Association would assist, in the most effectual way, the great objects of its foundation.

I cannot for a moment suppose that the Council of this Association, if urged by you to do so, would resist such an appeal; and it is to me certain, that, in this manner, real advantage to the profession, and a sure advance in our knowledge, might be annually effected without encroaching upon any other useful objects. Should you agree with me, I would urge that a very strong representation to that effect be sent from this Section to the Council. At any rate, I trust you will forgive my bringing this matter before you, feeling, as I do, that, in the present condition of medicine, what we require is not brilliant hypothesis, or ingenious speculation, but that solid genuine work to which we may look for furnishing us with truthful data. Let us resolve, by means of renewed experiments and careful observations with our modern appliances, to overcome the difficulties which surround us, and there can be little doubt we shall render the practice of our art worthy of the advanced state of science which now prevails.

ON AMPUTATION AT THE ANKLE-JOINT.*

By GEORGE H. B. MACLEOD, M.D., F.R.S.E.,

Professor of Surgery in the Andersonian University, Glasgow, and Surgeon to the Royal Infirmary and Lock Hospital; formerly Senior Surgeon to the General Hospital in Camp before Sebastopol.

THE great frequency of disease implicating the tarsus and the tibio-tarsal articulation makes amputation at that joint a very common operation. Various methods were resorted to by Vacca, Brasdor, Textor, Baudens, and others, before our great surgeon, Mr. Syme, perfected it in our own time; and, as experience has declared against amputation low in the leg, and also through the tarsus, it very often falls to the hospital surgeon to perform his operation. I had, during and after the Crimean war, considerable opportunities of judging of the success attending the *sus-malleolaire* amputation of Lenoir, and was strongly impressed with its drawbacks. The only valid argument in its favour is the small mortality which attends it; and, in that respect, circumstances (as during a military campaign) may occur in which it might be desirable to have recourse to it, notwithstanding its disadvantages of a painful ill-covered stump. It is very rarely the case, so far as I have observed, that disease of the ankle-joint implicates the bones of the leg so extensively as to render Syme's amputation inapplicable. Further, in those cases of disease of the tarsus, or in destruction of the foot, as by round shot or a wheel, in which it might be possible to amputate through the tarsus by Chopart's method, or by any of those plans by which the astragalus or os calcis are retained, experience has, I think, proved the greater advantage of disarticulating at the ankle, and retaining, if possible, the thick cushion of the heel as a covering for the ends of the leg-bones.

The opinions expressed in the following paper are founded on a series of fifty amputations at the ankle, performed during the last fifteen years, and with only one death. So low a mortality is quite exceptional, especially when it is considered that the majority of these operations were performed in public institutions, many of them in military service, and for most severe accidents. The only fatal case of the series was the last but one, where death followed an amputation performed for disease on the first of this month; the patient, a young lad, dying of purulent infection on the sixteenth day. No doubt several other patients suffered from severe complications, and were nearly lost; but ultimately all recovered from the operation, except the one referred to. A long run of success such as this is not unfrequently observed by surgeons in connexion with certain operations—when, without apparent cause, the tide turns, and in the end the average mortality becomes equalised to that experienced by others. It was doubtless in the belief of such a fact that, on a celebrated surgeon meeting a professional friend in the street, and boastfully telling him he had cut so many patients for stone without a death, he was met by his friend's remark that, "under the circumstances, he would be very sorry to be his next patient."

The patient who died under my charge was by no means in so unfavourable a condition for operation as many others who recovered without a bad symptom.

The mortality following amputation at the ankle has been variously stated. My friend M. Legouest, in his *Traité de Chirurgie de l'Armée*, puts it at 23.2 per cent. In our army, during the latter and best period of the Crimean war, it was 22.2 per cent. In the American

civil war, it was 13 per cent.; and the most favourable civil experience with which I am acquainted reckons it at 8 to 10 per cent. Weber, one of the most recent authorities, calls it 16 per cent.

