the greatest boons to surgery that this century has produced, if not the greatest.

I have spoken of the daily dressings of these cases that were formerly necessary. What is now the case? I find that three or four dressings are, in the great majority of cases, sufficient during the healing of the wound. In one of my last cases, two dressings would have been sufficient; for, on dressing it the third time, I found, not only everything perfectly aseptic, but the wound healed, and I regretted much that I subjected the patient to an unnecessary disturbance. In truth, there is no such test-case for illustrating the value of antiseptic surgery as excision of the knee-joint. It is much more so than ovariectomy, or any of the other operations connected with abdominal surgery.

There are many circumstances which militate against immediate union being obtained after a resection of the knee. In the first place, the cases requiring so formidable an operation are, as a rule, in a condition of great physical exhaustion consequent on long confinement, and probably protracted suffering, of both mind and body. The wound that is made is of necessity large; the operation, when done with the necessary care, occupies a considerable time. Two large freshly cut bone-surfaces are made, between which union is to take place; and, lastly, there is the great difficulty of keeping, no matter what appliance be adopted, the limb absolutely at rest during the process of union. As a proof of the great difficulty of getting ready union that used to be experienced, I may mention that formerly six, eight, ten months, or even longer, elapsed before union used to take place; and consultations frequently occurred, previously to operation, as to whether the patient would have strength to endure so protracted a suppuration. Now, as a proof that matters are completely revolutionised in this respect, I may mention that, in eight out of these twelve cases of knee-joint resection, union took place without the formation of a single drop of pus. Doubtless we now know better how to produce immobility of the limb during the process of union—a factor of an importance only second to antisepticism in promoting rapid, firm, and efficient union in these cases. Any movements between the freshly divided bone-surfaces, even though unattended with pain, or any obvious inconvenience to the patient, are, in truth, of serious moment. "By displacing," as Mr. Coppinger has observed, "and wounding the newly formed tissue by which repair is accomplished, they directly interfere with the reparative process itself; while, secondly, they favour the absorption of septic material by causing ruptures of the delicate granulation-films, to which Mr. Savory has prominently alluded, and on which so much depends as a material safeguard against infection". My experience quite coincides with his, that it is impossible to exaggerate the injurious effects in some manner produced by even slight movements of the bones, or displacement of the deeper portions of the wound.

The value of perfect fixation in promoting primary union is well exemplified, as Lister has pointed out, in the operations for hare-lip and in breast-excisions. On the other hand, in operations in which it is impossible to get perfect immobility, such as excision of the hip-joint, I have never seen primary union, nor am I aware of any case in which it has been obtained.

The method of fixation of the limb adopted in the Richmond Hospital is a modification of that of Dr. P. H. Watson, and it appears to me to fulfil, as perfectly as need be, all the required conditions. I may mention that the suppuration is not applied usually until some hours after the operation, when all oozing has subsided. An antiseptic bandage having been applied to the leg first and subsequently to the thigh, two metallic splints, made of common hoop-iron, are applied on the anterior and posterior surfaces of the limb, and then are fixed, first on the leg and subsequently on the thigh, by gypsum bandages applied in the ordinary manner, care being taken to leave the portion of the limb near the situation of the wound open, so as to allow the application of antiseptic dressings without any disturbance of the limb. I consider this method of fixing the limb far superior to any others with which I am acquainted, and it has the merits of cheapness, simplicity, and thorough efficiency. An objection has been made to the use of gypsum, on the ground of its liability to become softened by the action of the spray during the dressing of the wound. If, however, ready union take place, and the wound remain aseptic, the dressings will be so few in number that no apprehension need be felt in reference to the alleged probabilities of softening. If, on the other hand, frequent dressings be required, then it is quite easy to protect the apparatus by painting over the portion of it in the neighbourhood of the wound a solution of dammar resin in ether, or, what is perhaps more available and equally efficacious, paraffin.

