growths have not recurred, and the case can be fairly regarded as a cure.

To sum up briefly: The symptoms are those of chronic irritation of the urethra. But an accurate diagnosis cannot be made by the symptoms alone. An endoscope must be used and the urethra thoroughly inspected. The prognosis is good; and, for treatment, the writer would recommend, as being both rapid and effective, the removal of the growths through an endoscope with a curette and cotton tampons, in the manner described above. If after-treatment is necessary, injections of permanganate of potash for several weeks. If this is not sufficient, then sounds or topical applications of nitrate of silver.

There has been very little written on the subject, especially as regards treatment, which is certainly an important point. The symptoms are a constant source of annoyance and discomfort, which can be quickly relieved by a safe and simple operative measure. Works on surgery, both general and genito-urinary, have little to say about it, and what they do say consists mainly in stating the fact that papillomata or condylomata sometimes occur within the urethra. Directions for removing them are either not given at all, or are not made sufficiently explicit. Oberlinder's admirable article, previously spoken of, is the only one which I have found giving a careful and accurate description of the entire subject.

Dr. J. T. Bowen has very kindly made sections of some of the pieces which were scraped out, and the accompanying drawing which he has made shows the microscopic appearance of a single tuft (Fig. 2).

I think papillomatous urethritis must be an uncommon condition; but it may be found by a more general use of the endoscope in cases of chronic inflammation of the urethra especially where of long-standing, that in some of these the symptoms are in reality due to the presence of papillomatous growths.

FIG. 2.

SURGICAL OPERATIONS FOR THE RELIEF OF PRESSURE PARALYSIS IN CARIES OF THE SPINE.¹

BY DRs. WILLIAM N. HULLARD AND HERBERT L. BURRELL.

THE advances in surgery, which have been so rapid and so extensive within the last few years, have at length reached a point where operations of a serious nature upon the spinal column, involving the removal of portions of several vertebræ and the opening of the spinal canal, may be performed with success, so far as the operation itself is concerned, and it now becomes the duty of the physician to be able to give, so far as is consistent with our present knowledge, an intelligent opinion in regard to the benefit likely to be derived from such operation in any given case, and the risks

which are to be encountered apart from those of a purely surgical character.

We wish then to point out as distinctly as possible what cases of spinal caries are, in our opinion, suitable cases for operation, and on what factors we depend to form an opinion in any special case.

The symptoms for which operations on spinal caries have been undertaken are those of compression with or without irritation of the spinal cord, and the direct object of these operations has been the relief of pressure on the spinal cord. This compression is usually produced in caries of the vertebræ either by the collection and accumulation of inflammatory products between the dura mater and the bone and by the thickening of this latter membrane with an increase of fibrous or connective tissue formation, or by the direct pressure of displaced bone. The first cause is by far the most common. In a very large proportion of cases, it is probable that compression once produced does not materially diminish and that the improvement in the symptoms, which so frequently occurs, is due principally to the adaptation of the cord itself to its surroundings; in a smaller number of cases the compression may be more or less acute, and may diminish or disappear spontaneously. These latter cases are usually connected with abscess formation. Apart from the general condition of the patient and the ordinary surgical considerations, there are three elements especially to be weighed in determining the advisability of an operative procedure on the spine. First, the actual condition of the spinal cord; secondly, its prospects of recovery (of function), if not operated upon, under rest and other suitable treatment; thirdly, its prospect of recovery (of function) if the pressure be removed.

ACTUAL CONDITION OF THE CORD.

The amount of injury suffered by the cord depends upon various factors, some more or less easily estimated, others extremely difficult to judge of. The principal ones are (1) the degree of pressure; (2) the time throughout which it has been exerted; (3) the liability of the cord to inflammation or degeneration.

