the 31st they were not noticeable, and he remained well afterwards. He took the drug for twelve days altogether, and it was then discontinued because of an erythematous eruption that appeared. He was in the hospital three weeks.

A third case, a girl of 8, under the care of Dr. Cooper, of Rotherhithe—a very bad case indeed, associated with much wasting, imbecility, paralysis, and pericarditis—was given also five grains three times a day. She took it for eight days, and was by that time so much improved that it was discontinued for iron and digitalis. The improvement began within forty-eight hours after the commencement of the antipyrin.

A fourth case, now in the Evelina Hospital, a girl of 9½, came in on November 26th with general rather violent chorea. I gave her five-grain doses every six hours, and on the 29th increased it to ten grains every six hours. On December 3rd she was lying in bed hardly choreic. In this case, however, although the chorea was manifestly better, she suffered from antipyrin poisoning. After three or four days a copious measly rash appeared, with high fever and albuminous urine, and then it was necessary to stop the drug.

The other case, under the care of Dr. Steele Perkins, of Streat-ham, was made worse by the treatment, and it was given up after ten days. I shall not indulge in any exuberant anticipations, but, remembering how very troublesome chorea is, I think there is enough evidence at hand to make us believe that, at any rate in some cases, antipyrin may prove of service. Legroux and Dupré⁵ have given it in twenty cases in doses of about seven grains five or six times a day, and they conclude that it is one of the most certain and harmless remedies for chorea, the improvement usually commencing in four to six days.

Before closing, perhaps I may be allowed to add a word not upon a new remedy, but upon an uncommon method of administration of an old one. I refer to the subcutaneous injection of *strychnine*. There is, of course, nothing novel in this. Nevertheless, I am under the impression that strychnine is not often administered in this fashion. Dr. Habershon has advocated its use thus in cases of cardiac failure, and during the past year I have had three troublesome cases of more or less general paralysis that have, for such cases, rapidly improved by its means. One was a case of peripheral neuritis due to alcohol and lead-poisoning combined. He was in a very tremulous condition when admitted. Many of his muscles were much wasted. He had a good deal of pain in the course of various nerves, and he was both sleepless and demented. Various drugs were administered, and he was assiduously galvanised, but he became decidedly more powerless. By-the-bye he had a subcutaneous injection of hydriodate of hyoscine, first ⅛ of a grain and then ⅙, and this certainly seemed to quiet his nocturnal delirium, and procure him sleep. On November 4th I ordered him ⅙ grain of strychnine to be injected hypodermically twice daily. On the 14th it was increased to ⅙, and by the 31st he was taking ⅙ twice daily. By this time it was noted that the movements of the patient's hands and arms were much more lively, and there was a gain in the grasping power of both hands. From this time he made continuous improvement. The injection was continued for another month, and was then omitted, chiefly because it caused, or he thought it did, severe pain in his ulnar nerves, which, he insisted, came on soon after the injection, and caused him great misery for several hours afterwards. He had had this pain before the commencement of the injections, and my clerk, Mr. McIlwaine, had doubts about the reality of the cause, but the man was very positive, and I think he was very probably correct. His ulnar nerves were clearly those most affected by his disease, and it is fair, therefore, to suppose that the remedy acted upon them in excess.

A second case was one of general paralysis, dysphagia, diaphragmatic palsy, and reaction of degeneration in the muscles in a young man aged 27. All the history that he could give was that, being a carman, and of late carrying sacks of coal, he had, a month before his admission, felt generally out of sorts and easily fatigued. A week later his finger-tips became numb, and then his toes, and gradually he lost all power in his legs, and then in his arms. He was at first given iodide and perchloride of mercury, and he steadily got worse. Then he had three-minim doses of liq. strychnine given internally; but, as he was steadily going down hill, and was swallowing and breathing so badly that I quite feared for his life, I changed the internal administration of strychnine to the hypodermic method after a week. He had

⅙ grain injected night and morning. This was commenced on the fifth, and on the ninth the report stated that there was a marked improvement in the strength of the right arm, and there was considerable improvement in sensation. By the thirteenth he was beginning to have slight control over his legs. His pains, before rather troublesome, were not so severe, and the patient seemed altogether better; and he rapidly improved from that time, so that at the end of a month he was able to get up and about feebly. He is now, many months later, quite well. It might be added that the real nature of the case still remains obscure to me. The completeness of the paralysis, coupled with his occupation, and a doubtful thickening and prominence over the second cervical vertebra, made me think at first of some cervical pachymeningitis, but I subsequently inclined more to the diagnosis of peripheral neuritis, albeit the cause of it could not even be suggested.