There is an accident that has happened in connection with two or three of my cases of resection which, when it has occurred, has at the time been a source of much anxiety to me. I allude to hæmorrhage,

not at the time of the operation, but, as a rule, some hours subsequent to it. This has, in all the cases in which it occurred, necessitated reopening the wound. The hæmorrhage in all my cases I found not to come from any vessels capable of ligation or torsion, but from the freshly divided surfaces of the bones, which, previously to and at the time of the operation, were in a very hyperæmic condition. The method I adopted for checking the bleeding was to place a pledget of lint, soaked in a solution of chloride of zinc, between the bones for some minutes. The reopening of the wound, and application of the chloride of zinc compress, was done always under spray and all other antiseptic precautions; and no subsequent trouble was experienced, nor was the asepticity of the wound interfered with. The accident, though it can scarcely be placed among the "surgical calamities"—to use an expression of Sir James Paget—is certainly one which must ever be a source of grave trouble to the surgeon, and of possible danger to the patient. For some time, I have thought that the hæmorrhage was a reactionary one, and connected with, and to a great extent depending on, the application of Esmarch's bandage. Mr. Teale of Leeds has recently informed me that the accident has occurred on more than one occasion in his hands; and so convinced is he and his colleagues that it depends largely on the use of the elastic bandage, that in resections of the knee-joint it has been altogether abandoned in the Leeds Infirmary.

From the preceding remarks, the following propositions may I think be laid down.

1. Excision of the knee should not be looked upon as a last resource, but should be undertaken, if possible, before any profound organic changes take place.
2. Expectant treatment, to be efficient, must be undertaken at an early stage of the disease, and extend over a period of at least two years.
3. No better result than ankylosis can be looked for by this method.
4. In a patient with a predisposition to secondary tuberculous developments, the possibility of the recurrence of the disease after expectant treatment must be borne in mind.
5. In cases attended with prolonged suppuration, the chances of the occurrence of visceral, especially renal disease, must not be lost sight of.
6. Where the skin is unbroken, the disease limited, an efficient method of fixation applied, and a rigid system of antiseptic dressing of the wound adopted, primary union may, in the majority of cases, be anticipated.
7. When these latter conditions are fulfilled, excision of the knee-joint cannot be longer regarded as the formidable procedure it was formerly held to be.
8. The alleged unfavourable results of excision of the knee-joint in early life are opposed to more extended clinical experience.

A CASE OF SCIATIC NERVE-STRETCHING IN LOCOMOTOR ATAXY: WITH REMARKS ON THE OPERATION.

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THE ordinary medical treatment of locomotor ataxy is so unsatisfactory, and the prospect of even temporary benefit is so problematical, that any novel therapeutical method which holds out to us some reasonable hope of improvement is worthy of careful consideration and trial. Among the well-known symptoms of the disease are the so-called "lightning-pains"; these are often sufficiently severe to cause great suffering, and have demanded for their palliation the administration of anodynes, especially the subcutaneous injection of morphia. Although we may by this means control them in great measure, and render the patient's life more endurable, the necessity of constantly increasing the dose, and the establishment of the opium-habit with all its attendant miseries, constitute grave objections, and may even do more harm than good in some cases.

The operation of stretching large nerve-trunks is free from these objections, and has proved so efficacious in neuralgia that it was *primâ facie* probable that the pains of ataxy would also yield to this procedure. Accordingly, a little more than two years ago, Langenbuch of Berlin operated in this manner on a patient in whom the pains of ataxy were of great severity, and found, as he had anticipated, that the pains were abolished by the operation; but he also found, to his great surprise, that the characteristic ataxic movements of the lower extremities had disappeared. It is open to considerable doubt whether this first case was really one of locomotor ataxy; but the operation has since been performed several times on undoubted cases, and with results which have

been in some measure beneficial in the majority. I shall presently refer to the various published cases; but, before doing so, I will give a short account of a patient under my own care on whom the operation was done.