Of the entire number of operations, thirty-two were by Syme's method; and it is chiefly on some details connected with this procedure that I wish to dwell in this paper. Eleven were by postero-internal flap, as first proposed by Jules Roux of Toulon, and ably advocated by my late much valued friend, Dr. Richard McKenzie of Edinburgh; three were by Pirogoff's method, or its modification by Sédillot; two were irregular, the soft parts being much destroyed, and the coverings taken from different sides of the joint; and two were by long anterior flap, after Baudens' plan, in cases in which the heel was destroyed.

Only fourteen of the patients were females, and the ages ranged from five to sixty-nine. In most of the cases, the patients varied in age from ten to eighteen; these operations were almost all necessitated by disease, as, with few exceptions, the traumatic cases occurred in adult males.

In one case (twice counted), a Pirogoff had, after an interval of two and a half years, to be converted into a Syme, from the os calcis becoming caries; and, in another patient (also counted as two), both feet were removed at different times for disease. Thus, for fifty amputations, there were but forty-eight patients.

Of the fifty cases, thirteen only were traumatic. Some of these occurred in the East during the war; the rest in civil practice in Glasgow. Ten of the thirteen operations were primary—*i. e.*, performed within twenty-four hours of the accident; the rest were had recourse to after suppuration had set in.

Of the thirty-seven operations undertaken for disease, three were performed on Jewish children during my residence in the Levant. Extensive caries of the tarsal bones, combined or not with disorganisation of the ankle-joint, was, in the great majority of cases, the cause necessitating the operation. In many, the disease was of long standing, and the general health grievously impaired. Two were for fungous disease of the sole of the foot; one was occasioned by the presence of a fibrous tumour, which had burst up the tarsus; one was to get quit of a defective stump resulting from a Chopart, in which the cicatrix was weak and irritable, and the heel retracted; two were for severe burns of the foot; and two for old and intractable ulcers of the dorsum, which had received only temporary benefit from plastic operations and other measures.

Such, then, is a short analysis of the series of cases I wish to submit to this distinguished assemblage, and on which I would further beg their permission to make a few remarks.

Having myself, then, had considerable experience of amputation at the ankle, and having, in the hands of others, seen a large number of cases, I have very decidedly been led to consider Syme's method as that which best fulfils the requirements of the vast majority of those cases in which we wish to remove the foot. It is not my wish at present to discuss the question of excision, either of the articulation, or of special bones in the neighbourhood of the joint; nor do I stop to insist that the cases I operated on were such as could not have been managed by any procedure short of amputation. I will simply say that I did not believe them capable of being *cured* by any other method than amputation, though it is possible that a certain measure of success might have been temporarily obtained from a less serious alternative.

In the series of cases alluded to, then, the great majority were examples of Syme's amputation; and my experience of it, as compared with other modes of operating, is so favourable, that in the future I intend to adhere to it in all cases fitted for its employment. That the proceeding of Roux, by internal flap, gives most admirable results, no one can, I think, deny, who has tried it fairly. In cases in which the outer surface of the heel is destroyed, that operation is capable of supplying a most excellent substitute for Syme's amputation. The covering is ample, the blood-supply good, the proceeding easy, the drainage excellent, and the position of the cicatrix perfectly satisfactory. The drawbacks to it are, that the blood-vessels and nerves are drawn across the end of the bones; and that, if sloughing attack the flaps, they cannot spare much of their extent without becoming deficient. The quadrilateral internal flap of Sédillot is very much the same thing, as is Soupart's amputation by internal flap.

Pirogoff's amputation, though ingenious, and theoretically superior to Syme's, is in reality much inferior to it. It is not at all fitted for cases of disease, as the portion of bone left becomes again in time the seat of disease. It certainly saves the dissection of the heel-flap, which many find so difficult; and the greater length and increased firmness of the stump, together with the non-interference with the blood-vessels of the heel, are made the most of by its partisans. In traumatic cases, it succeeds very well; but it is found that, as regards the fitting of a false foot, the presence of the heel-bone is a great drawback; and the back

* Read in the Surgical Section before the Annual Meeting of the British Medical Association in Leeds, July 1869.

part of the heel, and not the firm plantar pad, is what comes into contact with the ground.