I must only inflict one other case upon you. It is that of a man aged 41, who was admitted for loss of power in his right leg, and incontinence of urine. He came in with these symptoms, and there was, on careful testing, some loss of sensation in the opposite leg. His bladder was running over. This and the paralysis made one suppose that there was disease in the cord, rather than outside it, and I feared he had some transverse myelitis, worse on the right side. He had not been in the hospital long when he lost the use of the other leg. He had at first some iodide of potassium and perchloride of mercury. But not finding any marked improvement after a fortnight, I changed it to two-minim doses of the liquor strychnine of the *British Pharmacopœia*, twice a day, and at the end of five weeks he was up and walking about the ward. He is getting about fairly well now, with some clonus and exaggerated reflexes on both sides; but his chief trouble is frequent micturition, possibly due to some slight vesical irritation still remaining.

AN ADDRESS

ON A

USEFUL TECHNIQUE IN REMOVING TUBERCULAR DISEASE FROM THE HIP-JOINT.

*Delivered before the Brighton Medical and Chirurgical Society,
December 6th, 1888.*

By ARTHUR E. BARKER, F.R.C.S.,

Surgeon to University College Hospital; Hunterian Professor of Surgery and Pathology, Royal College of Surgeons.

MR. PRESIDENT AND GENTLEMEN,—In the short communication which I have now the honour to lay before you it will be necessary to start by assuming that I need not plead here for the now almost universally received doctrine of the identity of scrofula with tubercular disease; nor need anything special be said of the details of that irritative hyperplasia induced by the presence of the bacillus which gives rise to the production of those bodies generally known as tubercles. If I may be allowed to say so, I have alluded to these points in sufficient detail to define my own position in my Hunterian Lectures at the Royal College of Surgeons last June. But as the procedure now to be described is the outcome of some deductions put forward in those lectures, perhaps I may be pardoned if I briefly refer to them.

In the first place, the identity of the tubercular processes met with in joints and those observed in other organs was made out. In the hip the tubercular hyperplasia was shown to begin primarily either in the young tissue at the junction of the neck and head of the femur, or in the same tissue at the lines of union between the three portions of the acetabulum, or finally in the synovial membrane of the joint. Starting in any one of these situations, it may spread to any or all of the other parts of the articulation.

Wherever it makes its appearance, tubercle in joints is subject to the same changes as in other parts of the body, such as the brain, the lungs, the kidney, or the lymphatic glands. In the first place, if the vitality of the individual or affected tissue be

⁵ *Revue Mens. des Mal. de l'Enf.*, March, 1888.

improved, the bacilli may be arrested in their growth, may ultimately die, and the infected area recover with more or less alteration of structure.

This of course is what is always hoped for and aimed at in the earlier treatment of hip-disease by complete rest, local depletion, change of air, tonics, and suitable diet; but where the general vitality of the individual and of the infected tissue is lowered in any way, and the bacilli meet with little or no resistance, the tubercular process is found to run through the following stages: the tubercles increase in size as they invade either the medulla of the bone or the subendothelial layer of the synovial tissues. When they have attained a sufficient size to remove their centres from the nutritive influences of the capillaries which surround but do not enter them, they commence to undergo fatty degeneration. This change, commencing at the centres of the tubercular foci, results in that caseation or liquefaction with which we are all familiar. So long as the skin is unbroken, and the joint is kept moderately quiet, this caseation or liquefaction is unaccompanied by any suppuration, although all the structures of the joint may be involved in one large, cold abscess. This abscess is bounded by a lining of exudation tissue, which more or less protects the surrounding structures against infection, but contains in its innermost layers the active tubercles whose degeneration is furnishing the caseous material. The latter is capable of inoculating fresh-cut surfaces if brought into contact with them, and of thus producing fresh tubercular disease. It is also capable of being taken up by injured veins or lymphatics, so as to infect the system generally. It may also inoculate blood-clot or serum remaining in a wound after operation, and thus start a fresh colony of bacilli.

