Lecture

ON

ANTISEPTIC OSTEOTOMY

FOR

GENU VALGUM, GENU VARUM,
AND OTHER OSSEOUS DEFORMITIES.¹

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IN THE LANCET of March 30th, 1878, I published a clinical lecture on Antiseptic Osteotomy, detailing four cases and five operations. In it two distinct methods of operating for the relief of genu valgum were mentioned, both being practised on the condyloid extremity of the femur, beginning on the inner side. The first described the removal of a V-shaped portion of bone, the second consisted in a simple incision without removal of bone. Subsequent writers, in criticising this paper, have confined their observations solely to the first method of operating, overlooking altogether the second. In one instance a surgeon advances a very similar operation, if not one which is identical to the latter described by me; and though he remarks on the first method of operating, he in no way refers to the other. Partly with a view of elucidating these matters, but chiefly in order to present the experience gained by more extended observation, this paper is dictated.

I have now operated on over forty limbs, and have performed over fifty osteotomies, without a single fatal case. Of these over thirty have been for genu valgum, the remainder being for genu varum, rickets, and angular ankylosis of knee-joint.

I beg first to direct attention to genu valgum. Knock-knee consists of the too great protrusion inwards of the lower limb at the knee-joint. The deformity differs widely in degree—in some cases consisting merely of a slight inward inclination, while in others the angle formed is so great as to render the patient incapable of walking or standing for more than a very few minutes, and even during that time causing great pain. The latter amount of deformity was well illustrated in some of my cases, as the one first operated on. It is seldom or very rarely congenital; it commonly arises, or at least becomes manifest, at the time when the child is first allowed to walk, and it very often shows itself during dentition. It may, however, not come on until the period of adolescence, or even later. Those few cases that occur late in life—after twenty-five years of age—are seldom accompanied by osseous deformity, but are due to the laxity of the ligaments. Its etiology points to a primary constitutional weakness, or temporary debility, and to a relaxed and atonic state of the muscles and ligaments. The periods at which it most often occurs show this—namely, dentition and adolescence. It has many times followed an acute illness, such as scarlet fever. A large, heavy body, taken in conjunction with the above, aids in its formation. It sometimes occurs in a semi-paralytic limb, and it is then seldom more than a relaxed state of the soft parts.

It is difficult to say on what physical force the initial inward inclination of the knee depends. There are several ways in which the primary physical tendency may arise. First, children, when beginning to walk, separate their feet widely the one from the other, and, as a consequence, throw considerable strain on the internal lateral ligaments of the knee-joint; if these are weak, or the body of the child heavy, elongation of these ligaments would be apt to ensue, and so the tendency to the development of knock-knee would be laid. Again, talipes valgus, though often looked on as a result, may in some cases be legitimately regarded as a cause of genu valgum; and, short of this pedal deformity, non-attention to the boots of those children who wear the

inner side of the heels might supply the inward initial inclination. Whatever may be the opinion regarding the inward initial physical causation, there can be little dubity concerning the actual condition of the parts, after the knock-knee has been formed. In this two conditions are recognised. The first, often preliminary to the other, consists of a laxity of the ligaments on the inner side of the joint, some holding that this is aided by a contraction of the biceps tendon. I am inclined to believe that the structures on the outside of the joint become contracted as a result, though when they have thus become contracted they will help in maintaining the deformity. This first condition is one which is confined to the soft parts. The second state is one of osseous deformity, the internal condyle being elongated beyond its natural limits, and out of proportion to the external condyle. This elongation of the internal condyle sometimes reaches a vertical inch beyond the internal. An easy way of showing the presence of this osseous deformity is to flex the limb of the patient, when the lower leg comes into a line with the thigh; again straighten it, and the vertical elongation of the condyle restores the genu valgum.

