liver. One cannot fail to be struck with the fact when operating upon the liver that in adult female patients that organ often occupies a much lower level than is usually ascribed to it. In the two following examples a normal liver was mistaken for a tumour in the lumbar region:

The first patient was a woman, about 30 years of age, who had developed a localised peritonitis beneath the liver—a perihepatitis. The cause of this was never made evident, but it is not improbable that it had its starting point in the colon. After all the inflammatory symptoms had subsided there remained an indefinite lump beneath the liver and between the last rib and the iliac crest. The patient was still confined to bed and still complained of much pain in the lumbar region. Her temperature was not quite normal, but the persistence of pain and of a certain amount of tenderness, together with the continued illness of the patient, suggested the presence of pus. I opened the abdomen in the right semilunar line, and found that the gall bladder was free from adhesions and contained no gall stones. Below the region of the gall bladder was a confused mass of adhesions, among which was found the hepatic flexure, which was with some difficulty separated from the liver. In front of the vaguely-defined kidney was a well-rounded mass, covered by adhesions and bound firmly to the lateral and posterior parietes of the abdomen. It could not be separated from the liver, but, as it reached almost to the iliac crest, I did not for a moment suppose that it was hepatic structure. I imagined it to be the wall of an abscess, and after having failed, owing to the adhesions, to identify its deeper connections, I made a small incision into it. I immediately found that I was cutting into normal liver tissue. It then became apparent that the extreme right side of the right lobe of the liver extended downwards almost to the iliac crest; it was buried in adhesions, and, as the incision showed, was of normal texture. It had a close resemblance to the "linguiform process" described by Dr. Heller, Mr. Mayo Robson, and Professor Riedel. Most of these who have written upon the subject of "Riedel's lobe," as it is called, have assumed that this condition is due to gall stones; but in this case, and in one quoted by Mr. M. Robson, such association did not exist.

The second case was that of a woman past middle life, who complained of vague but troublesome pain over the region of the right kidney. She had never had hepatic colic nor jaundice, she, however, volunteered the statement that she had vomited gall stones. Between the liver region and the iliac crest was a well-rounded mass; this mass moved on inspiration; it could be pushed forwards, but no pressure from the front could make it sink back into the renal fossa. It was not dull on percussion from the front. The case was considered to be one of movable kidney, and I had been requested to suture the floating organ. On the examination I made previous to the operation, I felt so very nearly assured that the tumour was not renal that I made an incision in the right semilunar line, some little way below the ribs. I discovered then that the tumour was made up of Riedel's lobe, that it was perfectly normal, and quite free from adhesions. It reached well into the right iliac fossa. It formed so definite and remarkable a projection that at first sight it was difficult to believe that it belonged to the liver. The gall bladder contained many small stones, which I removed; the opening in the gall bladder was sutured and the abdominal wound closed. Both this patient and the one already described made perfect recoveries. They were both patients in the London Hospital within the last few months.

The third case is a little more remarkable. The patient was a young lady, aged 19, whom I saw in consultation with Mr. Alfred Cooper and Dr. Cornish. Since the age of 2 years her symptoms were such as to make it evident that no bile passed into the intestines. Since the time mentioned, that is for seventeen years, she had been deeply jaundiced; so stained was the skin that it was hardly possible to believe that the patient was a European. The motions had always been white; the urine was a deep mahogany colour; vomiting was frequent; bleeding from the gums and nose was of almost daily occurrence, and the patient was liable to attacks of fever in which the temperature ran up to 102° to 104°. The urine was often offensive, and she had only menstruated twice. There was chronic dyspepsia and abiding malaise. Dr. Lauder Brunton, who saw the patient, considered the case to be one of stenosis of the bile ducts, probably of congenital origin. The liver was no longer enlarged, but it had been enlarged when the patient was 10 years old. Her condition was deplorable, and it was the opinion of those under whose care she was that unless some relief could be obtained, her life could not be long extended. From a surgical point of view there was little to encourage an operation upon a patient who had had persistent jaundice for seventeen years, and who suffered from hæmorrhage from the gums and nose. The desperate state of the patient, however, appeared to me at least to justify an exploratory incision. I opened the abdomen, and was pleased to find a gall bladder, the size of a hen's egg, filled with clear mucus. A probe could be made to enter the cystic duct, and pass a little way into the common duct. About a quarter of an inch from the commencement of the common duct that tube ended in a firm, fibrous nodule, and beyond this nodule no trace of the duct could be discovered; there was, in fact, an absence of the terminal part of the duct. I established a communication between the gall bladder and the jejunum. The operation was performed on the 9th of this month, and so far the patient's recovery has been uneventful. For the first time in seventeen years bile-stained motions have been passed, and it is evident from the marked improvement shown in all the symptoms that the bile has at last a free means of escaping into the small intestine. I have no means of explaining how it happened that for the first two years of the patient's life, assuming the trouble to be congenital, there was no jaundice. This instance serves to illustrate that even the most unpromising of cases may prove to be worth at least an exploratory incision.