Now if all this be true, and of this there can be no doubt, the excision of a hip henceforth must be something very different to what it has been in the past. The mere removal of the head of the femur and parts of the acetabulum, with free drainage of the cavity until all shreds of tuberculised material have been cast off by suppuration, will not be sufficient if we are to aim at an ideal result. Our aim in the future must be not only to remove any diseased bone present, but also all the infected synovial tissues and their *débris*. And not only this, but we must also completely get rid of all the contents of any caseous abscesses connected with the joint, together with their lining membranes. Moreover, all this must be done in such a way that no tubercular *débris* shall be left on any of the fresh-cut surfaces to infect the wound, or be taken up by the veins or lymphatics into the system.

Finally, all the operation must be conducted with as little violence to the injured tissues as possible, so that bruising and laceration is reduced to a minimum. In this way the vitality of the tissues around the wound will not be lowered, and they will be less liable to subsequent tubercular infection; there will also be a minimum of reactionary hyperæmia with serous exudation after closure of the wound, and no damaged tissues to slough away.

Now it has for a long time appeared to me that if all the tubercular disease in a hip-joint could be completely excised at once on the lines just laid down, so that only sound structures should be left behind, it ought to follow, inasmuch as the tubercular process is not a suppurative one, that primary union of all the surfaces of the operation cavity could take place at once without any necessity for that prolonged drainage which has hitherto been the rule.¹ In this way the production of a drainage sinus could be avoided, the persistence of which has always been a source of danger to these patients, leaving as it does a doorway open into the joint for the access of pyogenic organisms. Exudation material in a closed wound is secure against the inroads of the latter and would rapidly organise into solid tissue, but in an open wound offers the best soil for their cultivation.

The method of excising tubercular tissue from the hip, which I have now the honour of introducing to your notice, is one which I have formulated within the last year upon the above deductions. It will I think be found to meet the requirements of these cases in a way not hitherto attained by any methods with which I am familiar.

I trust, Sir, I shall not put too severe a tax upon your patience if I describe this method rather fully, and notice in passing the objects aimed at in each detail.

In the first place, the most rigid and uncompromising asepsis is insisted on. Everything turns upon this. Antiseptics are of

course used for the operator's hands, the instruments, sponges, etc., but only sparingly for the patient's wound. The necessity for great caution in the use of powerful germicides with children in operations, such as excisions at the hip, which require considerable expenditure of time for their satisfactory completion, I am convinced of by a considerable experience. For this reason I have come to rely more and more upon the *aseptic*, and less upon the antiseptic, treatment of the wounded surfaces themselves. In past days, when the spray was continuously used during prolonged excisions, and the wound was vigorously syringed out with strong carbolic solutions, severe shock and carbolic intoxication was frequently the result. And though no death has followed upon even extensive excisions of the hip in my own cases, I have often felt very anxious about them on this account, many deaths having been recorded from these causes by other observers.

This anxiety, together with a full realisation of the fact that in dealing with tubercular disease which has been kept quiet and has not yet burst through the skin, we are not attacking a truly suppurative process, has led me to give up the spray altogether, and trust to vigorous flushing of the wound with *sterilised hot water*, reserving the use of germicides for a final short mopping of the field of operation, just before closing it by suture. At the same time far greater care has been bestowed upon the antiseptic scouring of everything which could in any way come into contact with the wound from without.

But the great difficulty of *thoroughly* ridding the wound of all tubercular *débris* without syringing with large quantities of germicide solutions has been fully recognised, and since last June I have been employing this sterilised hot water for this purpose. This can be used in any amount, and at high pressure, with entire safety. And not only this, but when used at a high temperature it in itself has a tendency to prevent shock, both by its warmth and by its arresting hæmorrhage, a matter of the greatest importance in the case of debilitated children.