The French school attributes the lowering of the internal condyle to the lateral incurvation of the lower third of the femur, and if this is so, it affords an additional reason for rectifying the deformity in the lower third. Now, many recognise this lowering of the internal condyle as the only feature in this condition, but it must be remembered that the soft tissues, although they play a secondary part, are yet important factors to be considered, especially in view of remedial measures. The internal lateral ligament has been stretched, and, therefore, as far as the internal aspect of the joint is concerned, the inner condyle is the only part to be considered. On the external aspect, owing to the distance between the lower limb and the femur being lessened in genu valgum, the external lateral ligament will be shorter than in the straight position, and so likewise, but not to the same extent, will be the popliteus muscle and the biceps tendon. The more aggravated the deformity, the greater will be the shortening of these structures. Under ordinary circumstances, the popliteus is a rotator inwards of the lower leg on the knee, but being fixed to the extremity of the external condyle, it will tend to pull this part backwards and downwards, and consequently, were the internal condyle removed and straightening of the limb resorted to, the inner portion of the cut osseous surface on the femoral shaft would be apt to be tilted forwards by this muscle, while the internal condyle would remain slightly behind. The biceps has been spoken of as a cause of this deformity, and some have divided it along with other structures for the relief of this affection. It is not likely that the biceps would produce this deformity, at least from any central origin, seeing that it is supplied by the same nerve as the internal hamstrings.

In rickety cases the tibia is affected in various ways, often in the shape of a transverse thickening about the spine. On the inner side of the tibia there are sometimes one or more projections, in the shape of little protuberances or spines, which my colleague, Dr. Clark (lecturer on anatomy at the Royal Infirmary), believes to be the seat of the insertion of the internal lateral ligament, the bone being thus deformed in consequence of the continued strain upon it. Those who have been subject to knock-knee for long periods have peculiar modes of placing the foot on the ground. Some have a marked talipes valgus, many have something akin to varus, and in most bad cases the toes grasp the ground, this being apparently brought about by the continued effort of the person to steady himself while walking or standing. In some cases of long-standing genu valgum the toes cannot be far extended without much effort.

Genu valgum may thus be divided into two kinds, the one in which the deformity is confined to the soft parts, the other in which it is principally osseous, but which has certain important ligamentous contractions on the outside of the joint. The former is amenable to treatment by splints, bandage, tenotomy, &c.; the latter can only be dealt with by some procedure which will rectify the osseous deformity and the contracted soft parts.

Since the publication of my first paper on osteotomy for genu valgum, several methods have been advanced. Lately Jackson, of Wolverhampton,² has proposed to divide the soft structures on the outside of the joint, and then to straighten the limb. This procedure would, no doubt, suf-

¹ This lecture was delivered before the Medico-Chirurgical Society, Glasgow, on Dec. 6th, 1878. Dr. Macewen then showed a dozen patients who had been subjected to osteotomy, the majority of whom had been affected by genu valgum, a few with genu varum, and one with rickets.

² British Medical Journal, September 23th, 1878.

fect in cases where the internal condyle was not the chief factor in the deformity. But where there is osseous malposition, the mere division of these ligamentous and tendinous parts would fail in rectifying the deformity, unless it were coupled with removal of the internal condyle, or by incision elsewhere.

There are several methods which deal with this osseous deformity. M. Delore, of Lyons, does so by what he terms the *décollement des épiphyses*. He effects his end by *brisement forcé*, or a process of forcible straightening. The knee of the operator, placed against that of the patient, acts as a fulcrum, and the patient's limb is broken over this. The time required for this *redressement brusque* is from five minutes to half an hour, and when the surgeon is tired he is to be replaced by an assistant. Looking at this operation *à priori*, it appears that the fracture of the bone is a little haphazard, and if so would in some instances produce unsatisfactory results.

On the faith of M. Delore's recommendation I tried the procedure in two instances. In a lad of eighteen years I found it impossible to fracture the bone in the manner described, even with the help of an assistant, and while exercising all the force we could bring to bear on the limb. In the other, a boy of five years, the limbs yielded after considerable force had been applied, and they seemed to give way at or about the epiphyses of the femur. In this way the limbs were made straight, but not so straight as after the operation which I generally practise. After the bones were found to have united, the deformity was still slightly present, and he was instructed to return in a few months to have them rectified by the chisel. I speak of Delore's operation with this limited experience, and without having seen him personally apply it. Had this operation been performed in non-antiseptic days, it would have had a very great advantage over any cutting operation. But with strict antisepticism, the compound fracture or osseous incision is reduced to a simple one, and therefore the incision is, in this respect, quite on a level with the simple fracture. Granting this, then, there is the fracture of the bone at haphazard, which one has in the *redressement brusque*, to be compared with its division with mathematical accuracy afforded by the chisel. Of the two, I clearly prefer the latter.