Our means of determining the condition of the cord in general are well-known, and we will only say that the symptoms to be principally relied upon are the loss of motion and of sensation and the condition of the reflexes below the diseased area. It is evident that the greater the loss of motion and sensation below the diseased point, the greater must be the obstruction to, or the destruction of the cord conduction. If the inhibition or destruction of the conduction through the cord were proportional to the amount and duration of the compression, our problem would be much simplified. As it is, however, we have to deal with an indeterminate factor, the spreading of the disease in the cord. It is still a disputed question in what pathological form this extension of the disease ordinarily occurs, whether, as maintained by Strümpell, it is a degenerative process, or whether, as held by Gowers, it is inflammatory. However this may be, there is no doubt that, in addition to the ordinary spreading of the disease in certain cases, a spontaneous myelitis may occur, and the possibility of this must always be borne in mind.

PROSPECT OF RECOVERY WITHOUT AN OPERATION.

The prospect of, at least, a partial recovery is in the

¹ Read before the American Orthopedic Society, September 19, 1889.

large majority of cases, especially in the earlier stage, a very good one. Even in cases of total loss of motion and sensation, recovery, at least partial, may occur. Incontinence of urine and feces are very serious symptoms (Lauenstein's formula), yet we have seen both disappear after several months duration and the patient become practically well. The duration of the symptoms is a most important element in the prognosis, though even this is not so determining as might at first seem probable. We all know cases in which paralysis has existed for years and which finally commenced to improve and recover motion and sensation. The recuperative power of the spinal cord, at least as regards function, is much greater than would be supposed *a priori*. The cases of caries of the spine are comparatively few, in which, aside from causes dependent on the general health of the patient, it is not possible or even probable that some improvement in the symptoms, directly referable to the cord, will occur, if the active advance of the disease can be checked.

So long as we have reasonable or even moderate chances of recovery without operation, we do not believe it advisable or justifiable, in the present condition of spinal surgery, to perform so serious an operation as resection of the laminae of the spinal vertebrae. This consideration at once reduces the proportion of these cases, suitable for operation, to a very small one, as we all know how prone these cases are to at least a partial recovery; on the other hand, when spontaneous recovery has become otherwise well nigh hopeless, this procedure offers us a prospect of success which should not be neglected. At present, it seems probable that this prospect is greater in the case of children than of adults.

PROSPECT OF RECOVERY FROM PARAPLEGIA AND OTHER CORD SYMPTOMS BY MEANS OF OPERATIVE REMOVAL OF COMPRESSION.

We have thus far been able to collect only eleven published cases in which an operation for the removal of compression has been performed upon the spinal cord, omitting Abbe's case, which, though counted by White, seems doubtful. (These are Macewen, five; Horsley, Duncan, Lane, Dercum and White, Wright, Thompson, each one.) To these we add our own case, making twelve in all.

Three cases (Macewen's) were successful, four were much benefited, and some of these, notably Duncan's, should probably be classed as successful. One (Wright's) had recurrence of the former symptoms in two months. Four died, one in thirty hours, one in thirty-six hours, one in a week and one in a few months; the two latter of general tuberculosis.

Of these the age is given in only seven. Five were children under fourteen years of age. Two were adult males. Of the children one became well, three were at least much benefited, in one the symptoms recurred. Both the adults died of shock.

The results of these cases are, on the whole, favorable, and we are warranted in looking forward to much better ones as progress is made in surgical technique.

The principal contra-indication, besides the obvious ones existing in the general condition of the patient and his surroundings, is the presence of tuberculosis in some other portion of the body. In such cases the prognosis is necessarily serious, and the operation should not be attempted unless there exists some

symptom thought to be due to pressure and immediately threatening life, as in the case of Thompson. Macewen's view that the presence of continued high temperature is of itself a contra-indication, aside from the possibility of its pointing to tubercular disease in other parts of the body, has not been borne out by later cases, notably by that of Lane, where, in spite of high temperature, the operation was successfully performed. The presence of an abscess is a contra-indication to resection if the pus can be evacuated in any other manner.

The occurrence of acute symptoms referable to the cord, other than those due to abscess is not an indication for operation unless they appear to threaten life through compression of the cord. On the other hand, in many cases where acute symptoms occur, we have to deal with processes in the cord which may not be specially aided by the removal of the compression, and where again there is a tendency to partial recovery. Thus a sudden paraplegia or increase of loss of motion or sensation is a contra-indication to immediate operation, though the time may come later when the operation will be desirable.

