Statistical report of all operations performed on healthy joints in hospital practice by Mr. Lister, from September 1871 to the present time, together with such accidental wounds of joints as occurred in the same period / by W. Watson Cheyne, F.R.C.S.

STATISTICAL REPORT

OF

ALL OPERATIONS PERFORMED

ON HEALTHY JOINTS

IN HOSPITAL PRACTICE, BY MR. LISTER, FROM SEPTEMBER 1871 TO THE PRESENT TIME, TOGETHER WITH SUCH ACCIDENTAL WOUNDS OF JOINTS AS OCCURRED IN THE SAME PERIOD.

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STATISTICAL REPORT OF ALL OPERATIONS PERFORMED ON HEALTHY JOINTS

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A DESIRE has been frequently expressed that a statistical account of some of the results of the antiseptic method of treatment in Mr. Lister's own hands should be published; and with the view of satisfying this reasonable wish the following cases are brought forward.

In comparing the results of one method of treatment with those of another, it is not sufficient to state these results merely numerically; some idea of the nature of the individual cases must be given; but to publish all those which have occurred in Mr. Lister's practice since the commencement of antiseptic treatment in sufficient detail to convey a correct impression of their nature would be a very laborious work; and further, such a paper would contain many cases of little interest, which, however, could not be omitted without laying oneself open to the charge of withholding part of the results. I have, therefore, with Mr. Lister's permission, selected a series of cases which must be looked on as crucial tests of the treatment, viz., those where healthy joints have been opened by incision or through accident and kept open for some days.

This paper will accordingly contain an account of all such cases which have occurred in Mr. Lister's hospital practice since September 1871 up to the present time. I begin at 1871, partly because the note-books conveniently accessible to me commence at that date, and partly because the treatment has been carried out in its present form only since that time, the spray and gauze being substituted during that year for syringes and lac-plaster.*

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* See the BRITISH MEDICAL JOURNAL for January 14th, 1871, where the first mention is made of the use of the gauze and spray, and where a very instructive case of incision into the elbow-joint to remove the head of the radius which was dislocated forwards is given. (Compare with this case No. 10.)

It may not be amiss to recall here the chief features of the treatment, the results of which are under consideration. The theories, I might almost say natural laws, on which it is founded are: that putrefaction or other fermentative changes occurring in a wound are the chief sources of danger to a patient after operation, the degree of danger varying with the situation and nature of the wound, the constitutional condition of the patient, and the character of the ferments present; that the cause of fermentative changes in organic liquids is the growth of organisms (generally bacteria) in them; that these organisms are never developed *de novo*, but always from a parent; that they gain access to a wound only from the air and the surrounding objects;* and that it is possible, by a proper use of various chemical substances, to destroy their vitality before they reach the wound. The great aim of the operator or dresser is, therefore, so to manipulate as to prevent the access of living organisms to a wound. Those in the air are destroyed by having a spray containing some sufficiently powerful antiseptic playing around the wound; those on the instruments, sponges, skin of patient or operator, etc., by washing these with a strong antiseptic lotion. The operator performs the necessary manipulations in the antiseptic atmosphere, merely taking care that nothing impure comes in contact with the wound, and also that, should his fingers or any instrument be removed from this atmosphere, they are repurified before reinsertion into the wound. At the conclusion of the operation, an antiseptic dressing of suitable material and dimensions is so arranged that causes of putrefaction shall not gain access to the wound during the time which elapses till the dressings are changed, and at each change of the dressings the same care is taken as during the operation.

It will thus be apparent that the cases here recorded are examples of the results of the practical carrying out of a principle, and not of the application of any particular medicament in any special form to the tissues. The use of the spray is not more important as an antiseptic means than the purification of instruments, etc., in the antiseptic lotion. The spray merely purifies the atmosphere; and, as there are undoubtedly fewer organisms floating about in the air than are present on any instrument which has got dust or water on it, if one were compelled from any cause to give up one or other antiseptic means, one

* In some rare instances organisms have been found in the pus of previously unopened abscesses. This has been notably the case in acute necrosis. These exceptions are, however, so rare, as to justify the general statement in the text. (See a paper by myself "On the Relation of Organisms to Antiseptic Dressings", in the *Pathological Transactions* for 1879.)

would at once choose the spray as the least important and that which could be the most easily dispensed with. In fact, the antiseptic treatment was carried on for years by Mr. Lister without any spray; the wounds being washed out with carbolic lotion, and carbolic putty, lac plaster, or other dressing acting on similar principles immediately applied.