Next there is the class of osteotomies, which are divisible into two: those which aim at a separation of the internal condyle; and the one which I advanced, the division of the condyloid extremity of the femur. There are various procedures for the removal of the internal condyle. Ogston separates the internal condyle by Adams's saw, and Reeves does so in Ogston's line by the chisel. The saw freely enters the joint, and is liable to deposit in its interior bone-débris and blood. The chisel, when used so as to make *an incision only* in Ogston's line, is also very apt to enter the joint, and post-mortem experience shows that it is extremely difficult to divide the bone down to the articular cartilage without permitting the chisel to pass through that structure, so that in the living body it would take indeed a very precise and delicate adjustment to accomplish this end. Even supposing this delicate manipulation were successful, and the instrument did not enter the joint, the articular cartilage, the elasticity of which is limited, would snap, and does snap, when forcible straightening is resorted to, and, if the deformity be severe, a considerable hiatus will be left on the articular surface, just as in Ogston's operation. Whether by saw or chisel, the separation of the internal condyle has, besides the mere fact of opening the joint, three objections, which are all the more pronounced if the cases are severe. It produces an irregular articular surface, a sharp projection of bone on the inner side of the knee (caused by the sawn or chiselled surface being pushed upwards), and it leaves untouched the strong ligaments and tendons on the outside of the joint, which help to retain the limb in its deformed position.

It may be said that through time the gap in the articulation will be filled up, and the sharp internal angle will be rounded; both of which I grant, provided they do not produce mischief in the first instance, and I prefer not to court these risks and disadvantages gratuitously, all the more so as they may be avoided by another method.

In considering these two osseous defects, I saw that they might be easily remedied by the removal of a wedge of bone in the same line. By chiselling out an accurate wedge in Ogston's line, the articular cartilage forming the apex, the separated part of the internal condyle may then be folded

up on end, when it becomes flush with the shaft; and, no strain being put on the cartilaginous apex, it does not snap, and the joint is not opened. This operation I performed several times post mortem, and, after satisfying myself as to the facts, the operation was carried out in a case of double knock-knee. This was done on May 10th, 1878,³ and it gave a satisfactory result, but, on the whole, not such a perfect one as is obtainable from the practice of operating through the condyles. For those who prefer the separation of the internal condyle this operation would in those respects be better than the separation of the condyle by saw or chisel, with its consequent defects. It is, however, like all other operations for the separation of the internal condyle, open to the objection of leaving the strong ligamentous and tendinous structures on the outside of the joint as forces to act in preventing the perfectly straight position being obtained without the additional operation of tenotomy, or forcible rupture of the parts.