Supposing, now, the case of a child, say, 8 years old, whose hip, in spite of the best treatment we can devise, is steadily becoming disorganised, and in whom a soft swelling is forming round the joint, with fluctuation but without sinuses as yet, the technique I adopt is as follows: The child is, of course, first washed thoroughly with soap and hot water, and taken off the double Thomas's splint, which has probably been in use for months. Then the limb is wrapped in a towel dipped in 1 in 20 carbolic solution, if possible an hour or two before operation. The incision I have used for several years past is that originally proposed by Hueter, of Greifswald, in 1878, and a little later in this country independently by Mr. R. W. Parker, and which, it is satisfactory to note, is taking the place of all the older incisions. It commences on the front of the thigh, half an inch below the anterior superior spinous process of the ilium, and runs downwards and a little inwards for three inches. As the knife sinks into the limb it passes between the tensor vaginae femoris and glutei muscles on the outside, and the sartorius and rectus on the inside, until it reaches the neck of the femur. This incision does not divide any muscle fibres, nor either vessels or nerves of the slightest importance. It is unnecessary to carry the deeper part of the incision to the full extent of the external wound. If an abscess is opened up before the joint is reached, its contents are thoroughly flushed out with sterilised hot water, at a temperature of between 105° and 110°, before anything further is done. For this purpose I have had a large three-gallon can made, which has three taps below, to each of which six or eight feet of india-rubber tubing is attached. This can is placed some feet above the operating table, so as to have a considerable pressure of water. Each of the rubber tubes terminates in one of these instruments, which I have designed for the double purpose of enabling the diseased cavity to be flushed out with the hot water, while softened bone or tuberculised synovial tissue can be gouged or scraped away simultaneously; this has been found to save much time and disturbance of the wound. The abscess having been cleared out by means of the rush of hot water, aided by these flushing gouges, the neck of the femur is sawn across with a narrow saw in the direction of the external wound. The diseased head can then be lifted out by means of the flushing scoop or a sequestrum forceps, through which the hot stream is rushing into the joint. By the time the head of the bone has been got out the whole cavity is comparatively clean. Now begins the search for further disease. This can usually be easily estimated by the left forefinger with which the acetabulum is first examined, and then all

¹ See Hunterian Lectures.

the other parts of the joint cavity. Wherever diseased material is felt it is cut away by the flushing gouge or scoop, while the hot water carries away the *débris* as fast as it is produced, and with it all blood, while at the same time it arrests bleeding from the fresh cut surfaces. When every part of the field of operation has been gouged and scraped clean of all tubercular material, and the water runs away clear, the cavity is dried out with carbolised sponges, one or two of which are left in it until all the stitches are placed in position. These, which are of hard carbolised silk, should dip deeply, and be placed close together. Just before they are tied, the sponges are removed, and with them the last traces of moisture. The wound is then filled up with iodoform emulsion, and the sutures are tied, as much of the emulsion being squeezed out at the last moment as will come away. A little iodoform is now dusted over the surface of the incision, in which there is no drainage-tube in most cases, and the whole joint is covered with salicylic wool, so adjusted in strips that evenly graduated pressure is brought to bear upon every aspect of the field of operation, while the limb is held well abducted. If the wool be now firmly compressed with a spica bandage, the walls of the whole clean-scraped cavity are brought into contact, and the remainder of the neck of the femur is thrust into the acetabulum, and secured there.

Flushing gouge with rubber tube attached to hilt. The tube is closed by a sliding ring moved by the button in the handle. The cutting edge of the gouge receives the full force of the water stream rushing through the handle.

Now where all this has been done, although there remains potentially a cavity, there is actually nothing of the kind, for all the surfaces have been brought into apposition. And then, assuming that perfect asepsis has been observed, all these surfaces ought to unite with a minimum of plastic exudation. After the operation, the patient is at once placed upon his double Thomas's splint as before.

Let me now give you the result of the first operation done on these principles. On July 3rd last I excised the hip of a boy, aged 5, which was extensively diseased, and converted into an abscess, in spite of careful treatment on a double Thomas's splint, etc., for a year, and was rapidly becoming worse. The operation was done as above, and the wound was stitched up completely without drainage. There was no shock at all, although the operation was long and severe. The first dressing was left undisturbed for ten days, at the end of which time the wound was found to be soundly healed. The stitches were removed on the thirteenth day, and the boy went home on the following day. He remained on the double Thomas's splint for eight weeks, when it was removed by the parents on his going to Eastbourne, where he began to run about almost at once. Since then he has remained quite well, and is now running about with only a short linear scar in front, and with less than half of an inch shortening of the limb. Not a trace of any mischief can be discovered about the joint, and the latter is slightly movable.