In conclusion, I cannot avoid one word on the subject of this self-same exploratory incision. That this simple procedure has been of enormous value no one will doubt; that it has been the means of saving many a life has been amply demonstrated; that it has enabled a correct diagnosis to be made and a logical treatment to be carried out in hundreds of obscure cases needs not to be insisted on; but there must

arise in the minds of many the question whether the exploratory incision, infinite as its value may be, is an entirely unmixed blessing. I notice that there are indications which tend to allow this ready measure to replace the admirable labour of clinical observation. The incision is so simple, the collecting and arranging and judging of clinical evidence is so difficult and tedious. With a scalpel in the hand, the patient, searching examination of the abdomen as practised in older days is no longer needed, and it is a question whether the education of those who wish to become acute clinical observers has not suffered a little thereby.

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THE OPERATIVE SURGERY OF THE JOINTS.*

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THERE is an obvious parallel to be drawn between the joints and the abdomen in regard to the results that have followed the introduction of asepsis into surgical practice. Formerly the peritoneum and the joints were equally regarded as forbidden ground; while to-day, of all the structures that can be named, none are more favourable for operative procedures. Moreover, the structure and the physiological endowments of the peritoneum on the one hand, and the synovial membranes on the other, which formerly so often conducted to disaster, are precisely those to which, at the present day, rapid repair after surgical interference is so largely due. Both membranes consist of an epithelial layer resting on a substratum of loose areolar tissue, richly supplied with blood vessels. Thus both are the seat of rapid tissue change, and from the surface of each absorption is very active. Such structures are highly favourable to the development of processes of an infective type whenever septic micro-organisms have gained an entrance, but they are also very favourable to the processes of repair when infection is excluded. The importance of the latter fact was speedily established so far as the peritoneum is concerned, for, by a fortunate circumstance, the date of the introduction of the aseptic method coincided with a very active period of abdominal surgery in the instance of ovariectomy, with the result that a full demonstration was forthwith obtained of the amount and rapidity of repair of which this membrane is capable.

In the case of the joints, however, the powers conferred by the aseptic method have not even yet, I am inclined to believe, met in all quarters with full recognition. In saying this I do not allude to those surgeons to whom the performance of large operations is an every-day occurrence, and whose experience inevitably brings them to a full conviction of the certainty with which repair follows in wounds, wherever situated, when asepsis is maintained. I refer rather to those to whom, from the circumstance that they are busily occupied in other departments of practice, the knowledge of the recent progress of surgery is to some extent only second hand. To such the opening, for instance, of the knee-joint, would present itself as a proceeding which they would hesitate to recommend, or even to countenance, except in cases of absolute necessity. Yet it is certain that it is just as safe to open the knee, or any of the other joints, as it is to open the abdomen, and that, as in the case of the peritoneum so in that of the synovial membranes, the old view that these structures are in some way inherently unsuitable for operative treatment is erroneous. I think it may be worth while to illustrate this fact in respect to the joints, so as to bring this department of operative surgery, so to say, into line with that of the abdomen.

OPERATIONS ON THE SEMILUNAR CARTILAGES OF THE KNEE.

The treatment of the more severe cases of detachment or other injury of the semilunar cartilages of the knee is a good example of the recent development of the surgery of the joints. The main facts in regard to these appendages of the knee-joint are well known. Although either may be involved,

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it is the internal cartilage which is in the great majority of instances at fault. The cartilage may be torn from its circumferential attachments to a variable extent, and it is the anterior horn that is usually concerned. The laceration may involve the anterior third or much more of the cartilage. In one case Sir William Fergusson found a semilunar cartilage in a dissecting-room specimen almost completely separated, so that it lay entirely behind the condyle of the femur. In another dissecting-room specimen described by Mr. Godlee the cartilage was lying in the intercondyloid notch in the middle line of the joint. It may be not only separated from its moorings, but also torn completely across so that it forms a thong, whose end is freely movable and is liable to get between the bones. The cartilage may be split up into longitudinal striæ. The symptoms, of course, vary with the case. In some instances of "internal derangement" but little inconvenience is produced. Displacement of the cartilage may occur only at long intervals, and be only slight and attended with slight symptoms; but when considerable laceration of its attachments has taken place it slips frequently and widely, and the patient suffers from repeated attacks of synovitis, and is unable to use the limb for periods varying from two or three days to a fortnight or even more. As this condition of things is common in young adults, who are anxious to be active either in their work or in their amusements, and as in many instances it prevents active exercise, it is important that some adequate treatment should be available.

