ANALYSIS OF CASES
OF
AMPUTATION OF THE LIMBS
IN THE
RADCLIFFE INFIRMARY, OXFORD.

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For some years past, beginning with 1838, the capital operations in the Radcliffe Infirmary, at Oxford, have been registered from notes taken at the time of the operation. The Admission Books before 1838 show (as I believe) all the cases in which primary amputation was performed upon In-Patients for accidents as far back as 1810: and these cases are included in the tables in this paper. The secondary operations are not noted in the Admission books; nor (except in very few cases) are those in which amputation was performed for disease.

In arranging cases of amputation for purposes of comparison, two large classes are easily distinguished, — Amputation for Disease, and Amputation for Injury; and many subdivisions may be made in each class. The different

proportion of mortality, according as the operation is in the upper or lower extremity, and whether near the trunk, or at a distance from it, is well recognised: and one former observer at least (Mr. James, of Exeter,) has pointed out that the mortality in disease varies according to the nature of the disease, as much as in accidents, it varies according to the nature of the injury, and the period at which amputation is performed.

AMPUTATION FOR DISEASE.

Diseases of Joints.

The Register of operations contains notes of the cases of 96 patients (59 male and 37 female) on whom amputation was performed for Disease of the Joints, — 57 in the Thigh, 21 in the Leg, 7 in the Upper Arm, and 11 in the Forearm.

In some few of the cases here classed as ‘Diseases of Joints,’ it must be to some extent doubtful whether the disease began in the proper structure of the joint, or in the neighbouring bone (134, 159), especially in cases of the ankle (37, 82, 112, 118, 239), and wrist (69, 254). At the late stage in which patients apply at a Hospital, it is often difficult to tell clearly; and in cases of doubt, the difficulty is seldom altogether removed by dissection of the limb.

Of 57 cases in which amputation was done in the Thigh for disease of the knee, 6 died from the immediate effects of the operation: —

A married woman, 43 years of age, in a *very* low state before amputation, died the 5th day, exhausted. (150.)

A girl of 15 died the 18th day, exhausted. (151.)

A young woman of 19 died the 15th day, exhausted, apparently from the effects of secondary hemorrhage on the 7th day. (159.)

A young man of 20 died the 24th day. Much blood was lost at the operation; and about two hours afterwards hemorrhage took place, for which the stump was opened.

He seemed to sink from the loss of blood, from which he never thoroughly rallied. An abscess was found deep among the muscles of the thigh, but no pus in the veins, nor any appearance of inflammation. The viscera of the thorax and abdomen were healthy. (183.)

A sawyer, aged 38, died the 15th day. Much blood was lost at the operation, from which he never fairly recovered. The lungs were free from tubercles; there was slight inflammation of the left pleura; general inflammation of the pericardium, which contained several ounces of turbid fluid, with flakes of lymph. The stump was foul and unhealthy, without union (except at some points of the integument), with pus in the saphena, femoral and external iliac veins: the internal and common iliac, and ascending cava seemed healthy. (194.)

A boy, 9 years old, died the 8th day. He was very low before the operation, suffering from profuse suppuration from several openings about the knee, and lower part of the thigh. He gradually sank from the time of the operation. (210.)

— and 5 others did not recover their health, so as to admit of their being discharged on the recommendation of the operating Surgeon:—

A man, 53 years of age, died in the 11th week, with “long-continued diarrhœa.” (7.)

A man, about 22, died in the 6th week, with phthisis; the stump was nearly healed. (59.)

A lad of 18 died in the 7th month, with diarrhœa. Ulceration of the ileum was found, with peritonitis; tubercles were thickly deposited throughout the lungs. (160.)

A man, aged 38, died the 38th day with phthisis. The stump healed quickly. Disease in the lungs, which had been quiet before the operation, was rapidly developed; and at his own request he was taken to his home in the country the day before he died. (230.)

A glover, aged 25, under my care, died in the 11th week, with large sloughs on the sacrum, and with phthisis,

— probably miliary tubercles without cavities. At the time of his admission, I proposed amputation as the only means of relief; but he did not consent till after seven weeks, by which time he had become much lowered by the constant pain of the disease, and by the discharge from sloughs which formed over the sacrum. The stump healed slowly. At his own request, he was taken to his home in the country, and died in two days. (250.)

NOTE. — In this case, and in three others (105, 208, 248), the articular cartilage had disappeared altogether from the outer condyle of the femur, while on the inner it was only partially absorbed or thinned. In two other cases in which it had disappeared from the outer condyle, it was sound on the inner in one case (224), and probably, also, in the other, as its appearance is not noted. (16.)