The other methods of amputation at the ankle—as Baudens' by anterior dorsal flap, the external, the circular, two lateral flaps, Teale's and Quain's modifications—may, in certain conditions of the soft parts, present advantages; but, in the immense preponderance of cases demanding the removal of the foot at the tibio-tarsal joint, Syme's, in my humble opinion, is the best.

Let me, then, draw attention to a few details connected with that mode of operating, which, I think, are not sufficiently understood, and on which success, I believe, in a great measure turns.

First, let me ask, what are the essentials of any good method of amputation? Whatever else may be said, the following are evidently of the utmost importance.

That the whole disease or injured parts should be removed; and that with as little mutilation as possible, and with as great a saving of the body (especially of bone) as can be.

That the covering retained for the ends of the bones should be ample in amount, healthy and firm in quality, so as to make it capable of withstanding pressure and attrition; that the blood-vessels and nerves should be placed out of the way of pressure, and that they should be well covered and protected; that the flap or flaps should be well supplied with blood, and fall easily together, and be capable of easy retention; that secretions should have easy exit; that the resulting cicatrix should be out of the line of pressure; and, lastly, that the stump should be one to which the mechanist can with greatest facility adjust a substitute for the removed part.

Such, as it appears to me, are the desiderata for any perfect amputation; and the more nearly these conditions are supplied, the more worthy of confidence will the procedure be. Now, I take it, every one of these conditions are supplied in Mr. Syme's method. The only one which can be fairly questioned is that which relates to drainage. The cup-like shape of the heel-flap makes the escape of pus from it sometimes very difficult, but that depends, in a great measure, on a slight error often committed in fashioning it, and in the after management, as I will presently show; while, if a slit is made in the dependant part of this heel-flap, all difficulty is overcome, and no harm is done. When properly performed, all the other conditions are most perfectly fulfilled in Syme's amputation.

Mr. Syme has himself drawn attention to several important details connected with this operation, but in so terse a manner that they are apt to be overlooked till one comes personally and frequently to study them at the operating table. I wish to dwell for a moment on some of these.

It is well known that the external malleolus lies considerably lower, or rather is considerably longer, and comes nearer the sole of the foot, than the internal, and it is a little more posterior in its position. Further, the articulation between the tibia and astragalus is most open and loosest in front, and there lies higher than it does behind. The posterior tibial artery again divides beneath the internal annular ligament of the joint into its internal and external plantar branches, so that, if we cut quite up to the internal malleolus, in forming out plantar flap, we divide the vessel prematurely, and so greatly injure the blood-supply.

The knife best fitted for amputation at the ankle is a short, strong-bladed one, of which a good hold can be got, and yet that the blade is quite within command of the hand.

In making the first incision, the foot is held at right angles to the leg, while in making the dorsal flap, the foot is extended on the leg. The first incision begins immediately below the *middle* of the external malleolus, and extends to a point exactly corresponding (as to height from the sole) on the inner side. This will be about half-an-inch below the extremity of the internal malleolus. By attending to this, two important ends are gained; 1, the flap will be symmetrical and not too deep; and 2, the posterior tibial artery will not be prematurely cut. It will be observed that there is no sloping of the incision forwards or backwards, as is sometimes done. Forwards is never required, and introduces a very grave difficulty into the subsequent dissection; and backwards is very rarely called for, and only when the heel is very prominent. The plantar incision I have been speaking of goes down to the bone, dividing all the tissues. The flap thus marked out should now be dissected backwards by a series of small cuts, made between the left thumb-nail and the bone, till the heel is turned. This is, unquestionably, the most difficult part of the operation, as it requires time and care; but, by freeing the flap well at its outer angle, and keeping the line of incision described in which too deep a hollow is not made, the dissection is accomplished in a little time. No sweeping cuts can be ventured on, otherwise the cushion of the heel will be severely, and possibly fatally, injured in its structure and blood-supply. It has not infrequently happened to me, in operating for disease, to find the periosteum

so thickened and loosely attached to the bone that, having got below it, I have separated the heel-flap with the nails of my thumbs; and some of these cases have given the firmest and best stumps afterwards.