Hence, to say that, because a surgeon uses the spray, or, indeed, all the materials for antiseptic work, he therefore employs the antiseptic treatment, is incorrect, unless the various means are used with the definite aim of excluding the putrefactive ferments. On the other hand, to say that, because a surgeon does not use a spray or even carbolic acid, he therefore does not employ the antiseptic method, would be equally incorrect. So long as the result of his treatment is to exclude or render inert the causes of putrefaction, he has been practising antiseptic treatment.

Besides the avoidance of putrefaction an essential element in the treatment is to provide free drainage for blood and serum, and so avoid inflammatory disturbance from tension.

It will prevent repetition if I give here a case in full as a type of the course usually followed under antiseptic treatment by incised wounds in healthy tissues. Cases behaving similarly will be referred to in the sequel as having run an "aseptic course".

John D., aged 43, was admitted into the Edinburgh Royal Infirmary on February 12th, 1874, suffering from exostosis growing from the external condyle of the right femur. The patient stated that for the last thirty years a swelling had existed on the outer side of the lower end of the right femur. This had increased very slowly, but of late it had interfered with the movements of the knee-joint.

There was a small tumour about the size of an orange, quite hard, situated on the outer side of the right knee, apparently growing from the external condyle of the femur. The patient complained of great pain in walking.

Operation.—February 12th. A longitudinal incision about three inches in length was made on the outer side of the knee over the tumour. Some synovial fluid escaped, probably from a wound in the capsule of the knee-joint. The tumour was found to be pedunculated, and the pedicle was cut across by bone-forceps. (The rough ridge corresponding to the base of the tumour extended to a point three-quarters of an inch below the level of the upper border of the patella, the limb

being extended.) Two drainage-tubes were inserted, and the rest of the wound was stitched up.

February 13th. Morning temperature 99.2 deg.; pulse 70. The patient had not slept well, in consequence of chloroform-sickness. He had taken a good breakfast. There was almost no pain in the wound. The dressing was changed, and found to be soaked with a sero-sanguineous fluid. One drainage-tube was removed.

February 14th. Morning temperature 99 deg; pulse 76. The patient felt quite well. As no discharge was visible outside the dressing at the usual time of visit, the dressing was not changed.

February 15th. Only the superficial dressing was changed to-day. There was only a very slight serous stain on it. There was no redness nor pain on pressure round the wound.

February 19th. The patient had not been dressed since last date. The whole dressing was changed to-day. One stitch and the remaining tube were removed.

February 26th. The patient was dressed. There was only a slight serous stain on the dressing; no pus. All the remaining stitches were removed. Cicatrisation was complete, except where the drainage-tube was, and there blood-clot filled the channel.

March 5th. Healing was complete everywhere, except a minute point where the drainage-tube had been. There had never been any pus or granulations.

March 12th. The wound was quite healed. The knee-joint movable.

March 25th. The patient was dismissed cured.

Here we observe that there was no local or constitutional disturbance after the operation; and such is the typical aseptic course. It is unfortunate that in this case, which I have selected as being one where the knee-joint was probably opened, a complete record of the temperature has not been kept. I may, however, state, from careful examination of many temperature-charts of cases treated antiseptically, that the following is the usual course. On the evening after the operation, the temperature is generally slightly below the normal, especially if the operation has been a severe one. Next morning, it is normal, or slightly elevated (one or two tenths of a degree). On the following evening, it is generally at its greatest height, being rarely higher than 100 deg. Fahr. It then rapidly falls, and is again normal twenty-four hours later. It never rises again, unless putrefaction occurs, or unless

other causes of elevation of temperature, such as tension, come into play.

After the effects of the chloroform have passed off, the patient who has been operated on antiseptically has the aspect of perfect health, no impairment of appetite or other symptom of fever being present.

As regards the local effects, there is no pain, no inflammation, no suppuration; the discharge, which is serous in quality, rapidly diminishes in amount, and hence the dressing requires to be but seldom changed. If a joint be opened, there is no impairment of its mobility.

Any deviation from the typical aseptic course will be noted in the report of the cases.