John A., aged 48, a clerk, was admitted into St. George's Hospital on December 29th, 1880, under Dr. Barclay, who was kind enough to transfer him to me. *Family History.* His father died at the age of 60; his mother, aged 45, of "decline"; and four brothers of consumption. *Personal History.* The patient had rheumatic fever at the age of 13. When nineteen years old, he contracted syphilis—i.e., a hard sore appeared about three weeks after connection; but he did not remember any secondary symptoms. He married at the age of 20, and has had four healthy children. He told us that he had committed great sexual excesses before his marriage, but that he never felt the worse for them. Smoking and drinking disagreed with him, and he was always very moderate in these respects. His general health was robust, and he was much given to athletic exercises. In January 1877, he fell from a trapeze, and struck his back. He was much shaken, but was able to get up and walk home, and experienced no ill results from the accident. In the following June he had, for the first time in his life, an epileptiform seizure, preceded by giddiness, profuse sweating, and trembling, and followed by drowsiness. He had had five similar attacks subsequently, the last having occurred a month before his admission. During the time which had elapsed since the first fit (three years and a half), he had been gradually losing strength in his legs, and especially co-ordinating power, so that he soon became practically unable to walk in the dark. He had not noticed any modification in the sensation of the soles, but had frequent feelings of numbness and tingling extending over the whole left side of the body, and more particularly affecting the lower extremity. These sensations were always most marked before a fit, and were most probably of the nature of an epileptic aura. Shooting, darting pains, suddenly passing down the legs from the groins and thighs, had been frequent, and at times very severe. There had been several intervals of remission; but he had had them for the last six months nearly without interruption, although not so severely as on former occasions; they had latterly been accompanied by sharp constrictive pains round the waist. He had often suffered from "bilious attacks", with vomiting and epigastric pain, coming on suddenly without apparent cause, and subsiding in a few days. The bowels had been obstinately constipated, micturition slow, and sexual power abolished. *State on Admission.* He was a well-nourished, muscular man, with grey hair. The heart and lungs were normal; the urine free from albumen and sugar. The legs and thighs were well formed, and there was no wasting. They were moved freely in all directions as he lay in bed, and strongly extended when pressure was made against the soles. He knew their position in bed accurately, and there was no delayed sensation of pain when the soles were pricked. On getting him up, he was quite unable to stand without being supported on both sides; and, when he attempted to walk, the legs were brandished about in an irregular and purposeless manner—one foot frequently knocking against the other, and the heels being forcibly stamped on the floor. There was no ataxy of the upper extremities. The various reflexes were carefully examined by Dr. Myers, with the following results: sole and cremasteric absent on both sides; knee-jerk (patella tendon tap, quadriceps tendon tap, and depressed patella tap) absent on both sides; ankle (front tap, muscle tap, tendon tap, and clonus) also wanting on both sides. Sensation was also examined; and it was found that in the calf two points were not distinguished unless they were more than nine inches apart, and on the dorsum of the foot four inches apart. There was no inequality in the two legs. The pupils were equal and strongly contracted; they did not dilate in the dark, but did so, though not to the normal extent, during distant vision. Near and distant vision were normal, except for presbyopia, which was not excessive for his age. Ophthalmoscopic examination was impossible. *Treatment.* From his admission to January 15th, 1881, he was given bromide and iodide of potassium; perchloride of mercury was then added, and continued for a month, the only result being slight salivation. Fluid extract of ergot was next tried, and also proved of no service; there was not the slightest improvement in his condition. The pains, however, did not trouble him much till March 2nd, when they returned with great severity, and soon afterwards I determined to try the operation of nerve-stretching. *Operation.* This was performed on March 9th by Mr. W. H. Bennett, as follows. The patient being etherised, the left sciatic nerve was exposed at the lower border of the gluteus maximus by an incision about two inches in length. The nerve was then raised from its connections by passing the index finger beneath it, and dragged forcibly out of the wound, being raised about two inches above the skin. It was then grasped firmly between the finger and thumb, and the central end very