There are three methods from which to choose: (1) The knee clamp shown in Fig. 1 may be applied. There is no doubt

Fig. 1.—Splint for retaining in place a dislocated semilunar cartilage. The mechanism limits the movement of the joint to flexion and extension, all rotatory movement being prevented.

Fig. 2.—The apparatus consists of double steels on either side of the limb, extending about 9 inches above and 10 inches below the centre of the knee-joint, these steels being attached by metal thigh and leg plates. The chief feature of the appliance is the construction of the knee joint. This is a combination of ring catch and regulating movement, enabling the patient to walk first, with the leg absolutely fixed, and then increasing the movement gradually.

that for slight cases, and for those who can still follow their occupation while they wear the clamp, this apparatus, if its use is continued for twelve months, is often adequate. It leaves flexion and extension uninterrupted, so that it does not interfere with ordinary exercise. It, however, prevents

riding and swimming, and it would be an imperfect protection for the joint in the rough work of the navy or army, and in football, tennis, and other forms of strong muscular exercise; and it could hardly be depended upon by those who have to go abroad, or into districts where it could be neither renewed nor repaired. In the more severe cases the clamp often fails to keep the cartilage in its place. Under any of these circumstances operative interference may, when due care is taken, be safely recommended, for there is, of course, no more danger in opening the knee-joint to treat a damaged semilunar cartilage than for suturing the patella (*infra*). The choice as to operation will lie between (2) suture as originally recommended by Annandale, and (3) removal of that portion of the cartilage which has been torn from its connections. For myself I can speak only of the results of removal. I have not performed suture; first, because the operation of removal appears free from any appreciable risk; secondly, because removal does not, so far as I have seen, in the least degree impair the functions of the joint; thirdly, because removal affords a more definite guarantee against any further inconvenience than mere suture can. Cases have occurred in which after suture the symptoms have returned—a result which seems not improbable if the original laceration has been extensive.

In each of the 12 cases in which I have operated, the internal cartilage has been involved, and it has been the anterior segment that has been concerned. In one the cartilage had been torn completely across, so that its free end projected beneath the skin in such a way that it was taken for a pedunculated nodule of cartilage developed in a hypertrophied fringe of synovial membrane. When it was exposed it was drawn out like a thong an inch in length, and was cut off as far back as its separation from its normal connections extended. The operation has been performed by making a horizontal incision over the line between the condyle of the femur and the head of the tibia, and extending from the side of the ligamentum patellæ backwards to the anterior edge of the internal lateral ligament. In two or three cases it has been necessary to divide the anterior fibres of this ligament. When this has been done, the divided ligament has been accurately sutured. In all of these cases primary union has occurred without complication of any kind, all the symptoms have been removed, and the joint has manifested no defect, and given no further trouble. As soon as the wound has healed, that is in the course of a week, the splint has been removed, and the patient has been allowed to begin using the limb.

LOOSE BODIES.

The usual operation for the removal of a loose body from the knee, carefully performed, is well understood to be devoid of any appreciable risk, but I have lately met with two cases in which much more extensive proceedings were necessary, and in which the tolerance of the joint to active interference was very clearly demonstrated.

CASE I.—A gentleman, a patient of Dr. Chapple, of Weybridge, 27 years of age, had loose bodies in his knee.¹ Five were easily felt, and he had also a cyst in the popliteal space in the position of the semimembranosus bursa, and as large as a moderate-sized hen's egg, which appeared to be occupied by numerous loose bodies which gave a crunching sensation as they moved over each other. The joint was opened by a vertical incision on the inner side of the patella, an inch and a half in length, and five loose cartilages were removed, not, however, without difficulty and delay, as some of them slipped back into the recesses of the joint. The cyst in the popliteal space was then opened, and from its cavity twenty-nine cartilaginous bodies were extracted. All except one were loose, but this was attached by a short pedicle to the inner wall of the cyst at its upper end, where it could be just touched with the tip of the finger, but could not at first be secured. The cyst was therefore freely laid open so that the cartilage could be drawn down and removed. The operation lasted more than half an hour, and during this time the interior of the joint was necessarily very freely handled. The case ran a perfectly aseptic course, and both the wounds were healed in a week. For some time the joint was stiff, and painful on any attempt at movement, and on three occasions it was manipulated under gas.² All the movements in the joint have long been quite natural. The (fibro-cartilaginous) bodies removed varied in size from a pea to a Spanish nut, and were irregular in shape and nodulated like a mulberry.