In cases where the joint has been opened by accident, the state of matters is, of course, very different from that where the incision has been made under antiseptic precautions. In the accidental wounds, dirt or air with its dust have entered the joint before the surgeon sees the case; and the problem then is not only to prevent the entrance of causes of putrefaction, but also to destroy the vitality of those which have already gained admission. This is done by the injection into the wound and joint of a strong antiseptic lotion, care being taken that the fluid enters all the recesses of the wound, while at the same time any such distension as would force it into the cellular tissue is avoided. The lotion used is, in cases seen an hour or two after the accident, 1-20 carbolic solution, and where several hours have elapsed, a solution of carbolic acid in rectified spirit 1 in 5.

The method of procedure is as follows. The surrounding skin having been washed with 1-20 carbolic lotion, and the external wound having been enlarged if necessary, the end of a gum-elastic catheter, connected with a syringe containing the lotion, is introduced into all the recesses of the wound, and the fluid is thus applied to all parts, the large opening allowing its free exit. Any coagula found in the wound are at the same time sponged away. Suitable drainage is then provided for, and an antiseptic dressing applied, the whole operation being done in a cloud of carbolic spray.

Here, of course, success is no longer a matter of certainty. It may be that the wound is a very complex one, and that some of its recesses may not have been reached by the lotion. When, however, success is attained, the case follows a course similar to that just described.

In accordance with this difference in the conditions, I have arranged the cases in two groups, according as the incision into the joint was made by the surgeon or was the result of accident.

No.	Name and Age.	Date of Admission. Operation, and Discharge; with Result.	Disease.
1	John C., 46.	*Ad.*, April 5, 1872. *Op.*, April 6, ,, *Dis.*, May 9, ,, *Result*, cured.	Caries of metacarpal bone and first phalanx of ring-finger.
2	David B., 39.	*Ad.*, July 22, 1872. *Op.*, July 22, ,, *Dis.*, Aug 5, ,, *Result*, cured.	Loose cartilage in knee-joint.
3	John McI., 34.	*Ad.*, March 13, 1873. *Op.*, March 28, ,, *Dis.*, June 6, ,, *Result*, cured.	Ununited fracture of olecranon; fracture oblique; considerable separation of fragments. Patient unable to extend the arm. Accident occurred five months previously.
4	John H., 19.	*Ad.*, May 6, 1873. *Op.*, May 31, ,, *Dis.*, Aug. 15, ,, *Result*, cured.	Dislocation of the lower end of the ulna backwards. The lower end of the radius was much thickened. Suppuration had occurred in the sheaths of the flexor tendons. The movements of the wrist-joint were painless, but limited, more especially as regards extension.
5	William T., 31.	*Ad.*, Nov. 19, 1873. *Op.*, Nov. 26, ,, *Dis.*, Jan. 8, 1874. *Result*, cured.	Loose cartilages in the elbow-joint. The movements of flexion and extension were impaired, more especially the former. Pain on attempting to complete these movements.
6	Frances G., 54.	*Ad.*, Nov. 3, 1873. *Op.*, Feb. 8, 1874. *Dis.*, Sep. 14, ,, *Result*, improved.	Ununited fracture of neck of right femur. Accident happened 18 months before admission. Right limb, 29⅞ in.; left limb, 31½ in. Suffered great pain; could neither sit nor walk.
7	Grace S., 15.	*Ad.*, May 6, 1874. *Op.*, May 14, ,, *Dis.*, May 27, ,, *Result*, cured.	Ganglion on the back of both wrists beneath the extensor tendons, which had resisted all treatment: multilocular.
8	Agnes ——, 17.	*Ad.*, July 1875. *Op.*, July 13, 1875. *Dis.*, Oct. 20, ,, *Result*, cured.	Ostitis of the tibia; bone much thickened. A sinus was present, leading down to bare bone.