If great care is taken to keep close to the bone, the greater part of the heel-flap can be quite safely and more expeditiously dissected off from above; *i.e.*, from within outwards, after disarticulation. I have repeatedly done this, after the advice of my old master and friend, M. Alphonse Guérin, though I am well aware that it does not meet with the approval of the distinguished surgeon who proposed the operation.

The anterior flap is made by an incision straight across the instep, between the cornua of the first cut. No convexity should be given to this flap if the heel is sound, as the tissues of which the anterior flap is composed are thin and weak; and it is desirable to keep the cicatrix well forward on the stump. There is less chance, too, of missing the articulation, as a beginner is apt to do, and getting below the astragalus. A little movement communicated to the joint, or attention to the position of the malleoli, will obviate any difficulty in finding the articulation. The anterior and lateral attachments of the bones are now to be divided, and the joint opened. In separating what remains of the soft parts, we carefully keep close to, and cut on, the bone.

In clearing the extremities of the tibia and fibula, we must be careful to keep very close to the bones, so as not to risk injuring the arteries. A fine resection saw answers best to remove the malleoli, and the section should be accurately perpendicular to the shafts of the leg-bones. If any portion of the tibia is removed except its malleolus, it should be only the thinnest possible slice, by which the cartilage is removed with the cup-like articular surface of the tibia, but all fear of annoyance from the cartilage may be abandoned; and if the bone is healthy, it is far better not to interfere with it than run any risk of exposing its interior. The cartilage may be gently sliced off, if it is thought desirable, with a knife, and any limited portions of disease may be picked out with a gouge; but attention is often required to distinguish changed from diseased bone; and there is no doubt but that one of the chief sources of danger, after all amputations, is the opening by the saw of the interior of a bone. It is in this, as I take it, that the great advantage of amputations in the contiguity, as contrasted with those in the continuity, of bones exists. The less the action of the saw, the less the destruction of periosteum, the less roughness in the ends of the bones to irritate afterwards the soft parts, the less bleeding from the bone implicated, the better for the result.

I believe that the plan advocated, of first disarticulating and then sawing the leg-bones, is much superior in all respects to the other sometimes adopted, of at once dissecting up the flaps sufficiently far to allow of the bones being divided. There is much less fear of injuring the blood-vessels, and thus causing sloughing; and the difference in time is very slight.

As to securing blood-vessels, I prefer torsion in this amputation to the ligature or acupressure. It is quite efficient in most cases, though occasionally the ligature has to be employed. It has not infrequently occurred to me to have no vessels to tie at all, as neither at the time of the operation, nor afterwards, have any bled. This is, of course, the rare exception, and always makes one anxious about secondary hæmorrhage. Much more frequently many minute vessels have bled, especially from any periosteum which may have been left in the heel-flap; and in such cases, if torsion, cold, elevation, and pressure, has not sufficed to arrest it, the sutures should not be fastened (though put into place); and, after the patient is put to bed, the limb should be well elevated, and an ice-bag, or a compress and bandage, used to stop the bleeding; the clots may then be washed out, and the flaps put together. It is most undesirable to put the flaps into position so long as there is any oozing, as the cup-like heel will get full of blood, and union delayed immensely. I may say, in passing, that I have found torsion forceps much more easily worked when made with a spring catch, like the artery forceps of Signorini, than constructed with a sliding catch, as they generally are.

In traumatic amputations we can, after all bleeding has ceased, at once adjust the flaps; but, when there is much disease in the soft tissues, and so a profuse suppuration to be apprehended, we will sadly regret doing so. In such cases the sutures being put in place, the flaps are not to be pressed together, but a piece of wet-lint inserted between them, and adhesion by granulation afterwards sought for.