Of 21 cases in which amputation was done in the Leg, for disease of the ankle, or of the joints of the tarsus, all recovered from the operation.

One, however, died in the House: —

A boy of 15 died in the 16th week, with phthisis. The stump had healed some weeks. (70.)

All the patients who underwent amputation in the Upper extremity recovered from the operation, and left the Infirmary "cured."

Of those who recovered from the operation, and were discharged from the Infirmary, 20 never regained their former health, — 9 dying within 6 months of their discharge, 6 within 12 months, 3 within 18 months; 1 lingering rather more than 2 years, and 1, in whom the stump did not heal, lived about 4 years.

Of those who, as far as is known, did recover their health, 16 have since died; —

3 from causes not connected with the original disease; — one from accidental violence (a fall down a staircase), 5½ years after the operation (57); — one, after several

attacks of general dropsy, died comatose, with granular kidneys, 6 years after the operation (104); — and one, who was much exhausted by a succession of abscesses, was attacked, during the late epidemic of smallpox, with the disease in a severe form, and died, between 8 and 9 years after the operation (105).

One died with dropsy and lumbar abscess, between 6 and 7 years after the operation (22); — and 12 died with symptoms of pulmonary phthisis (one of them having also diabetes); 1 lived about 15 months, 4 lived about 2 years or a little longer, 2 lived between 3 and 4 years, one lived about 7 years, one about 8 years, 2 lived nearly 10 years, and one nearly 13 years.

The other patients, with the exception of two (58, 63), of whom nothing is known, are believed to be all now in good health. Among the number are the first two patients in the Register, — at a distance of 18 years from the operation.

The history of the patients after leaving the Infirmary has been taken sometimes from personal knowledge and enquiry; in some cases from the reports of friends or relations; and in many instances from the neighbouring Clergy and Medical practitioners, whose friendly help has supplied many points of information.

From a careful examination of the notes in the Register, it does not seem that the deaths after amputation, from causes connected with the operation, or the subsequent death from phthisis, at an early or late period after removal of the limb, is dependent on the length of time the disease had lasted before operation, or the extent to which the joint was disorganized by disease.

In the course of a long disease, varied with occasional periods of relief, the early history, and the symptoms attending the first appearance are often forgotten, and can hardly

be recalled to memory with sufficient exactness for correct medical registration. The note in the Register is in almost all cases alike, — that the disease began “without known cause,” and had existed some months (or years) before the patient came to the Infirmary. In later cases greater pains have been taken to note the history of the first appearance. In 5 cases the disease has been attributed by the patient to local injury (125, 129, 136, 167, 231). In one case disease had been quiet, without hindering the patient from his work, for nearly 20 years, till slight injury 6 months before his admission (84). In 4 cases it is remembered that the pain came on suddenly (113, 114, 248, 249).

Taking the history of the disease from these notes, with as near an approach to accuracy as can now be made, the cases may be arranged in classes: —

Those in which the disease had existed less than 12 months at the time of operation, of which there are 42 cases, — 30 men and 12 women.

Those in which it was of longer standing, yet less than 2 years, of which there are 20 cases, — 13 men and 7 women.

And those in which it had lasted beyond that time, 34 cases, — 16 men and 18 women.

Thus it seems that in cases submitted to amputation in early stages of disease, the proportion of men is greater than that of women: in later stages the proportion of women is greatest.

Although it is not stated in every case whether it was the Right or Left limb removed, yet it is clear that the Right was the subject of operation more frequently than the Left.

Of the Right Lower extremity there were 38 cases, — 29 of the thigh and 9 of the leg. Of the Left there were 32, — 24 of the thigh, and 8 of the leg.

Two other cases of the Right Lower extremity might be added, in one of which the thigh was removed (207), and

in the other the leg (193), for deformity, the result of old disease of the knee and ankle.¹

In the smaller number of cases in the Upper extremity, the proportion does not differ much. Above the elbow there were 2 of the Right, and 4 of the Left. Of the forearm there were 7 of the Right, and 4 of the Left.

One class of cases requires separate notice, — those in which amputation was done in Boys and Girls under puberty, or about that age.

Of these there are 15. Three of them died in the House (70, 151, 210). One died 5 weeks after being discharged (109), one in 6 months (15), one in about 9 months (89), and an other probably as soon (58). One lived about 10 years (27). One was killed accidentally about 5½ years after amputation (57).

The remaining 6 are believed to be all living, having outlived the operation for periods of 13 years, 12 years, 10 years, 9 years, 4 years, and 15 months.

Various Diseases.