Treatment.	Remarks.
Removal of the finger and the whole of the metacarpal bone; the carpal articulations being of course opened.	On April 23rd, the wound had entirely healed, except a small point at the distal end. Aseptic course.
Free incision into joint; cartilage removed.	Wound was completely healed on August 5th. It had been dressed four times. Aseptic course. Knee freely movable.
Longitudinal incision over olecranon, the cartilaginous end of the humerus being at once freely exposed. Ends of fragments refreshed, drilled, and tied together by strong silver wire. Wound left open. Splint applied so as to keep the arm extended.	The wound had completely healed on May 2nd, except where the wire projected. Dressed ten times. Wire removed on May 19th, when union was complete. Passive motion was commenced on April 8th, and was performed at each dressing. Typical aseptic course. When dismissed, the movements of the arm were almost perfect. In a letter received from the patient some time afterwards, he stated that the one arm was as good as the other.
Abscesses opened; end of ulna removed; drainage-tube introduced into the wrist-joint, which was healthy.	No local or constitutional disturbance followed the operation. When sent to the convalescent home on August 15th, there was still a small sinus, but this soon healed. The movements of the wrist-joint were greatly improved.
Longitudinal incision over external condyle. Joint opened; loose bodies (about 200 in number) scooped out. two drainage-tubes were inserted; wound stitched.	Healed on December 17th. Dressed seven times. Aseptic course. Arm was paralysed at first, owing to the pressure of the tourniquet; but, under the use of galvanism, this was cured. When dismissed, the movements were much improved. (See paper by Mr. Sampson Gamgee in *Lancet* for January 10th, 1874.)
The limb having been drawn down to full length by pulleys, an incision was made over and above the trochanter, and the ends of the fragments were refreshed with the gouge and hammer, the joint being opened in the process. Drainage-tubes inserted into joint; no stitches; long splint and extension with weight and pulley applied. Length of right leg after operation, 30⅝ in.	Healed on March 28th; aseptic course. Extension was maintained till April 3rd; but when it was at length removed, it was discovered that the weight had been too heavy, and that the limb operated on was longer than the other. When the patient left the hospital, there was not osseous union, but she was able to walk fairly and to sit, and the pain which she previously suffered had completely disappeared.
Both ganglia were removed, the tendons being exposed during the operation and held aside. On the right side the wrist-joint was opened, the articular surfaces of the scaphoid and radius being seen.	When dismissed to be treated as an out-patient, healing was not complete. On June 2nd, the left wrist was found healed; on June 7th, the right had also healed. Left dressed seven times; right eight. Drainage-tubes removed May 20th. Typical aseptic course. Movements of fingers and wrist-joints on both sides were perfect.
Thinking that the case was one of necrosis, Mr. Lister cut down and gouged out a portion of the bone. In doing so, he found the interior of the shaft softened, and converted into a sort of granulation material. In scraping out this matter, the gouge accidentally passed into the ankle-joint, which was healthy. Chloride of zinc was applied, and a drainage-tube inserted.	When the patient was discharged, the wound had completely healed. There was no pain, and the ankle-joint was freely movable. No constitutional or local disturbance followed the operation.

No.	Name and Age.	Date of Admission, Operation, and Discharge; with Result.	Disease.
9	Edward R., 59.	*Ad.*, Aug. 12, 1875. *Op.*, Aug. 17, ,, *Dis.*, Dec. 16, ,, *Result*, cured.	Enchondroma of scapula. A tumour had been removed from the same region seven years before the patient's admission to hospital.
10	Alexander —, 26.	*Ad.*, Nov. 10, 1875. *Op.*, Nov. 16, ,, *Dis.*, Dec. 26, ,, *Result*, cured.	Four months before admission, patient met with an accident, causing fracture of the ulna a little above its middle, and dislocation of the head of radius backwards. Pronation and supination were almost impossible. Extension could be carried slightly beyond a right angle.
11	James D., 16.	*Ad.*, Feb. 14, 1876. *Op.*, Feb. 14, ,, *Dis.*, Mar. 20, ,, *Result*, cured.	Patient was run over immediately before admission. Left ankle much bruised and distended with effused blood.
12	John D., 64.	*Ad.*, May 18, 1877. *Op.*, June 1, ,, *Dis.*, Sept. 8, ,, *Result*, much improved.	Rupture of rectus femoris and crureus in both thighs, the vasti being still attached to the sides of the patella. No power of extension; though, if the leg were extended, it could be kept so. If it became at all bent, the patient fell.
13	Adam W., 7.	*Ad.*, May 27, 1877. *Op.*, July 6, ,, *Dis.*, Aug. 24, ,, *Result*, cured.	Badly united fracture of the lower end of the humerus, the lower part of the upper fragment projecting backwards and locking the olecranon, thus causing inability to extend the forearm beyond an angle of 120 deg.
14	William T., 35. (See No. 5.)	*Ad.*, July 19, 1877. *Op.*, July 25, ,, *Dis.*, Aug. 11, ,, *Result* cured.	Return of previous symptoms.
15	Francis S., 40.	*Ad.*, Oct. 24, 1877. *Op.*, Oct. 26, ,, *Dis.*, Jan. 11, 1878 *Result*, cured.	Transverse fracture of the right patella, produced by striking the bent knee against a bar. Patient was admitted on October 12th, but insisted on going home, and on being treated by apparatus. As the apparatus did not answer, he now readily consented to the performance of the operation previously proposed.