These defects are obviated by transverse division through the expanded portion of the shaft immediately above the condyle. In my former paper two distinct methods of osteotomy for genu valgum were mentioned—the one by simple incision, the other by removal of a wedge. The former was the procedure adopted in my fourth case mentioned in that lecture, and, with few exceptions, it is the one which has been carried out by me since. The operation is conducted in the following manner. While the limb is extended, a point is taken slightly above the level of the upper margin of the patella; or, as my late house-surgeon, Dr. Symington, shows, a more fixed point would be the uppermost part of the external border of the patellar articular surface, which can easily be felt beneath the skin; a line drawn about half an inch above this would represent the incision in the bone, the chisel being inserted straight across the femur in that line. While the limb is extended, a longitudinal incision is made in front of the tendon of the adductor magnus, the middle of the incision corresponding to the transverse line just spoken of. The length of this incision is slightly greater than the breadth of the largest chisel to be used. The division of the soft parts ought to be completed at one stroke, the scalpel passing at once to the bone. Besides the skin and cellular tissue, only a few fibres of the vastus internus are divided. The chisel is then introduced, and, after getting it into position, it is convenient to notch the bone slightly by pressing the instrument with the hand firmly against the bone; in this way a line is drawn on the inner side of the femur as a guide for future applications of the chisel, as the instrument is not so broad as the antero-posterior aspect of the bone. For the same reason, it is convenient to divide in a systematic manner the bone from either the posterior or anterior end, the groove in the femur serving as a guide. When making the incision on the posterior border, it is well to depress the handle of the chisel, so as to cut outwards and slightly forwards. In this way the risk of wounding any of the soft parts is avoided. The femoral incision ought to be effected with as few withdrawals of the instrument from the wound as possible. In making the incision in the bone the limb is generally kept extended, but some think that by flexing the knee the vessels are thrown further away from the seat of operation. Generally, surgeons, in practising this operation for the first time, make the incision through the centre of the shaft very well, but they leave a little portion of the bone in front or behind undivided, when they experience difficulty in fracturing the outer layer. If attention be directed to this, the shaft is easily divided. Before attempting to fracture, the bone ought to be divided for over two-thirds of its thickness, and the smallest chisel may advantageously be carried further, so as to give direction to the fracture. If any attempt is made to fracture when the osseous incision has only penetrated to one-half of the femoral thickness, there is then a risk of the internal condyle being broken off, the fracture running from the incision toward the inter-condyloid notch. If this happened, there would be the same tendency to leave an irregular articular surface as there is in the operation of sawing or levering off the internal condyle. If the separation of the internal condyle were carried out in this way, it would have the advantage of offering no risk of the instrument entering the joint, the chisel running parallel to the condyles of the femur. In one case, where this was intentionally carried out, it gave a comparatively good result.

³ Reeves separated the internal condyle by the chisel on May 1 th, 1878.

I, however, do not recommend this procedure, as among certain disadvantages it has those belonging to the separation of the internal condyle by other methods. The separation of the condyle in this way may be easily avoided by following the above instructions—the division of the femur for more than two-thirds of its thickness before attempting to fracture. In making the incision through the bone, if the deformity be slight, a single chisel may be used, and if so it ought to be made to divide the bone without being withdrawn. If the deformity be greater, two or three instruments of varied thickness may be used, the first being the thickest, the second thinner, and the third the thinnest of all. In this way a wedge-shaped opening is made without removal of bone. If the deformity be still greater, the wedge opening may be enlarged by *gently* levering aside the soft bony tissue. This levering aside is best done after the incision is completed, and with the instrument fully into the aperture. It may be seen that this levering aside would do away with the necessity of using so many instruments, the compression of the bone being substituted for the varying thickness of the chisels. It is thus seen that no bone is removed, and, what is of still greater importance, the wedge-shaped opening is made, on the inner side, of only half the size required for the rectification of the deformity; the other half is obtained from the outer side of the bone. If it be remembered, the incision goes in to fully two-thirds of the femoral transverse thickness, the remainder of the bone is snapped or bent. In so doing, the apex of the osseous incision acts as a fulcrum, and as the bone is bent round so as to fill up the internal wedge, the outer layers of bone are either well stretched or a wedge-shaped hiatus is left. In this way both the outer and the inner side of the bone contribute to the formation of the wedge. If a complete wedge were removed, the apex being at the external layer of bone, then there would be no hiatus left on the outer side. It would, however, be open to two disadvantages: first, it would be difficult to do; secondly, it would be difficult to cut the exact size of the wedge to be removed. On the other hand, if a simple incision is made, the deformity is rectified at the expense of the outer side entirely. This does very well where the deformity is slight, but where severe, it would allow the deformity to be entirely rectified by the outer side, and the wedge so formed on the outer side might be greater than could be firmly filled up. But by the division of the bone in the way described by me, a very slight wedge being formed on the inner side enables the bone to be fractured more easily than if the bone were simply divided by an extremely narrow and fine chisel; secondly, it divides the wedge between the outer and the inner side, leaving the portions to be taken from the latter to be determined by the amount of straightening necessary to make up for the deformity; thirdly, this small hiatus or rarefaction of the osseous tissue on the outer side will be more quickly and firmly filled up, and the periosteum is retained, though stretched over this slight separation. This would not be the case if the gap made were large, as the periosteum would then tear. I believe also that this method will make a more seemly limb than by taking a large wedge from the inner side, or by forcing out a wide gap on the outer.