I have employed various disinfectants and antiseptics in the after-treatment of these and other wounds, and am strongly impressed with their advantages in lessening discharge and destroying smell. Carbolic acid dissolved in water (1 to 30), or Condy's fluid or chloride of zinc (gr. 15 or 20 to the ounce), are very useful indeed, when used to wash over the flaps at the time of the operation; and carbolic acid or Condy's fluid should always be mingled with the water used for syringing out the

stump (which I always do at each dressing, so long as pus lodges in its interior). A pad placed below the heel-flap, and kept firmly applied by means of a bandage, materially prevents bagging with pus, and promotes adhesion and recovery. The two extremities of the wound should always be left open for the escape of discharge; and some of the sutures should be strong, and placed so deeply as effectually to hold the heel-flap in place. Finer wire sutures may be used between, so as carefully to adjust the edges of the flaps; and narrow stripes of adhesive plaster aid the same result. The sutures should be left in place as long as possible. I never now use a cut in the centre of the heel for drainage; as, if the plantar incision is not carried too far forwards, the open ends of the flaps will sufficiently drain the interior.

I am a strong advocate for dressing as seldom as possible. Unless the suppuration is very profuse, and the drainage bad, it is not necessary to interfere oftener than every second day; and, in fact, if the dressings applied be of the simplest and lightest kind, very little meddling will be required. I rarely make my first dressing till the third or fourth day.

In traumatic cases, a good plan is to put the stump under cold irrigation for some days after amputation. In fact, this admirable application may in many cases be most advantageously continued nearly till the close.

In cases of disease in which many sinuses have existed, it will be some time before the stump becomes firm and healthy; yet these apertures are most useful during healing, and in time, by good dressing and bandaging, close firmly. Abscesses in the course of the tendinous sheaths are occasionally troublesome, and the usual complications of wounds may have to be combated.

I have had very few cases of secondary hæmorrhage, hardly one of sloughing, when Syme's amputation was employed; and none of painful or imperfect stumps. In both cases in which, from the destruction of the soft parts, I was forced to take my flap from the dorsum of the foot, I had sloughing and most imperfect stumps; and at least one of those irregular ones I mentioned, in which the flaps were made up of shreds, as I may say, from different sides of the articulation, would, I fear, have to undergo subsequent amputation; though, having lost sight of them as they were sent to the rear, I was unable to trace their final condition.

I must apologise for detaining the meeting so long; but I hope that I may have suggested some practical points for their consideration.

SUCCESSFUL CASE OF CÆSAREAN OPERATION : MOTHER AND CHILD ALIVE.

By J. S. GAUNT, Esq., M.R.C.S., Alvechurch.

ON the morning of July 29th I received a note from Mr. Parsons of Tanworth, requesting me to meet him and Mr. Kimbell of Tanworth at a case of difficult labour at Aspbury Heath. We met at nine o'clock, when I found that Mrs. B., aged 38, a blacksmith's wife, had been in labour since the 27th. She thought the membranes ruptured on that day, with the first pains; but only a small quantity of fluid escaped. This was her fourth pregnancy. In her first labour, in 1857, she was attended by Mr. Kimbell, and more than a week passed before the child was born; it was still-born. In her second confinement, in 1860, she was attended by the late Mr. Duce of Wednesbury. She was in labour twelve hours, when a very small living child was born, which survived its birth but a few weeks. After this confinement, she suffered from pain and weakness in her back and hips. She was in the General Hospital at Birmingham for ten weeks, under the care of Dr. Russell. In 1865, she was in labour for four days, being this time again attended by Mr. Kimbell. Craniotomy was performed by this gentleman, after consultation with Mr. Smith of Redditch.

On vaginal examination, I was unable to reach the presenting part. The transverse diameter was only one inch, the antero-posterior an inch and a quarter, barely admitting my first three fingers, closed together, up to the first joint. I urged my colleagues not to delay, but to proceed at once to the performance of the Cæsarean section, as being the only hope of saving the mother's life, as well as that of the child. This was consented to. I advised forty minims of Battley's solution of opium to be administered, and we arranged to meet at three o'clock. The bowels had acted in the course of the morning; and water was passed at 2 P.M., so that it was thought unnecessary to introduce the catheter. She was placed on a bed, with her legs drawn over the bottom, the feet resting on pillows. Mr. Kimbell administered chloroform; and, when she was fully under its influence, Mr. Parsons made an incision about four inches in length in the course of the linea alba,