CASE II.—A young lady, aged 25, was seen in February of last year. She gave the history that in the previous July she had violently wrenched her knee by a fall. The accident was followed by a good deal of pain and swelling, but she walked half a mile to her home. When she walked, however, there was an audible crack in the joint, and she cried out with pain. The joint was put up in a splint, and in a fortnight she was able to use the limb. On examination six months later it was found that the joint could neither be fully bent nor completely extended, but that it was free from swelling and all other signs of disease. The patient limped, and complained that when after sitting down she got up, she could not use the

limb until the joint cracked. She stated that if she used the limb much it became a little swollen and hot. Its condition seemed to vary very little, and she had only slight pain in it. She travelled for a commercial firm, and found that the condition of the knee interfered very much with her occupation. The trouble, whatever its nature, appeared to be situated at the back of the joint, and she had never felt a loose body or had any pain or tenderness over either of the semilunar cartilages. I advised that the joint should be explored. I then learned that she had consulted Mr. Walsham and that he had given her the same opinion. A few days later Mr. Walsham opened the joint by sawing transversely through the patella, and dividing the fibrous structures on either side of it. On flexing the joint a loose piece of cartilage three-quarters of an inch long by half an inch in width was found imprisoned behind the crucial ligaments, and there was a hiatus in the articular face at the back of the internal condyle, from which this piece of cartilage had apparently been separated. The joint was washed out, and the patella sutured by wire in the usual way. Healing took place by primary union. As the joint at the end of a fortnight was stiff it was moved under gas. The patient made a complete recovery, and Mr. Walsham informs me that she is now dancing and taking all other forms of active exercise without any defect.

SUTURE OF THE PATELLA.

A test operation, as it may be termed, is suture of the patella, by the open method, in recent or old fractures of the bone. The results obtained appear to show conclusively that this operation has taken its place on the list of recent advances in the practice of surgery, and the evidence it affords as to the tolerance of the joints of active interference is sufficiently conclusive. During its performance the whole synovial cavity is often exposed, and when the parts are vascular so that free bleeding takes place, a sterilised sponge may be placed in the joint, just as it would be in the cavity of the peritoneum during an operation on the gall bladder or on the appendix. It is advisable on the following grounds: (1) Experience shows that it is practically safe. At St. Bartholomew's Hospital in the last five years it has been performed 28 times for recent fracture, and in no instance has suppuration occurred. In the early operations in cases of old fracture two or three cases of septic inflammation were met with, but no such result has occurred in the last six years. (2) During the operation I have often found, as others have described, that an aponeurotic flap, torn from the superficial surface of one of the fragments, has dropped into the interval so as to prevent their intimate contact, and twice in the last 10 cases I have found that one of the fragments was tilted so that its broken surface presented towards the skin, and the cartilaginous surface faced the other fragment. This displacement was not in any way apparent on external examination, nor does it seem possible to recognise it until the fracture is exposed. (3) The operation allows of very accurate adjustment of the fractured surfaces; and further incidental advantages are that blood extravasated into the cavity of the joint can be removed, and that the torn structures on either side of the patella can be adjusted with sutures. (4) The patient is able to be active on the limb well within a month of the accident, wearing an apparatus (Fig. 2) which at first prevents, but subsequently allows, a gradually increasing degree of flexion of the joint.

EXCISIONS.

The general safety with which excision of the joints can now be performed is best illustrated by the results obtained in the case of the knee—the largest of the joints, and that in which an operation involves the most extensive wound of the soft parts, and the largest exposure of cancellous bone. Yet when care is taken to select appropriate cases, primary union after excision of the knee is as certain to take place as it is after ovariectomy or removal of the appendix. So that when once the conclusion has been formed that, in regard to the future of the limb, excision of the knee is advisable, there need be no more hesitation in resorting to the operation than there is in performing laparotomy. The selection of cases, however, must always be a matter of primary importance, and a few remarks may be offered respecting this. (1) As to age. Excision of the knee has become thoroughly established as one of the great operations of surgery in patients between 12 or 14 and 45, in whom the length of the limb has been mainly or completely accomplished, and strong synostosis may be confidently reckoned upon. In patients under 12, although the immediate result may be excellent, there are two very serious drawbacks with which every surgeon is familiar. These are arrested growth, and—the tendency to firm synostosis being defective—yielding at the line of union, so that serious deformity is apt to take place. In patients over 45

the cases calling for excision must be rare; indeed I have not met with them: but if the general health is sound there seems to be no reason why the operation should not be performed, in certain cases, for instance, of tuberculosis in patients up to the age of 50. (2) In some cases deformity—consisting of flexion, combined with backward displacement of the tibia—is so great that the limb cannot be straightened without cutting away almost the whole of the condyles, and leaving a cross section of the femur so small that it does not in any way correspond with that of the tibia. (3) In cases in which at the time of the operation an active growth of tubercle, either in the synovial membrane or the ends of the bones, is going on, there is the danger that although the external wound may close by primary union, and the parts appear for some weeks in a perfectly satisfactory condition, a renewal of the tuberculous growth may take place. In such instances, in six weeks or two months from the date of the operation, considerable bulbous swelling is developed, the skin becomes dusky and infiltrated, the union between the bones breaks down, and amputation has to be performed. In these acute cases excision should not be performed until by rest and blistering, or the actual cautery several times applied, followed by careful elastic bandaging, the active growth of tubercle has been checked. Should suppuration have occurred the operation should be postponed until pus has been removed by opening, scraping, and draining the abscess cavity.