Of other diseases of various kinds, some local and some of constitutional origin, there are 28 cases. In 13 cases, amputation was done in the Thigh, in 14 in the Leg, and in one at the Wrist-joint.

Malignant diseases, 5 cases.

Necrosis, 5.

Caries, 4.

Other diseases of bone, 2.

Diffused abscesses, with destruction of bone, 1.

Gangrene, 2.

Elephantiasis, 1.

Old ulcerations, 3.

Useless or inconvenient limbs, 5.

All these patients recovered from the operation, except in 2 of the cases of Malignant disease.

¹ In 9 cases, under my care in the Infirmary, of contraction of the knee from former disease of the joint, 7 were of the Right and 2 of the Left.

Malignant Disease.

The cases in which amputation was done for Malignant disease were, cancerous ulceration in 3 cases, fungus hematodes in one case, and cerebriiform cancer in one.

3 were in the Thigh and 2 in the Leg.

One of each died in the House :

A man, aged 38, died in the 5th week after amputation of the thigh for cancer of the bones of the leg of long standing. Two or three days before death the pulse became rapid and the breathing impaired ; but it was not till within an hour of his death that any immediate change was anticipated. Examination of the body did not disclose anything beyond slight enlargement of the heart, and some minute tubercles in the lungs, — “ nothing in short to account for death.” (65.)

A widow, 63 years of age, under my care, died the 13th day after amputation of the leg, for cerebriiform cancer of the tibia, which had existed about 8 months.¹ Early in the morning of the 10th day she was observed to be faint and pulseless, bathed in a cold sweat. From this time she gradually sank. Much fat was deposited about the heart, and the muscular substance was softened ; the mitral and tricuspid valves were much thickened, with deposit on their edges. The liver was soft and fatty ; the kidneys in an early stage of granular degeneration. No appearance of malignant deposit was detected anywhere, nor any enlargement of the inguinal or lumbar glands. (232.)

In one case disease reappeared, and the man died in about a year. (60.)

The other two are now living ; — one 13 years after amputation of the leg, for what is supposed to have been fungus hematodes of the bones of the foot (71), and one after amputation of the thigh, performed 18 months ago, for cancerous ulceration spreading into the tibia. (233.)

¹ Museum, Ch. Ch.

Necrosis.

Of 5 patients who underwent amputation of the Thigh for necrosis of the bones of the leg, 4 are now in good health ; and one, though living, is crippled by deformity of the spine (the result of *mollities ossium*), which has come on since the operation.¹ (117.)

Caries.

Four patients (all of them women) underwent amputation for caries of the tibia, — 2 in the Thigh and 2 in the Leg.

In one, disease reappeared in the other leg, and in the sternum, and she died in about 2 years. (39.) One continued well for 2 years, when she was attacked with small-pox, and died in 3 days. (79.) One continued well for about 7 years, when she was attacked with uterine disease, and died exhausted by hemorrhage, about 8 years after the amputation. (94.)

In the remaining case the patient is in good health. The operation was done 16 months ago. (235.)

A man, who underwent amputation of the Leg for enlargement of the bone following injury, died 13 years afterwards, from the effects of some internal disease of the abdomen. (64.)

An intemperate man, 48 years of age, underwent amputation of the Leg, for disease resembling Elephantiasis, which had been 14 years in progress.² There was not any reproduction of the disease at the time of his death, 3 years afterwards, during an attack of typhus fever. (180.)

In the remaining cases the patients are all now living.

¹ Case mentioned, Stanley, 'Diseases of the Bones,' chap. vii, p. 113.

² Museum, Ch. Ch.

AMPUTATION FOR INJURY.

Primary Operations.

The Register contains notes of 35 cases of Primary Amputation, — that is, cases in which amputation was done soon after the patient's admission, without trying to save the injured limb. The Admission Books show 15 other cases; being, as far as I can learn, all the primary operations performed on In-Patients between 1810 and 1838, — the year in which the Register begins. After forming an opinion that the limb could not be saved, the period chosen by the operating Surgeon has been as early as could be conveniently done; in cases of collapse, not till after the patient had rallied. In one case this did not take place for 16 hours. (126.)

Of these cases, 6 were in the Thigh, 13 in the Leg, 16 in the Upper arm, and 15 in the Forearm.

Of the 6 cases in which amputation was done in the Thigh, 5 were fatal, — all of them cases of very severe injury, attended with circumstances little favorable to recovery: —

A man of 47, died the 22d day. He had nearly severed his leg from the thigh by falling with his knee bent on a scythe; he had lost much blood before admission, and gradually sank from the time of the operation. (87.)

A lad of 19, died in 24 hours. He had suffered a compound fracture from a train going over the middle of the thigh on a railway. Very little blood was lost. (140.)