Some, in criticising this operation, have expressed a fear about the effects of separating the epiphyses, lest the growth of the bone would be arrested. If this operation were through the epiphyses I would not entertain any apprehensions of this kind, from, among other reasons, the fact that Delore has separated the epiphyses in over two hundred cases without bad result. But the line of incision indicated in my operation is clear of the epiphyses—being above it, through the expanded portion of the lower third, or condyloid extremity of the femur,—and therefore cannot in any way be liable to produce such a result. Again, the line of incision being above the insertion of the external lateral ligament and the popliteus tendon, these structures are moved along with the external condyle, and in no way interfere, but rather help in rectifying the deformity.

This operation, then, does not remove any bone; it neither enters the joint nor interferes with the epiphyses; it rectifies the deformity by simple incision, making a compound fracture, which, under antiseptics, may be considered a simple one. This is the operation which I advanced in my former paper on Antiseptic Osteotomy (in THE LANCET), and which, after having tried various other methods, I still adhere to.

I now wish to refer incidentally to another procedure which had been tried in some very bad cases, especially in

rickety subjects, and which may yet be legitimately practised in exceptional cases. On April 24th, 1878, having divided the femur by a single chisel, I found that, though the limb was nearly straight, it was not quite perfect. I therefore divided the tibia below through the spine. This was found quite sufficient to rectify the remaining deformity. In several of my earlier cases this was carried out, but for a considerable time past I have found the femoral incision above described to be ample for all purposes, giving perfectly straight limbs, even in markedly deformed cases.

In a paper published on May 25th, 1878, Mr. Barwell relates a case in which he had to divide both tibia and fibula, and proposes these operations for certain cases of knock-knee. I have never found it necessary to divide the fibula in knock-knee, nor have I ever seen a case that required it. The fibula is not articulated to the femur, but to the tibia, and therefore, as a bone, can have nothing to do with the formation of knock-knee. It is a long slender rod, and readily bends to suit any slight opening made in the tibia. Its head, giving attachment to the external lateral ligament, might offer a point of resistance, but its shaft is so easily bent in young subjects as to afford a considerable yielding. Though I can scarcely see the possibility of a case of knock-knee requiring its division, yet, if such did present itself, it would be easy to snap the fibula, at the same time as the tibia is bent upwards after division, thus making a simple fracture of this thin rod, as I do in genu varum.

With regard to the wounds, they are not more than three quarters of an inch in length, and sometimes less. The wound on the inner side of the femur never requires a ligature; a little pressure with a sponge after the elastic band is removed is sufficient to stop the oozing. Formerly a catgut drain was inserted; now this is dispensed with, and the wound is dressed in the usual antiseptic method. When thoroughly healed the wound presents a faint white line, about half an inch in length.