No doubt those instances in which there is an extensive growth of tubercle in the synovial membrane, so that there is great pulpy thickening with fusiform swelling, are comparatively unfavourable for excision, yet if the disease is not in active progress at the time, and if the whole of the synovial membrane is removed, sound healing will usually take place.

A favourable group of cases for excision is that in which, while tuberculous disease is of long standing, it has led to no material deformity, but in which prolonged rest has been followed by no adequate improvement. In such cases probably one of two conditions is present: (a) The synovial membrane has been the seat of a chronic plastic inflammation, very similar to that which is found in fibroid phthisis of the lung. A joint thus affected is the seat of adhesions, which are sensitive, so that the joint as soon as it is used becomes hot, swollen, and painful. In such instances the patient may go on for several years with a crippled joint, and no treatment short of excision will relieve him.

CASE III.—A groom, aged 28, was in St. Bartholomew's Hospital for an affection of his right knee, for which he had been lying up for nearly two years. There was no deformity, only limited swelling, and no fluid. The synovial membrane was only moderately thickened; movement was restricted to a range of about 30 degrees; there was very marked muscular wasting. The case was regarded as one of chronic tuberculous disease, and the joint was kept at complete rest in leather splints for six months, and repeatedly blistered. At the end of this time, however, gentle exercise immediately produced pain and heat. The opinion was then formed that the joint was the seat of persistent tuberculous inflammation of a low grade, with the formation of adhesions. As there seemed no prospect of recovery, excision was performed. The disease proved to be confined entirely to the synovial membrane, which was reduced to tuberculous scar tissue. The cavity of the joint was completely obliterated. The cartilages were almost entirely destroyed by erosion, but such portions as remained in the form of small islets, or thin plates, were still firmly adherent to the bones and natural in appearance.

(b) There is a deposit of obsolete tubercle in the end of one of the bones, which is too large for absorption, and which, without leading to any active symptoms, remains as a continuous source of irritation.

CASE IV.—A man, aged 26, in St. Bartholomew's Hospital, had had tuberculous disease of the knee for four years, and during the greater part of this time he had been unable to walk upon the limb. The joint, however, was in good position, and allowed of smooth movement through a range of 25° or 30°. There was only slight swelling, and indeed it was not easy to say why the joint could not be used. It had been treated by persistent rest for six months in a country hospital, without any material improvement. Suspecting the presence of tuberculous deposit in one of the bones, I opened the joint, and then found numerous adhesions, and, buried in the substance of the internal condyle, and just beneath the cartilage, a mass of caseous tubercle, about as large as a chestnut. The joint was excised, and the deposit of tubercle removed; and the cavity which had contained it was freely scraped. The patient made a good recovery.

These two cases are examples of a group which at the present day should be carefully borne in mind. In both alike all active tuberculous disease had come to an end without having, so far as external appearances went, produced any very serious result. As a matter of fact, however, conditions had been established (irritable adhesions in the one,

and tuberculous sequestrum in the other) which rendered the joint practically useless, and which no amount of rest or counter-irritation would have sufficed to remove.

Another group of cases for which excision should be employed are those in which the knee has been the seat of an infective process (such as may follow gonorrhoea or childbirth), and as the result of which plastic inflammation has occurred and has led to incomplete fibrous ankylosis, attended with persistent pain and swelling after exercise. Patients are sometimes met with in whom, in spite of treatment, the joint is still useless a year or more after the original attack. In some instances deformity has also occurred. A common feature in these cases is that, although the joint on inspection and external examination does not appear to be extensively damaged—"it looks too good for excision"—it is yet in a condition in which no treatment will render it serviceable to the patient. In such instances excision should be recommended, and this may be done with the more confidence because the joint, when deformity is limited and no active disease is present, is in a very favourable state for the operation.

I need say little about the method of procedure in the operation of excising the knee-joint, but I may briefly draw attention to the importance of the mechanical treatment to be adopted. The knee in regard to excision is peculiar in being the only instance in which synostosis is a *sine qua non*. In all the other joints, except the hip, synostosis would be a distinct drawback. In the ankle it would leave the foot not only useless, but an encumbrance. Syme's amputation and an artificial foot for the sake of appearance would generally give a much better result.³ In the wrist, synostosis would interfere very seriously with the usefulness of the hand. In the elbow, the hip, and the shoulder the ideal result of excision is union by a strong interosseous ligament, just long enough to permit free without flail-like movement. In none of these joints therefore is it requisite to keep the bones in close apposition. But this is absolutely necessary in the knee, and the splint employed is therefore very important. I have used Gant's⁴ splint combined with the sterilised steel pins, employed by the late Marrant Baker. These pins keep the bones firmly adjusted, and so obviate the necessity for tight bandaging of the thigh. They are removed in about ten days. I have never seen them do harm, and they certainly favour synostosis.