Treatment.	Remarks.
The whole of the scapula below the spine, the spine itself, and about one-third of the glenoid cavity were removed, the upper border of the scapula and part of the glenoid fossa being left.	A portion of one of the flaps lost its vitality, leaving a large deep hole, at the bottom of which the articular end of the humerus could be seen. This took a long time to fill up, but was completely healed when the patient was discharged. The rest of the wound healed by first intention. Passive movement was kept up, and when the patient was dismissed, there was good movement at the shoulder-joint.
External lateral ligament of the elbow-joint divided and head of radius snipped off. Drainage-tube inserted into joint. No stitches.	Healing was complete on December 8th. Dressed six times; aseptic course. Passive movements were begun on November 18th. When discharged, the movements in all directions were very fair. When seen again in September 1877, all the movements were almost absolutely perfect.
Joint incised and clots evacuated.	Aseptic course. On March 10th, the wound was quite superficial, and boracic dressing was applied. Movements of joint normal.
The vasti were detached from the sides of the patella. The upper border of the patella was rawed, and the vasti were stitched to it — a V-shaped portion being taken out of the rectus and crureus. Counter-openings made on each side of the joint and drainage-tubes inserted. Only one knee operated on.	Wound went on well for about three weeks, when owing to the patient pushing his hand under the dressings, the wound putrefied; but by this time the opening into the joint had closed, and no harm resulted. When dismissed, the patient could extend his knee after it had been bent to an angle of 135 deg.; and the other knee being kept extended by means of a splint he could walk without fear of falling. (See report of case by Dr. Roxburgh in *Lancet*, 1878.)
Two longitudinal incisions made on the posterior aspect of the joint: one between the external condyle and the olecranon, the other between the olecranon and the ulnar nerve; these incisions, of course, opening the articulation. The projecting portion of the humerus was then removed, the attachment of the triceps to the olecranon process being left intact, and a hollow was gouged for the reception of the olecranon process. In order to get complete extension, it was necessary to remove the whole of the external condyle; drainage-tubes inserted.	The wounds had quite healed on July 30th; dressed six times; typical aseptic course. When discharged, the movements of the elbow-joint were almost absolutely perfect.
Elbow-joint opened; no loose cartilages found, but a number of bodies attached to a fringe of synovial membrane were removed.	Aseptic course. Wound had healed, and the movements were restored when the patient was discharged.
A longitudinal incision about three inches in length was made over the patella, when it appeared that the fragments were mutually displaced, and a mass of firm coagulum, mixed with fibrous tissue, interposed between them, so that it would have been impossible to bring the osseous surfaces into contact except by operative means. This material was removed, and the ends of the fragments were then refreshed, drilled obliquely, and tied together with strong silver wire. An opening was made into the joint on the outer side for the introduction of a horsehair-drain. The wound was closed by stitches, and the limb placed on a posterior Gooch's splint.	The wound had completely healed on November 17th, except where the wire was. Drain removed from knee on November 4th. Incision on outer side of knee healed November 11th. Dressed seven times; typical aseptic course. Wire was removed on December 21st. The splint was left off on January 7th. Patella firmly united. There was naturally considerable stiffness of the knee, owing to the limb having lain so long in the splint, but it could be moved with ease through an angle of about 45 deg. Patient would not submit to forcible movement under chloroform, or even to wear an elastic apparatus for gradual flexion.

No.	Name and Age.	Date of Admission, Operation, and Discharge; with Result.	Disease.
16	John S., 5.	*Ad.*, Feb. 6, 1878. *Op.*, Feb. 6, ,, *Dis.*, Mar. 29, ,, *Result*, cured.	Hæmophilia, with effusion of blood into the right ankle-joint. Stated that he was kicked on the ankle three days before admission. Patient was suffering great pain and constitutional disturbance. The joint was tense from the presence of fluid; and, as Mr. Lister feared that suppuration might ensue, he incised the joint.
17	William B., 45.	*Ad.*, March 18, 1879. *Op.*, March 20, ,, *Dis.*, May 4, ,, *Result*, cured.	Ununited fracture of the olecranon of nine weeks' standing. Patient could only imperfectly extend his forearm. The fracture was oblique; and, on flexion, there was considerable separation of the fragments.
18	Edward W., 12.	*Ad.*, Jan 5, 1879. *Op.*, Jan. 15, ,, *Dis.*, June 12, ,, *Result*, in process of cure.	Badly united fracture of the lower end of the humerus, with dislocation of both bones of the forearm backward. Accident happened three mouths before admission. The movements of the elbow-joint were very limited.
19	James P., 34.	*Ad.*, March 19, 1879. *Op.*, March 24, ,, *Dis.*, April 25, ,, *Result*, right cured; left *in statu quo.*	Loose cartilages in both knee-joints