I have now operated on thirty-three limbs affected with knock-knee, the majority by the femoral incision alone, and in all the results have been highly satisfactory. There have been thirty operations performed by my method by six Glasgow surgeons; and if their figures be added to my own, these present over sixty operations for genu valgum by this method, without a single untoward result. I operate on both limbs at once, and in those exceptional cases where the tibiae were divided as well as the femora, four osteotomies were performed at once. The majority had only two operations performed on them—one on each femur. The temperature was taken night and morning in the rectum, and with two exceptions it never rose above $100^{\circ}8'$, and generally averaged about 100° during the first week. In these two exceptions the temperature several times reached 103° , but this was generally due to some gastric disturbance, easily reduced by purgatives. It must be remembered that the temperatures were rectal; a degree of difference is supposed to exist between the axillary and the rectal. In no case was there the slightest inflammatory blush round the wounds. At first I put the limbs up in paraffin, because I considered that they might require frequent dressing. Now I regard them almost as simple fractures, and they are put up in ordinary splints. In some cases, where there has been an oozing of blood from the osseous surface, the dressing has been changed at the end of twenty-four hours. If there has been no discharge of blood the dressing is not touched. In either case that dressing is then kept on for fourteen days, without the limb being in any way disturbed; assurance that everything is right being afforded by the three facts—viz., freedom from pain, a moderate rectal temperature, and no discharge appearing on the dressing. When looked at after fourteen days have elapsed, the wound is superficial, delicate epithelium covering the organised blood-clot. Sometimes, however, there is a thin layer of soft yellowish lymph over the wound, or perhaps a shrivelled layer of blood-clot. The dressings are reapplied, and removed finally at the end of other two weeks, when the wound is found to be firm. Thus, in many instances, two dressings are sufficient; in some, the same material being kept on till the end, with the exception of renewing a small internal part. The splints are removed at the end of five weeks if the bones are found firm, which they generally are by that time. The patient, however, is not allowed to get up till the end of the fifth or sixth week. He might get up sooner, but I have not entered the race some surgeons seem to be running, in finding out the earliest time the patient could risk movement or rising from bed,

being quite content to make the result certain, even at the expense of a week or two longer. Passive movements are begun in the ankle during the first week, and during the second the patient is made to move his toes and ankles, thus causing slight movement of the knee itself. On the fourth week slight movement of the knee is begun.

When both limbs have been operated on, a bed is arranged with a sliding middle portion opposite the gluteal region, so as to facilitate the use of the bed-pan, &c. This answers well, the limbs remaining undisturbed. The splint used is a modification of the half-box, with the outer part carried up as a long splint and fixed to the patient's body if he is restless. A bandage is applied from an inch or two below the knee to the upper part of the thigh. The lower limb is left free and the external malleolus is well padded with a thick fold of lint, so as to throw the ankle inwards.

The results, as I have stated, have been very satisfactory, the patients being able to walk with straight limbs, supple joints, and most of them can walk to a considerable distance without fatigue. The first patient operated on, now over eighteen months, could neither walk nor stand for more than five minutes before the operation, and was in a very delicate state of health. When put on his back, and his knees placed together in bed so that they touched, there was a distance of nineteen inches between the internal malleoli. You now see him here, a strong, healthy-looking lad, who informs me that he walked one day lately from Glasgow to Uddingston and back, a distance he reckoned of about fourteen miles, and that without undue fatigue. Another lad, the most weak of the whole, walks a distance of four miles daily from and to his work. The greater majority of the patients operated on have been about fifteen to eighteen years, and in choosing patients for the operation the most suitable age is from eight or nine to twenty years. Of course the deformity may be rectified at an earlier as well as at a later age, but I think that patients from eight to twenty will give the best results.

Reference has been made to the fact that in some instances there is a turning of the foot on its outer side, causing an awkward gait, the toes tending to clutch the floor. After the knock-knee has been corrected, this, as a rule, passes gradually off, especially on exercise—walking and moving the toes. For some time after getting up, after both limbs have been straightened, some state that they feel as if on stilts. This soon passes off. Most patients are rendered several inches higher by the operation.

This paper has already extended to such a length that it leaves little room to do more than mention one or two facts regarding the other deformities included in the heading. I have had five cases of bow-legs, all of which presented the point of greatest curvature just at the lower part of the tibial spine. In these I have divided the tibia on its outer side, and, after doing so, made a simple fracture of the fibula. In four of these the results leave nothing to be desired. One case, has, however, been unfortunate, and ended in amputation, gangrene having set in in the toes. The causes which led to this I do not feel myself justified in mentioning at present, but this I will add, that it had nothing to do with the mechanism of the operation.

There are three of those who had been operated on for genu varum here this evening, and all of these can use their limbs freely and walk and work perfectly.

A number of cases have been operated on for ankylosis and rickety deformities; in some of the latter wedges had to be removed, in others the simple incision was sufficient. On one occasion six osteotomies were performed at once on one limb. This patient had a rectal temperature of 102° the first night, the second 100·5°, and afterwards it averaged between 99° and 100° for the first week. The wounds all healed without pus being formed, and the patient recovered with a strong limb. (This patient was shown.)