OPERATIONS IN SACRO-ILIAC DISEASE.

In the last ten years some important papers have been published on the operative treatment of sacro-iliac disease. In 1889 Mr. Mayo Collier⁵ related a case of early disease in which he had trephined the joint, and the patient had made an excellent recovery. In the Clinical Society's *Transactions*,⁶ in an exhaustive and very interesting paper, Mr. Makins discussed sacro-iliac disease in order "to render prominent the fact that the prognosis, perhaps particularly in children, is better than is generally stated, and to urge that the treatment of disease of this articulation should run on exactly the same lines as that of diseases of the joints in general, since cures may undoubtedly be effected even when disease has reached a very advanced stage." This author gives cases to illustrate the advantage of operative interference.

In the *Transactions* of the same Society,⁷ Mr. Golding-Bird has described a systematic proceeding (which he first employed in 1880) for examining and treating the articulation by trephining the ilium where it borders the joint, and he has related cases in which he operated with complete success. These and later papers have done good service by calling attention to an important subject. Formerly the treatment of sacro-iliac disease was in the highest degree unsatisfactory. When suppuration occurred pus was allowed to burrow widely in the neighbouring tissues; sinuses formed and sepsis occurred, and not infrequently the patient ultimately died of exhaustion. There is now, however, ample evidence to show that when operative treatment is adopted early, and when the treatment is conducted on aseptic lines, recovery will take place in a large proportion of cases, even although the disease has advanced to the stage of suppuration, and sinuses have already formed. I have lately operated on 4 cases.

CASE V.—The patient was a woman, aged 28, who had long-standing sacro-iliac disease. Suppuration had occurred a year before, and there was a sinus still discharging over the dorsal aspect of the joint. This

was enlarged, and on being exposed the joint was found occupied with granulation tissue and a few small fragments of carious bone. The iliac border of the articulation was removed with a chisel and mallet, and all the granulation tissue and damaged bone were scraped away. The wound healed slowly but soundly, and the disease has not recurred.

CASE VI.—A man, aged 28, from Wales, had had a small sinus for several months, behind the great trochanter, which, when he was admitted into the hospital, was discharging about half a drachm of sero-pus daily. A probe passed along this sinus was found to run towards the posterior inferior iliac spine. In this situation an incision was made upon its joint. A director introduced through this incision went straight into the sacro-iliac-joint. The wound was therefore enlarged, and the joint fully exposed. The iliac border of the articulation was now cut away with a chisel and mallet, so that the joint could be examined. It proved to contain a quantity of granulation tissue and a small plate of dead bone. The granulation tissue was removed, together with the sequestrum, and the surface was freely scraped. The wound healed by primary union, and two months later the patient returned to the country able to walk without either lameness or pain.

CASE VII.—A lady, aged 61, a patient of Mr. Currie, of Ipswich, had suffered for some years with pain about the back of the pelvis on the right side, and down the back of the thigh, and an abscess had formed and discharged itself through a sinus situated above and behind the great trochanter. This sinus had remained. Sometimes it nearly closed, and then after a few days, during which the patient was in pain, and had a rise of temperature, two or three drachms of pus escaped. The sinus ran straight to the upper extremity of the sacro-iliac joint, and, upon operating, a piece of dead bone, three-quarters of an inch long by half an inch broad, was removed. The wound soon closed, except at one point, where a sinus, just large enough to admit an ordinary probe, remained for nearly a year. At length a ligature escaped, and then the sinus quickly closed. As the disease was of long standing, and as she was 61 years old, the patient was kept at rest for six months, and then was allowed to move about for a short time each day. The wound is still soundly healed, and she is now, eighteen months after the operation, taking exercise in the ordinary manner.

This case seems an important one. It was probably an example of senile tuberculosis—a condition which, when it involves a large joint, generally tends to advance. I do not myself remember to have seen any example of recovery from tuberculosis in a patient over 50, involving either the hip or the knee, or even the wrist or ankle, and repair in this instance shows that the sacro-iliac joint is by no means unfavourable for operative interference.

CASE VIII.—A boy, aged 10, was lately in St. Bartholomew's Hospital for what at first sight appeared, from the flexed and adducted position of the limb and the position of sinuses at the back of the trochanter, to be advanced hip disease. On careful examination, however, the joint was found within a certain range freely movable, and the sinuses led not towards the joint, but upwards and backwards towards the sacro-iliac articulation, into the chink of which the end of a probe could be distinctly felt to pass. When the joint was exposed it was found to be the seat of extensive disease. Its borders at its lower part were extensively ulcerated, so that a cavity had been formed about $1\frac{1}{2}$ inch long and $\frac{1}{2}$ inch wide. This contained a quantity of granulation tissue and some bone detritus, but it presented, when it had been cleared, firm and apparently sound walls. At the present time, two months after the operation, although healing is going on the wound is not closed, so that the ultimate result cannot yet be stated. The limb has been brought into a good position by means of weight extension and the boy's temperature is normal.