When, however, in any case the health of the patient is gradually failing, when cystitis is becoming chronic, and when obstinate bed-sores are beginning to form without obvious cause in a case of some standing, operation should be resorted to early in order that the chances may be in our favor.

To sum up in short:

Contra-indications:—(1) General health and general surgical considerations; (2) The presence of tuberculosis in other parts of the body; (3) The presence of an abscess connected with the caries which can be otherwise evacuated; (4) Acute exacerbation of symptoms referable to the cord, and not threatening life.

Indications in favor of an operation are:—(1) General good condition and favorable surroundings; (a) when the disease is gradually and slowly progressing to an unfavorable termination; (b) when the patient has more or less complete loss of motion and sensation in the portions of the body below the level of the lesion, and incontinence of urine and feces, and where these conditions have lasted for a sufficient length of time to render spontaneous recovery improbable, and not so long as to have produced permanent destruction of all recuperative power in the cord. (2) Where acute symptoms threatening life appear, and where there is reasonable expectation that they may be relieved by the removal of compression.

We now come to the consideration of our own special case.

The patient, a strong butcher, forty-six years old, a native of Ireland, entered the Carney Hospital on the 29th of December, 1888, in the service of Dr. V. Y. Bowditch. His family history was good and he himself had never been ill previous to his present trouble. About three months ago, he began to suffer from pains in the back, sides and abdomen, and from a sensation of constriction around the body. Three weeks ago the pain extended to his lower extremities, they became weak and he was unable to walk without assistance.

December 30th. To-day an examination of the patient was made by Dr. Bullard at the request of Dr. Bowditch, as follows: Patient well developed and in excellent condition as regards general health.

Nothing abnormal detected about head, face, chest, upper extremities, or in any of the internal organs. Distinct prominence in the back, involving the fourth, fifth and sixth dorsal vertebræ, and over these there is some tenderness. There is a decided weakness of both lower extremities, but he can walk with the aid of a stick. Sensation is somewhat diminished everywhere in front below the seventh intercostal spaces; behind there is decided diminution below the level of the lower dorsal vertebra and slight diminution up to the level of the sixth dorsal. Thoracic reflexes normal as low as sixth or seventh ribs, below this and over the abdomen, the superficial reflexes are diminished. Over the back they are more marked in the upper portion than below, and are not marked over the glutei. Cremasteric reflexes slight; plantar cannot be obtained; triceps reflexes not remarkable. Knee-jerks much increased on both sides. Paradoxical contraction obtained on both sides, left more marked than right (this disappeared in a day or so).

February 1st. From change of service the patient enters to-day under the care of Dr. Bullard. Has grown steadily worse since entrance. Paraplegia increasing, some difficulty in micturition and considerable pain.

February 6th. Complete paraplegia. Sensation as before.

February 19th. The question of operation has been considered, but it has been decided to place the patient on a Bradford frame.

March 1st. Not comfortable on frame. Girdle pains very severe.

March 15th. Removed from frame. Very serious bed-sores. Has been in great pain most of the time, partially relieved by morphine.

May 13th. Patient growing rapidly worse, bed-sores increasing, and pain being intolerable. General condition has been rapidly failing, and is now poor. For the last fortnight every means has been used to improve his general condition.

Transferred to care of Dr. Burrell. (Patient was seen by Dr. Burrell, in consultation, for the first time in February, and several times later. For more than a fortnight before his actual transfer, he was practically under his care.)

On May 14, 1889, the condition of the patient was truly pitiable. He was suffering intense pain, which morphia could hardly make bearable; he had a large bed-sore, which exposed the sacrum and which extended onto either buttock. Sloughs had already occurred at various points on the heels and over the heads of the fibulae. Cystitis existed in a marked form. The patient urgently begged for some relief to his condition, and the uncertainties of the success of the operative procedure having been explained to him, it was undertaken.