Altogether I have operated by osteotomy on forty limbs, and have performed over fifty osteotomies without a single fatal case.

Before concluding I would like to make one or two observations regarding Mr. Barwell's paper in the *British Medical Journal* for May 25th, 1878, in which he refers to the first operation described by me, but takes no notice of the second procedure, published in the same paper—that of simple osseous incision; although he advances a very similar operation. Not only so, but, in reply to a note sent by Mr. Barwell prior to the publication of his paper, there is the following sentence: "Under some circumstances I remove a wedge of bone; under others I only make an incision

with graduated chisels." Though Mr. Barwell quotes from this letter in a foot-note in his paper, he yet does not mention the above sentence. In the same note, which is dated May 12th, 1878, the following is stated: "When making the oblique incision, I do so in the line indicated for Ogston's operation; but I obviate the serious objection to Ogston's operation by removing a wedge from the inner condyle, and only bending the part of the bone next the articular surface. In this way the sharp angular projection of the upper part of the inner condyle—which is formed after it has been severed across, as Ogston describes—is taken away; and, what is equally important, the joint is not opened into, and the articular surface is not interfered with." The operation referred to here was done on May 10th, 1878; Mr. Reeve's operation of simple division of the internal condyle by a chisel was performed on May 17th, 1878.

In THE LANCET for March 30th, 1878, I stated that the first osteotomy performed by me was the first antiseptic osteotomy performed in Britain; this has been accepted. But I believe that the second antiseptic osteotomy and the first for knock-knee were performed by Lister during the winter session 1875-76. This latter fact was previously stated in my paper.

ON THE TREATMENT OF DIPHTHERIA.

By D. DE BERDT HOVELL.

THE importance of giving a brisk calomel purge at the outset of diphtheria is, perhaps, not sufficiently recognised and acted on. Local applications are certainly useful, and the favourable effects of tonic medicines are a strong contrast to the very unfavourable, I had almost said disastrous, consequences of any contra-stimulant medicine. The necessity for the liberal and frequent administration of nourishment and stimulants is indicated by the great tolerance, or rather capacity, of the system to receive them; but, all said and done, we are still fighting an unseen and treacherous enemy, and are face to face with the fact that, until the expiration of twelve or more days, we are not secure from the fatal effects of a fresh deposit.

The late Mr. John Scott used to treat severe cases of cynanche with "a scavenger"—viz., calomel, jalap, and scammony, after which they usually got well. Looking at a diphtheritic throat one day, I said to myself, Why should I not give this patient a scavenger? I did so, and remarked that the subsequent course of the disease was certainly cut short. I have since adopted the plan, and invariably found that the same good results have followed; the tendency to fresh deposits has much diminished, and in many cases is wholly prevented. I can call to mind more than one case in which the attempt at a fresh deposit was clear, but very feeble.

Unhappily I have seen a good deal of diphtheria at different times since its appearance in this country about twenty-two years ago, and have treated it, on the whole, not unsuccessfully, but it was only about a year ago that the above circumstances almost accidentally forced the conviction on my mind that *elimination of the poison* ought to be the first object in treatment.

How this elimination takes place through the bowels, I know not, but diphtheria is a disease of blood-poisoning, and there is no reason why the poison should not be eliminated through the bowels any less or more than in enteric fever—in throat fever than in bowel fever. I cannot refuse the evidence of my experience that since I have adopted the practice of purging at the outset the course of the disease has been invariably more favourable, nor the testimony of those who declare that the dejections thus produced are abominably offensive. At any rate, the practical effect of "the scavenger" recommends itself to my mind in a much higher degree than the scientific inaction of temporising and waiting till the disease has run its course, however masterly such inaction may appear; or than the inferior, but by no means futile plan, of trying to neutralise the effects of the poison. Invaluable as the scientific knowledge is, it ought not to stop short, nor rest content, without improvement in practice.

Elimination, then, (1) through the bowels, (2) through the kidneys. Chlorate of potash drinks should be given frequently, incessantly. Where the nose is affected, the