I do not think it was wise to remove the splint so soon as was here the case. It was done without my sanction, but it does not appear to have been followed by any ill result, except a slight tendency to flexion and adduction, and the experience shows how soon firm union of the bones of the joint may take place under favourable circumstances. The slight flexion and adduction can be easily corrected by replacing the splint.

This case does not stand alone. Soon after this boy left hospital, my colleague, Mr. Bilton Pollard, had four cases of a similar kind at the Children's Hospital, in which he operated on very similar lines, cleaning out the joint very thoroughly (but without the hot-water flushing), and stitching up the wound firmly without a drainage-tube, as I had done, and using the iodoform emulsion as just described. In all four primary union was the result, and three have remained permanently closed ever since. In one the wound reopened again a little, but is now nearly closed.

Now, Sir, I need hardly insist before such an assembly of experienced surgeons that if, by any means, we can achieve similar results as the rule in the future in cases of comparatively advanced morbus coxae, it will be little short of a revolution. We can all remember the usual course of such cases in former days, even when operated on by the most skilful surgeons. The patient usually lay in bed for months with open wounds, suffering a martyrdom at each dressing, which had to be very frequent, and exposed to all the risks of wound infection, hectic, amyloid disease, and general tuberculosis in his very much weakened condition; and even when the wounds ultimately healed, it was frequently only to break out later at one or more points where tubercular foci had not been completely removed, or where the surfaces of the operation wound had been inoculated during the process of removal. So much so was this the case that there was a protracted inquiry, you will remember, a few years ago, by a Committee of the Clinical Society of London, to ascertain whether there was any real and substantial benefit to be obtained by excision of the hip at all; whether the ultimate mortality from the disease was reduced by it, and whether the results as to the usefulness of the limb were improved by the operation. And here I would venture to remind you that the best results in any long series of cases hitherto published, even since antiseptic surgery has become the rule, have never shown a smaller gross mortality after excision of the hip than about 36 per cent.

But now, if we can look forward to eradicating the whole tuberculised area at one sitting, and to obtaining primary union of our wound, what an enormous gain will this class of sufferers enjoy. They can leave their bed a week or so after operation, during which there is no painful and frequent dressing; in a fortnight they can leave the house for the country, and thus rapidly regain their vitality. This will enable them to resist any further ravages of the tubercular disease, which so frequently carried them off later on. The dangers of septic wound infection are swept away almost with a stroke, and with them one of those terrors which, in former days, led us to hesitate to operate upon these cases until we were driven to do so in very late stages of the disease, when we had often to sacrifice large portions of the femur and acetabulum. If under the newer régime these fears have no ground, and our excision wounds can be made to heal as simply as an osteotomy, we will be encouraged to operate earlier than hitherto has been the rule, and the consequent results as to functions of the limb will be immeasurably better.

For my own part, encouraged by recent experiences, I look forward to long series of cases of hip excision, not only without a death, but where our patients will be able to walk about upon a strong and but little shortened limb in as many weeks as it formerly required months to obtain a result not so good.

In conclusion, I will only ask those surgeons present to-night to put this method to the test in their own practice, and with due attention to details the same results will doubtless be secured. And if these are obtained, I am confident that my audience will not feel that in suggesting this new technique for excision of the hip, I have presumed too much upon their kindness. The use of hot water for washing out the abdomen has yielded such good results that it was only a step further to employ it for joints. But in the latter it ought to be even more useful, for the cleansing of a ragged irregular abscess cavity from tubercular *débris* should be much more difficult by any other means than the cleansing of the smooth peritoneum. So far as I know, hot-water flushing has not been used as described above for joints, and combined with flushing gouges, until now, nor am I aware that any instruments, like these I show you, which I have had made from my own pattern by Krühne and Sesemann, exist anywhere else.

Another case operated on by this method since these lines were written has given me increased confidence in the flushing gouges. Union by first intention has been as complete throughout the whole cavity, as in the other cases alluded to above.

CORPORAL punishment has for some years been prohibited in the Belgian State and other schools, and those teachers who are not able to maintain discipline by means of extra tasks are considered unfit for their calling.

INFANT SUFFOCATION.—At an inquest on the body of an infant which had been overlain in a bed occupied by the two parents and two children, the coroner, Mr. Wyatt, observed that in Germany it was a criminal offence to overcrowd beds with young children.