The patient was etherized and an incision was made in each vertebral groove extending from the second to the seventh dorsal vertebra; these incisions were carried down to the laminae. Considerable oozing of blood ensued, which was arrested by sponge pressure. A transverse incision was made uniting these two incisions in the vertebral grooves, just below the spine of the fifth dorsal vertebra. This made an H incision. Two flaps were raised from the laminae and the spinous processes by means of a heavy knife and scissors, and thus were made musculo-cutaneous flaps which were reflected upward and downward; then by means

of a Bonwell surgical engine, which was run at a low rate of speed, the laminae of the third, fourth, fifth and sixth dorsal vertebræ were divided. Unfortunately the engine, the saw of which was kept constantly wet by a stream of water broke down when the laminae were two-thirds divided and the operation had to be completed by the aid of an osteotome. The osteotome was then driven in directly over the spinous process of the second dorsal vertebra, breaking off its overhanging point. A separation was accomplished between the spines of the sixth and seventh dorsal vertebra by means of a knife and scissors; this allowed the block of the spines and laminae of the third, fourth, fifth and sixth dorsal vertebræ to be raised up, hinging at the divided point of the spine of the second dorsal vertebra. The turning up of this block of spines and laminae was not directly upward, but it was thrown a little to the right. This allowed a full, free exposure of the cord, which was seen in the bottom of the wound, seemingly normal in appearance, except opposite the fifth dorsal vertebra, where it was perceptibly flattened and did not pulsate. The veins of the cord were somewhat congested. The cavity was irrigated, and a small roughened portion of the lamina of the sixth dorsal vertebra was removed. The block of the spines and laminae was turned down into position, and held by sutures to the adjacent muscular structure. Wound closed with catgut sutures, and dressed with baked gauze. Time of operation one hour and forty-five minutes.

The hemorrhage which we expected would be quite severe was easily controlled; it was not greater in amount than usually occurs in a breast amputation and a clearing out of the axillary contents.

At the completion of the operation the patient was very cyanotic, and breathing was somewhat difficult. Stimulation was resorted to with partial success. The patient was put to bed reclining in prone position. Patient continued to improve very slowly throughout the day, and six hours after the operation took brandy per mouth, pulse very rapid and feeble. Eight hours after the operation patient was placed in a recumbent dorsal posture, and soon fell asleep. Respiration 36, pulse 144. Twenty-four hours after the operation it was noticed that he breathed with more difficulty and took less nourishment. Thirty-six hours after the operation the patient became cyanosed, his respiration became shallow, and he died of shock.

In commenting on this case we would say that it was undertaken as an experimental effort, with the distinct understanding with the patient that such was the case; and we both feel confident that had it been undertaken at an earlier period in the patient's illness, and at a time when his recuperative powers were stronger, it would not have ended fatally.

Dawbarn (*New York Medical Journal*, June 29) has reported a case where he resected for traumatic paraplegia. His operation occurred on December 20, 1888, and from his description we should judge that he attempted the same operative procedure that was undertaken in our case. His patient recovered, and some slight improvement in the symptoms ensued.

One of the advantages of the operation of "resection and reimplantation" is, that it lays bare a given portion of the spinal cord and restores the bony structures with a possibility, at least of their re-uniting; but at present, if we were asked to undertake this operation, we should decline, and should resort to the use of a

trephine and bone-cutting forceps for the removal of the laminae.

The key to the success of any operative procedure on the spine will be the securing of an efficient means for dividing the bony structures with ease, speed and accuracy.

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Hospital Practice.

CASES AT THE MASSACHUSETTS GENERAL HOSPITAL.

BY H. H. A. BEACH, M.D., *Visiting Surgeon.*

LACERATION OF THE NECK OF THE UTERUS AND THE BASE OF THE BLADDER; VESICO-VAGINAL FISTULA; OPERATION.

The patient was twenty-nine years old and had suffered from the annoyance and inconvenience of dribbling urine since the birth of her last child fourteen months ago. Upon examination a laceration was found dividing the anterior lip of the uterus and extending along the floor of the bladder for more than an inch and opening into that organ.

The borders of the laceration were freshened throughout their whole extent and then united by eleven silver sutures. Two weeks later all of the stitches were removed and the union found to be complete. Upon examination after two weeks more, hardly a trace of the laceration could be detected and there was no leaking from the bladder.