CASE IX.—A fifth case of sacro-iliac disease has lately been under my care in St. Bartholomew's Hospital. The patient was a woman of 64 who was admitted with a large subgluteal abscess just below the iliac crest. This was opened, and then it was found that the sacro-iliac joint was completely disorganised, and that the articular borders of the ilium and sacrum were extensively bare and bathed in pus. The abscess cavity was cleared of all its granulation tissue and freely irrigated, and a drainage tube was introduced. In a fortnight only a sinus remained. It was then proposed to examine the joint for the purpose of ascertaining whether operative interference was advisable, but the patient declined further treatment and went home.

The subject of this paper appears worthy of discussion. The joints like other organs, such as the kidney, the lungs, and the central nervous system, undergo degenerative changes that produce disabilities which treatment can do little to relieve and to palliate, which is all that can be done. In such instances no very material advances have been made, or are to be anticipated, at all events at present. But when attention is turned to operative surgery it is at once apparent that the joints have fully participated in the progress that has taken place, and that many conditions for which only a few years ago nothing could be done can now be successfully dealt with.

NOTES AND REFERENCES.

¹ The pathology of cases in which large numbers of loose bodies are found in the knee-joint seems to be obscure. Some years ago Sir Thomas Smith removed 415, and in another case Mr. Berry removed 1,300 from this joint. ² The synovial membranes resemble the peritoneum in the readiness with which adhesions form when a joint has been opened aseptically—for example, the knee, for the removal of multiple loose cartilages, or suture of the patella. The joint will soon become stiff from adhesions if it is kept at rest, no matter how aseptic the operation may have been. These adhesions, however (as in recent adhesions in the peritoneal cavity) are not very firm, and can easily be dealt with by (cautious) manipulation, under an anæsthetic and subsequent passive movement. ³ In young subjects, however, in whom ankylosis, whether bony or fibrous at the ankle-joint, has occurred, the foot may still be useful or the metatarsal

joint may gradually acquire a great degree of compensatory movement. I lately saw a man, aged 19, whose ankle-joint, after urethral arthritis, had become ankylosed in a position of rectangular talipes, but who, owing to the increased movement in the mediotalar joint, walked without appreciable defect. ⁴ *Gant's Science and Practice of Surgery*, 2nd edition, vol. ii, p. 16. ⁵ *Lancet*, vol. ii, 1889. ⁶ vol. xvi, p. 127. ⁷ vol. xviii, p. 186.

A REPLY TO THE ACCUSATIONS MADE BY MR. LEONARD HILL AGAINST THE HYDERABAD CHLOROFORM COMMISSION.

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THE action of anæsthetics is of constant interest to the medical public; but the admirable address of Dr. Augustus Waller and the other papers read at the annual meeting of the British Medical Association have increased the attention which the subject usually excites. For some time back I have been anxious to discuss some questions regarding the causation of death during anæsthesia, especially in relation to the work of the Hyderabad Commission; but the subject is so large and the time at my disposal is so limited that my intention has been postponed from week to week. I now feel that before either discussing the subject or replying to criticism I must first of all answer certain accusations which have been brought against me by Mr. Leonard Hill.

In the BRITISH MEDICAL JOURNAL for April 17th, 1897, a lecture was published by Mr. Hill on the Causation of Chloroform Syncope, and it was favourably noticed in a leading article of the JOURNAL for April 24th. In this lecture Mr. Hill not only criticised severely the work and conclusions of the Hyderabad Commission, but he brought against it charges of (1) prejudice, (2) carelessness, (3) ignorance, and (4) incompetence. At the time when Mr. Hill's lecture appeared the pressure of other engagements made it absolutely impossible for me to do more than write a few lines in the BRITISH MEDICAL JOURNAL of May 1st, asking readers to suspend their judgment on the question.

Had Mr. Hill been a medical student trying to gain a scientific reputation for himself by trying to detract from that of others I might have left his accusations unanswered; but Mr. Hill has already gained for himself a name as a scientific worker; he is a lecturer on physiology at the London Hospital; he is Secretary of the Physiological Society, and the opinions he expressed in his lecture have not only been quoted with approval by a number of subsequent writers, but they were endorsed by a leading article in the BRITISH MEDICAL JOURNAL of April 24th, 1897, and consequently, however disagreeable the task may be to me, I must reply to his charges.