Treatment.	Remarks.
An incision was made on each side of the ankle-joint. A quantity of dark fluid-blood escaped. Horsehair-drain passed through the joint.	Both wounds had healed on March 22nd. Hæmorrhage occurred from one of the wounds on the morning after the operation, and recurred at intervals for three days, being at length checked by the application of a solution of perchloride of iron in glycerine. Wounds were quite superficial on March 12th, and boracic dressing was therefore applied. No suppuration; aseptic course. When discharged, there was no pain in the joint: the joint was quite movable, and the boy was able to run about. Patient was in hospital in September 1879, on account of bleeding from his finger. The ankle was then in every respect quite normal.
An incision was made on the ulnar side of the posterior surface of the olecranon. Ends of fragments were refreshed with a chisel and hammer, the joint being of course opened. Fragments were then drilled obliquely and tied together with strong silver wire. Horsehair-drain passed into joint. Wound stitched; arm placed on a splint in the extended position.	The wound had entirely healed on April 9th, except where the wire was. Typical aseptic course. Drain and stitches were removed on March 27th. Passive motion was begun on March 31st; wire removed May 11th, the union of the fragments being then complete. When discharged, he was able to extend his arm almost completely. In a letter received from him in October 1878, he states that this arm is almost as useful as the other, and that he can carry on his trade as a plasterer, which he could not do before the operation.
On the supposition that the case was simply one of fracture, a longitudinal incision was made behind the joint, with the intention of excising it; but the true nature of the case being revealed, it was determined to avoid interference with the bones of the forearm. A small slice was sawn away from the lower end of the humerus, which was greatly distorted and thickened by callus. The lower end of the humerus was then pared and shaped with chisel and gouge, so as to resemble the natural form of the articular end of the bone, hollows being gouged for the reception of the coronoid and olecranon processes. The dislocation was then reduced; drainage-tubes inserted, and wound stitched. The reason for preferring this operation to complete excision was to avoid the lagging behind in growth of the forearm and hand, which is so apt to occur after that operation in young children.	Aseptic course. Passive motion was begun on the day after the operation. Pronation and supination were perfect from the first, and always continued so. Owing to the movements, a sore remained over the olecranon till April 10th, when it had completely healed. The limb was very strong. The movements of extension and flexion were fair, and were constantly improving when the patient was discharged.
Having fixed the cartilage in the right knee, Mr. Lister cut down and removed it. Drainage-tube put into joint. Two days afterwards, a free incision was made into the other joint, in search of a very small loose cartilage, which could not be fixed, but which the patient could generally bring by his own manipulations to the spot incised. Protracted manipulations on his own part, carried out under the spray with carbolised hands, failed however to bring the body to the wound; nor could it be discovered, after a long search, with the finger and hooks.	Both wounds followed an aseptic course. Drainage-tubes removed from each the day after the operation. Right knee healed April 12th; left knee had healed before the patient left the hospital. Movements on both sides unimpaired.

No.	Name and Age.	Date of Admission, Operation, and Discharge; with Result.	Disease.
20	Andrew G., 28.	*Ad.*, June 6, 1879. *Op.*, June 6, ,, *Dis.*, July 11, ,, *Result*, cured.	Patient was a medical man. He had suffered from bunion, beside the metatarso-phalangeal joint of the great toe of the right foot, for 14 years. Pads, etc., had been used, but without effect. Patient was unable to walk even short distances without great pain; and he could not enter on the practice for which his medical education had now qualified him.