dividing the peritoneum on a director. An incision was then made into the upper part of the uterus, wounding at the same time the placenta, from which issued a slight gush of blood. He then introduced his finger, and upon it divided the uterine wall. I now tore through the membranes, seized the breech, and extracted a well-developed living child, which began to cry lustily. After cutting through the funis, I separated the placenta, which was attached to the anterior and superior part of the uterus. I now introduced my hand into the uterus, passing my forefinger through the os into the vagina, from which there was a slight discharge of blood, continuing to this date. I then placed the fingers of my right hand on each side of the incision, and brought the edges into apposition. With my left hand I grasped the fundus, which contracted very fairly. The wound was closed by means of hare-lip pins passed through the abdominal walls, embracing the peritoneum with intermediate silk sutures. A pledget of lint, secured by adhesive strapping, was then applied, and a bandage carefully adjusted. We agreed to give one drachm of laudanum, to be followed by a quarter of a grain of opium every four hours; the diet to consist of beef-tea and milk.

On the 30th, there was some distension of the abdomen, and an enema was given. The following day, the bowels were relaxed, and they have subsequently acted on alternate days. The catheter was introduced, but was not afterwards required. The opium was inadvertently omitted on August 1st; great depression followed; and the pulse became extremely frequent.

The sutures were removed on August 9th, when firm union was observed to have taken place. Scarcely three ounces of blood were lost at the operation. It should be noted, that a higher temperature was maintained in the chamber, and that the vagina was syringed daily with a weak solution of carbolic acid.

Her father suffered from syphilis, and died from phthisis. Her mother became an inmate of an asylum. She told us that she had been becoming shorter in stature for some time past. I have only to add, that both mother and child are quite well.

CLINICAL MEMORANDA.

[Under this head, we shall publish from time to time, as materials accumulate, short records of remarkable cases in practice which are sufficiently rare, interesting, or instructive, to deserve record, but do not call for lengthened statement or comment. Brevity and point should be the valuable characteristics of cases forwarded for this column.]

RETENTION OF URINE WITH HÆMATURIA.

By J. BIRCHENALL, Esq., Macclesfield.

S. S., aged 63, tall, of athletic form, and robust health, actively employed as principal warehouseman in a silk-mill, had accustomed himself for some years to the occasional use of the catheter on account of prostatic enlargement. On May 17th, 1866, on going to bed, he took a strong glassful of hot whiskey-and-water; and, on the following evening, a similar potation of gin-and-water, for the purpose, as he supposed, of throwing off a recent cold. He was thereby necessitated to have recourse to the instrument more frequently than usual; but, as the relief in every instance was incomplete, and the urine highly charged with blood, he placed himself under my care. I passed a full-sized catheter without any difficulty, and drew off an ounce of bloody fluid. There was no tension or tumefaction of the bladder; but, as the uneasy straining sensation continued, I urged him to maintain the recumbent posture as far as possible, and ordered suppositories of opium. On inquiry I ascertained that, six weeks previously, he slipped upon the stairs, falling upon his elbows, that he was thereby much shaken, and that the secretion of urine for some days subsequently was of a slightly bloody hue. As the bowels were free, a mixture of nitrate of potass and carbonate of soda, in doses of five grains each, with thirty drops of tincture of hyoscyamus, was prescribed every four hours. The patient was ordered to observe a farinaceous diet, and to drink barley-water. The treatment afforded relief to the urgent symptoms, although, on every occasion when the catheter was passed, the urine was highly charged with florid blood. On the fifth day of my attendance I found that my patient had ventured to go down to business, but a cutting easterly wind superinduced an aggravation of his symptoms, of which I was not apprised for several days, when I found him in much pain with constant straining, and a sense of faintness; the pulse quick and irregular, and the tongue brown and dry. The catheter had been passed frequently, but it had given issue to slight jets only of bloody fluid. The suppositories were repeated, and port wine and infusion of roses administered at regular intervals. There was no head-ache, nor