strongly pulled upon. The peripheral portion of the nerve was not stretched more than was rendered necessary by the raising of the nerve from its bed. The operation was performed antiseptically, the wound being brought together with silver wire. It showed remarkably little tendency to heal, and no attempt at union by first intention took place. On March 17th, some irritation from the carbolic dressings occurred, which necessitated their discontinuance. On removing the sutures, not the least union had taken place, the wound immediately gaping almost like a recent incision. Granulation followed very sluggishly, the granulations being weak and flabby, requiring continual local stimulation. The wound was still partially unhealed on April 20th (six weeks after the operation), when he was sent to the convalescent hospital at Wimbledon. *Result.* The effect of the operation on his pains was decidedly beneficial; they ceased entirely until April 2nd, when they reappeared in the left leg and thigh (operated side), but much less severely, and only lasted a few days. In other respects, however, there was not the slightest improvement. The spinal myosis persisted; the reflexes were about as before; sensation unchanged; he could stand no better; and the atactic movements of the legs were as marked as ever. *Conclusion.* He remained at Wimbledon in the same state until May 24th, on the afternoon of which day he suddenly uttered a moaning cry, became unconscious, and had a series of epileptic fits, affecting chiefly the left side of the body; he then became comatose, and died the same evening. *Post Mortem Examination* showed no affection of the thoracic and abdominal viscera. The brain also appeared healthy to the naked eye, but was not minutely examined. The spinal cord showed a patch of opaque adherent membranes in the lower dorsal region, and the posterior columns of a reddish-grey tint; it was put into a mixture of chromic acid and spirit, but, unfortunately, not well preserved. Microscopic sections, however, show extensive degenerative changes, most marked in the lumbar portion. The postero-medial and postero-external columns are in a state of advanced sclerosis, the neuroglia being much thickened and increased, and the nerve-tubes atrophied. The same changes are present in a lesser degree in the posterior part of the lateral columns.

[To be continued.]

ON THE TREATMENT OF STRICTURE BY STRETCHING.

By REGINALD HARRISON, F.R.C.S.,
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IF we put aside cases of organic stricture of the urethra, which are remedied by the occasional passing of a bougie, there yet remain a certain proportion where such treatment is insufficient. To take an example: a patient, having neglected the early indications of stricture, is seized with retention; with difficulty a small catheter is passed, and thus the urgency of his symptoms are met. It often happens that retention recurs, and all the difficulties attendant upon the first catheterism have to be gone over again, with, probably, considerably more spasm super-added. To meet such cases, immediately or remotely, a variety of expedients are practised. Of these, I may mention continuous dilatation, or the tying of an instrument into the bladder; internal urethrotomy; perineal section; and rupture, as employed by Holt. All these have for their object the passing of a full-sized instrument into the bladder, without which none of them can be regarded as satisfactorily completed.

For some time, I have occasionally been employing for this object a process which I think is best described under the term "stricture-stretching". In using this phrase, I do not wish to be understood as advocating the use of either a new instrument, or new treatment. I merely desire to state how I have applied well-recognised principles with equally well-known means. Stricture-stretching, as I endeavour to carry it out, is very closely in imitation of the process to which gloves are submitted by the salesman after the purchase has been made. Into each stall of the glove the glove-stretcher is introduced, in order that the fingers may the more readily pass in. If the manipulation be dexterously done, neither are the seams split, nor is the kid torn; if clumsily, a rent and a false passage for the finger is the result.

So much for the simile, now for the reality. The stretcher I employ is that much abused but valuable instrument, Holt's dilator; and the stretching is effected quite slowly, by the introduction of successive sizes of dilating rods, until the dimensions required are obtained. All this is to be done at one time, with or without an anæsthetic, according to circumstances. I almost invariably have the patient placed under ether, as it is important that the process should be slow enough to permit of the tissues stretching without tearing. I do not think we fully recognise the extent to which the urethra is capable of being dis-