DISLOCATION OF THE SHOULDER-JOINT; SUBSPINOUS.¹

The subject of this rare lesion was a middle-aged woman, who appeared at the out-patient department with the history of a fall, but could give no adequate description of the way in which she struck. Under ether the luxation was easily reduced by flexing the arm and rotating the head of the bone into the axilla; then extending the arm and applying moderate pressure with the hand in the axilla.

STRICTURE OF THE OESOPHAGUS; DILATION.

Two months ago, the patient, a woman of forty-three years, swallowed by mistake, a teaspoonful of

¹ "This form of dislocation has been seldom met with. Only two cases, according to Sir Astley Cooper, occurred in Guy's Hospital in thirty-eight years; but in the last edition of Sir Astley Cooper's 'Treatise on Fractures and Dislocations,' edited by Bransby Cooper, nine cases are mentioned. Sedillot, Malgaigne, Desclaux, Van Buren, W. Parker, Lepelletier, Trowbridge, Physick, Snyder, Stephen Smith and myself have each seen one example. Examples have also been seen by Dupuytren, Arnott, Best, Levacher, Berard, Fizeau, Elpeau, Ferguson, Kirkbridge and by Rogers." [Hamilton. Fractures and Dislocations.]

undiluted nitro-muriatic acid. Profuse vomiting, and a burning sensation in the mouth, gullet and stomach followed. At the time of entrance to the hospital the inflammatory symptoms had subsided, but she was unable to swallow anything excepting liquids in small quantities. A No. 8 urethral bougie was with difficulty forced through a tight constriction below the level of the cricoid cartilage. This size was passed daily until it entered the oesophagus without difficulty. The size of the bougie was gradually increased until oesophageal bougies could be passed. They were also increased in diameter until one measuring thirteen-sixteenths of an inch entered easily. The patient was taught, and soon acquired, the knack of passing it herself. She improved much in health and strength with her increased capacity for taking nourishment of all kinds.

NECROSIS OF THE TIBIA INVOLVING THE KNEE-JOINT; OPERATION.

The patient was a man forty-three years old, who entered the hospital with his knee largely swollen, and presenting a number of fistulous openings apparently communicating with the interior of the joint. There had been a history of a fall five months before, striking the foot, but not the knee. Acute inflammation of the joint followed, pus formed and discharged spontaneously through the openings already described. This discharge continued up to the time when he entered the hospital. A number of small fragments of bone had been found on the poultices. A probe passed at the fistula on the inner side of the joint touched dead bone at a point about three inches below the patella over the centre of the tibia, but failed to reach the joint. A longitudinal incision of four inches was made from the spine of the tibia downward and the medullary cavity having been chiselled open, the disease was found to have involved more than one-third of the superior articulating surface of that bone. A large number of loose sequestra were removed and the carious bone curetted. The upper end of this bony canal now communicated directly with the knee-joint. The eroded cartilages of the femur and patella were carefully scraped away with the gouge and spherical rasp through an extension of the primary incision in the form of the branches of the letter Y along each side of the patella. The cavity was thoroughly drained, made aseptic, and, to ensure immobility, placed upon a bridged splint. The wound acted well from the first. A firm ankylosis gave all the advantages of an excision of the knee-joint without shortening.

TRAUMATIC ANEURISM OF THE ULNAR ARTERY; OPERATION.

Seven weeks before entering the hospital the patient had penetrated the ulnar side of the right wrist with a sharp fragment of glass from a broken tumbler. A sharp arterial hæmorrhage occurred, which was arrested by a handkerchief tourniquet and a bit of plaster. Upon examination the following day the puncture had closed. Some general swelling followed, and within a few days an abscess formed and opened spontaneously. As the swelling subsided, the patient observed a pulsating swelling at the seat of injury, which has slowly increased in size, without pain. There is a numbness of the little fingers and the ulnar side of the hand. The aneurism, of the size of a horse-chestnut, is in the line of the ulnar artery, and presents a red, shining surface, with visible pulsation, a distinct