being usually extradural, can be removed without the dura mater being opened. Further, according to Schmaus and Sacki and other pathologists, the cause of the paralysis at first is localised oedema of the cord; at a later period degeneration of nerve elements and softening occur. Hence by early removal of the cysts there are good prospects of recovery from the "myelitic" symptoms. In 10 out of 25 cases analysed by Colman, the dorsal region of the cord was the seat of the "compression myelitis" caused by the cysts.

In many of the cases recorded the cysts have first developed in the subpleural or subperitoneal connective tissue, or in the muscles of the back (as in the case here recorded). After-

wards they have extended through the intervertebral foramina into the vertebral canal, and then have spread in the longitudinal direction in the adipose tissue external to the spinal dura mater.

In most of the cases recorded symptoms of compression of spinal nerve roots—radiating pains—have occurred first, and later paraplegia, anaesthesia, and bladder, and rectal symptoms have developed. The onset of the paraplegia has usually been gradual.

As regards diagnosis, the symptoms just mentioned may be attributed to spinal hydatid cysts when examination reveals the presence of hydatid cysts in some other part of the body, and no other cause of "compression myelitis" can be detected. In some cases (as in that here recorded) a small cyst has been felt in the back close to the vertebral spines, and when this has been punctured the fluid has had the characters of hydatid fluid, and has contained scolices or hooklets.

The only treatment of service is removal of the hydatid cysts. But usually when the operation has been performed the compression has been of long standing, the cord has never recovered its functions, and the case has terminated fatally. By early recognition and operation many cases could be saved.

We have found references to four successful operations for spinal hydatid in medical literature, and probably a few others are on record. Putnam and Warren quote a case recorded by Lloyd,³ and another reported by Szekeres.⁴ In both the cysts were extradural. The results of operation are stated to be "recovery," but we have not been able to obtain the original articles. Hahn⁵ has recently mentioned a case in which recovery followed his operative treatment. Sir William Gowers⁶ mentions a case in which Sir Victor Horsley removed a number of hydatid cysts compressing the cord, "but the damage was too great to allow the recovery of the extensive atrophic paralysis produced in the right thigh and hip muscles."

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CASE OF HYDATID OF THE PLEURA.

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Medical Notes by Dr. W. B. RANSOM.

History.—Miss T., aged 43, consulted me first in September, 1901. She had been out of health for two years, her illness having begun with symptoms that suggested gastric ulcer to her doctor. Thus, she had had severe and sudden attacks of pain in the epigastric region, sometimes independently of food and not associated with vomiting or jaundice. She had been kept on milk diet for three months, and ultimately the gastric symptoms subsided. In January, 1901, however, she felt new pains in the chest between the left breast and clavicle. In March she consulted two eminent medical men in the North of England, who appear to have suspected a new growth of the lung. There had been some cough during the whole of the year, and a considerable quantity of phlegm since June, but no haemoptysis. She had lost a good deal of flesh in the earlier part of the year, but had gained 6 lb. between April and September.

State on Examination.—The chest was found to be normal except for an area of absolute dullness at the left apex in front, extending from the clavicle to the third intercostal space, and inclining slightly downwards towards the axilla. The area was continuous with the cardiac dullness, and in it breath and voice sounds were extremely faint, but no *râles* or crepitations were heard. There was no enlargement of glands, no abnormal pulsation, and the heart, larynx, and abdomen appeared normal. In the sputum, which was abundant and muco-purulent, neither tubercle bacilli, actinomyces, nor fragments of new growth or hydatid were discovered. The patient was ordered potassium iodide, and sent away to the country.

Progress.—In a month all expectoration stopped, she gained