TABLE B.—WOUNDS

No.	Name and Age.	Date of Admission, Operation, and Discharge; with Result.	Disease.
21	Frank K., 29.	*Ad.*, Nov. 20, 1871. *Op.*, Nov. 20, ,, *Dis.*, Dec. 23, ,, *Result*, cured.	Little finger-joint fractured in various places. Skin over hand contused. Fourth metacarpal bone laid bare in the greater part of its extent. Fourth metacarpo-phalangeal joint opened.
22	George G., 60.	*Ad.*, June 28, 1872. *Op.*, June 28, ,, *Dis.*, Oct. 1, ,, *Result*, cured.	Compound comminuted fracture of the humerus, caused by the wheel of a wagon passing over his arm. Humerus fractured in two places; the lower fracture communicating with the elbow-joint. Patient admitted about two hours and a half after the accident.
23	Robert H., 30.	*Ad.*, May 12, 1873. *Op.*, May 12, ,, *Dis.*, July 17, ,, *Result*, failed; amputation.	Compound fracture of the carpal bones of the left hand. Extensive laceration of the soft parts. Machinery accident. Patient admitted immediately after the accident.
24	Walter S., 42.	*Ad.*, May 17, 1875. *Op.*, May 17, ,, *Dis.*, May 21, ,, *Result*, in process of cure.	Wound of metacarpo-phalangeal joint.
25	Francis J., 48.	*Ad.*, Oct. 4, 1875. *Op.*, Oct. 4, ,, *Dis.*, Dec. 4, ,, *Result*, cured.	Compound dislocation of the ankle; the articular surface of the tibia protruding through a large wound anteriorly. Both malleoli torn off.
26	Henry W.	*Ad.*, June 8, 1876. *Op.*, June 8, ,, *Dis.*, June 13, ,, *Result*, cured.	Thumb and trapezium nearly torn off, and the carpal joints opened. Gunshot-wound.
27	David S., 13.	*Ad.*, May 2, 1877. *Dis.*, after Mr. Lister left Edinburgh. *Result*, cured.	Large lacerated wound of right knee. Large flap of skin thrown to one side. Mud was ground into the cartilaginous surface of the internal condyle of the femur. The accident resulted from a wheel of a heavy cart passing over his leg.

Treatment.	Remarks.
Mr Lister made a longitudinal incision over the inner side of the joint on the dorsal aspect. The joint was opened, and the projecting inner end of the extremity of the metatarsal bone cut off. The remainder of the joint left intact. Drainage-tube inserted ; no stitches.	Aseptic course. Wound was quite healed on July 9th. When discharged, the joint was quite movable and the swelling from thickening of the soft parts much less. In a note received from him on September 16th, 1879, patient writes : "The prominence on the inner side of the foot has entirely disappeared, and I have perfect use of the joint, with entire absence of pain. I can walk ten miles without any inconvenience."

OF JOINTS.

Treatment.	Remarks.
Little finger amputated ; other parts well syringed with 1-20 carbolic lotion.	Some sloughing and suppuration occurred among the contused parts in the hand, and an abscess formed in the forearm. Entirely healed December 23rd. Passive movements were begun in December, and could be easily performed.
Wound injected with 1-20 carbolic lotion. Some loose pieces of bone were removed from the lower wound. (No portion of the articular end of the humerus was, however, removed.)	Putrefaction was avoided ; typical aseptic course. The fracture had quite united on August 10th. The wound was quite superficial on Aug. 3rd, and boracic dressing was applied. On August 15th, erysipelas attacked the wound. This passed off, and the wounds were quite healed on Sept. 20th. When dismissed, patient was able to flex his arm sufficiently to enable him to touch his opposite shoulder.
Wound injected with a solution of carbolic acid in rectified spirit (1 in 5).	Putrefaction occurred in spite of the injection ; and as fever set in, Mr. Lister operated on May 16th, removing the carpus and fingers, but leaving the trapezium and the thumb. The flaps were left gaping, and carbolic oiled lint (1-10) was introduced between the flaps. Flaps brought together on May 24th. Stump was quite healed on June 25th.
Washed out with 1-20 carbolic lotion.	Putrefaction was avoided. Treated as an out-patient. Wound followed an aseptic course.
The wound was injected with 1-20 carbolic lotion, and an attempt was then made to reduce the dislocation. This failing, the articular surface of the tibia was sawn off, the astragalus being left untouched. Foot fixed at right angles to leg.	Aseptic course. The wound was almost absolutely healed when the patient was discharged. Joint strong and slightly movable. The temperature was on one occasion as high as 100 deg.
The thumb, with its metacarpal bone, was removed ; the trapezium was also dissected out. The wound and the carpal joints, as far as possible, were injected with 1–5 solution of carbolic acid in rectified spirit.	Aseptic course. Treated as an out-patient after June 13th. On June 31st, it was almost absolutely healed.
Shreds of tissue were clipped away, and the cartilage of the condyle was pared with a knife where the dirt was most ground in. The whole of the dirty wound was scrubbed with a nail-brush, and 1-20 carbolic lotion, and, in addition, 1-5 spirituous solution of carbolic acid were applied. No stitches were inserted. The limb was placed on a posterior splint.	The wound became filled with blood-clot, the deeper part of which became organised. On May 27th, there was a large granulating surface. The wound was quite superficial on June 26th, when boracic dressing was substituted for the carbolic acid. There was at that time very considerable movement of the knee-joint, without pain. In August 1878, "patient visited the hospital, walking without any assistance, the two knees being equally useful, except that the injured one was still somewhat stiff".