Although nominally directed against the Hyderabad Commission, all these charges, with the exception of the first, are really directed against me personally, for, as Surgeon-Lieutenant-Colonel Lawrie says in his letter to the JOURNAL of September 4th, 1897, p. 617: "The work of the second Commission was directed throughout by Dr. Lauder Brunton." For this work I am, in fact, responsible, and I am ready to admit that for any faults or shortcomings I alone am to blame. The most important deficiency in the research is one to which Mr. Leonard Hill refers, not in his lecture, but in a letter to the BRITISH MEDICAL JOURNAL of July 31st, 1897, p. 313, where he says that the Commission failed to throw any light on "the causation of those accidental deaths which take place in the primary stage of anæsthesia." These deaths in man are probably due in great measure to fear, anxiety, or other emotional excitement, and may arise from the respiratory and circulatory changes, either caused directly by these emotions or indirectly through the increased susceptibility to shock from pain or suffocation which they produce.

The members of the Commission were quite conscious of this deficiency, and they carefully considered whether it was not their duty to attempt experimentally to produce in animals, by causing pain and terror in them, a condition similar to that which may occur in nervous human beings previous to an operation under anæsthetics. They unani-

mously decided against doing so on the ground that the pain and terror they would have to inflict upon animals in order to produce in them a state at all like that which occurs in exceptionally sensitive human beings would be so great that they did not feel justified in doing the experiments. In coming to the decision to apply the anæsthetics so as to cause neither pain nor terror to the animals, they were perfectly conscious they were excluding two of the most powerful factors of shock from their experiments, and laying themselves open to the charge which Mr. Leonard Hill brings against the Commission in his letter.

That there are some other deficiencies I am perfectly ready to acknowledge. It would have been advisable to repeat several experiments if we had had time, and it might have been advantageous on several occasions to use other apparatus if it had been available. But there are few, if any, researches which are free from defects, and I hope to show that in that of the Hyderabad Commission there are none of sufficient gravity to warrant the sweeping condemnation Mr. Leonard Hill has passed upon it. I have no excuse whatever to offer for these deficiencies except the shortness of time at my disposal. This time was shorter than might at first be supposed. I had less than a fortnight in which to collect apparatus, for though I received notice of Surgeon-Lieutenant-Colonel Lawrie's proposal a few days before it was published in the *Lancet* on September 21st, yet the P. and O. steamer *Kaisar-i-Hind* left Southampton on September 27th, 1889, and luggage had to be on board a few days before. I reached Hyderabad on the evening of October 21st, and the Commission began work without apparatus on October 23rd, with apparatus on the 25th, and continued until December 18th. I had *carte blanche* from the Nizam's Government with regard to instruments and with the aid of my friend the late Professor Roy I collected quickly together all the apparatus which I thought would be requisite. I had in all, however, less than a fortnight in which to collect the equipment of a laboratory, four days in which to fit it up and, Sundays being excluded, forty-seven days in which to do the work with apparatus. But with the exception of time, nothing was left to be desired. The generosity of the Nizam, the intelligent interest taken both by himself and his Ministers in the work, the courtesy and zeal of Surgeon-Lieutenant-Colonel Lawrie, as well as of everyone connected with the Commission, afforded every possible assistance in carrying out the work. In his letter to the *Lancet* of September 21st, 1889, Surgeon-Lieutenant-Colonel Lawrie undertook to place the Hyderabad Commission entirely at the disposal of the representative of the *Lancet*, and to act under his direction. The Commission, he said, "will provide all instruments and appliances, and everything which may be required for the experiments, and will, without bias, do all in their power to assist the representative of the *Lancet* in arriving at the truth." This promise Surgeon-Lieutenant-Colonel Lawrie loyally carried out. He placed everything at my disposal, so that (1) I drew up the general plan of the research, and (2) stated what experiments I thought were necessary; (3) I did the first one or more of every set of experiments myself; and (4) I was present and superintended all the experiments till near the end of the research, when I was obliged to be absent for some time owing to an attack of dysentery. I am therefore personally wholly responsible not only for the plan of the research in general, but for the plan of each experiment in particular, and for the execution or supervision of each experiment, as well as jointly responsible with my colleagues for the general conclusions. Having now shown how it is that Mr. Hill's accusations, although nominally directed against the Hyderabad Commission, are really made against me personally, I shall take them up and answer them *seriatim*.

His first accusation is that of prejudice, and of a desire on the part of the Commission to prove the correctness of a pre-formed conclusion, instead of trying to find out the truth. He says on page 957, "The prejudiced enthusiasm of Surgeon-Lieutenant-Colonel Lawrie," and page 960, "The Hyderabad Commission engaged on a wild goose chase to prove that respiration ceases before the heart fails, find in their tracings the proof that the failure of respiration is the primary cause of death. I, on the other hand, maintain that not only my own tracings but theirs too, conclusively prove that the