No.	Name and Age.	Date of Admission, Operation, and Discharge; with Result.	Disease.
28	Ellen M., 12.	*Ad.*, Nov. 6, 1877. *Op.*, Nov. 6, ,, *Dis.*, Nov. 17, ,, *Result*, cured.	Punctured wound of ankle-joint, caused by scissors. The accident happened twenty-one hours before admission. Glairy fluid escaped, and a probe passed into the joint. Foot red and swollen.
29	Jane D., 50.	*Ad.*, Oct. 15, 1878. *Op.*, Oct. 15, ,, *Dis.*, June 20, 1879. *Result*, cured.	Compound fracture of the lower end of the femur, with splintering of the condyles into the joint. Patient was seen one hour and a half after the accident.
30	Maria L., 60.	*Ad.*, Nov. 12, 1878. *Op.*, Nov. 12, ,, *Dis.*, April 19, 1879. *Result*, in process of cure.	Compound dislocation of the left ankle-joint, with comminuted fracture of the fibula and fracture of the internal malleolus. Skin in the neighbourhood of the wound much contused.
31	Henry B., 22.	*Ad.*, April 20, 1879. *Op.*, April 21, ,, *Dis.*, May 30th, to come as out-patient. *Result*, cured.	Patient jumped over Waterloo Bridge; in his descent, he struck his left elbow against the side of the parapet. The result was an oblique fracture into the elbow-joint, detaching the internal condyle. There was a small opening in the skin communicating with the fracture.
32	Samuel M., 54.	*Ad.*, July 8, 1879. *Op.*, July 8, ,, *Dis.*, July 24, ,, *Result*, cured.	Punctured wound of the left knee-joint, just above the patella. The finger, when introduced into the wound, passed into the joint, and felt the under surface of the patella. Synovial fluid escaped. Great pain on movement of the joint. The wound was inflicted about fourteen hours before the patient came to the hospital.

Treatment.	Remarks.
Wound enlarged, and joint injected with a solution of carbolic acid in spirit (1-5).	The wound had quite healed on November 17th. Aseptic course; dressed four times. When patient was discharged, the ankle was quite normal, with perfect movement.
The opening in the skin was enlarged. The projecting end of the femur was sawn off, and reduction was effected. The wound was washed out with 1 to 20 carbolic lotion. An incision was made into the knee-joint on the outer side, and a drainage-tube was inserted into the joint, to prevent accumulation of fluid.	Aseptic course. The drainage-tube was removed from the joint on October 28th, and the wound of the joint had completely healed on November 24th: the wound in the thigh healed on December 13th. As the fracture remained ununited, Mr. Lister injected iodine between the ends of the fragments on February 14th. Union not yet occurring, Mr. Lister cut off the ends of the bones and wired them together with thick silver wire. The femur is still ununited, but is under treatment.
The detached portions of bone were removed; wound syringed out with 1 in 20 carbolic lotion. Dislocation reduced. Drainage-tubes inserted. Dupuytren's splint.	Aseptic course. Some portions of the skin sloughed. When discharged, the wound was almost healed, but the ankle-joint was stiff.
Wound enlarged; some small fragments of bone removed, and the wound and joint syringed out with 1 to 20 carbolic lotion. Drainage-tubes inserted.	Aseptic course. Wound completely healed on June 30th. The movements of the joint were then very good, and have since that time steadily improved.
Joint washed out with 1 in 20 carbolic lotion, and with a solution of carbolic acid in rectified spirit (1.5). Drainage-tube inserted; posterior splint applied.	Aseptic course. The pain on moving the knee ceased a few hours after it had been washed out. The wound was quite superficial when the patient was discharged, and the knee was quite movable. Healing was complete on July 31st. The patient was again seen in October, the movements of the knee being then perfect.