A man of 70, died the 6th day. He had fallen with his knee bent on a scythe, which passed through the joint and separated the posterior two thirds of the condyles, with part of the shaft, from the rest of the bone.¹ The popliteal vessels were not wounded, and there had been very little hemorrhage. The operation was little more than com-

¹ Museum, Ch. Ch.

pleting the separation of the limb. He went on favorably till the 4th day, after which he sank rapidly. (171.)

A farmer's boy, aged 14, under my care, died the 22d day. He had suffered a compound fracture of the femur, with laceration of the soft parts, laying open the knee-joint, and also a comminuted fracture of the tibia and fibula, from falling into a thrashing machine. He lost much blood before and during the operation. On the 10th day he complained of a little shivering and sickness; from which time he gradually sank. The end of the bone had perished for about a third of an inch; there was a small collection of matter in the course of the femoral vessels, and an other among the adductor muscles; the femoral and iliac veins seemed healthy. Both sides of the chest contained yellow turbid fluid with flakes of lymph, and the pleura was covered with a coat of recent lymph. Deposits of pus of various sizes were observed in the base of both lungs. The heart and pericardium were healthy, as were also the viscera of the abdomen. (197.)

A laborer on a railway, aged 28, died the 23d day. He had suffered a compound comminuted fracture, on the railway. Much blood was lost before admission. On the 14th day, when the stump had nearly healed, he complained of headache. The next day he had a rigor, the pulse became quick, and the breathing hurried; and he complained much of pain at the epigastrium. The countenance became sallow and anxious; the stump opened, and the bone protruded; and he gradually sank. A small collection of matter was found among the adductor muscles. The femoral vein seemed healthy as far as its junction with the profunda; the profunda and its larger branches, and the external iliac, contained pus, with patches of lymph adhering to the lining membrane. The pleura on both sides was obliterated by old adhesions. Purulent deposits of small size were found, surrounded by masses of red hepatization, in the base of both lungs. The pericardium contained about 4 ounces of serum. (199.)

In the case in which the patient recovered, the injuries were confined to the leg ; the knee-joint and the thigh were not injured.

All the patients who underwent amputation of the Leg recovered.

Of the 16 cases in the Upper arm 3 were fatal : —

A man, 30 years of age, died the 21st day. The injury was received from an explosion by gunpowder in a stone quarry. His death is attributed to "inflammation of the chest." (1827.)

A papermaker, aged 38, died the 4th day, — having gradually sank. His arm had been caught in the machinery of a mill ; the wrist and elbow joints were both laid open, and the laceration extended into the axilla. (164.)

A young man, aged 20, under my care, died the 21st day. He was a passenger one winter's night in a train which came in collision with a train of coal trucks, meeting it on the same line of rails. The broken woodwork of the carriages caught fire : when this was quenched, he was found under one of the carriages with the hand and wrist much burned, the upper arm crushed, and the bone cut through about half an inch above the insertion of the deltoid muscle. The wound had nearly healed, when, on the evening of the 15th day, he had a shivering fit, and a more severe one the next day, followed by a quick and weak pulse, and hurried breathing. The wound opened, and the bone protruded. The skin became yellow ; and he sank with symptoms of purulent infection. Permission to examine the body was refused. (198.)

Of the 15 cases in the Forearm only one was fatal : —

A lad of 19, died the 30th day. The right hand had been destroyed by machinery, and amputation was performed just above the wrist. Hemorrhage took place the next day ; and the stump was opened. On the 8th day free hemorrhage again took place ; the stump was opened again, and a large vessel tied. On the 16th, he complained of sickness, and pain at the epigastrium. Symptoms of effusion into the

chest came on; he got weaker, and gradually sank. The ends of the radius and ulna had perished, and projected from the open face of the stump. The large veins of the forearm did not show any unhealthy appearance. The right lung was covered with lymph, and compressed against the vertebræ by a large collection of purulent matter, mixed with flakes of lymph. In the base of the compressed lung were several small purulent deposits, surrounded by circumscribed masses of grey hepatization. The left side of the chest was healthy, and also the heart, pericardium, and abdominal viscera. (200.)

To this list of Primary Operations, 2 late cases might be added, where the patients, in losing their limbs, underwent all the dangers — though not the actual operation, — of a surgical amputation, — 1 in the Leg, and 1 in the Upper arm.

A laborer on a railway, aged 24, was admitted 27th December, 1850, under the care of Mr. Hitchings, with destruction of the right foot, and compound comminuted fracture of the tibia and fibula, about the middle of the leg, laceration of the integument over the knee, laying bare the patella, and two lacerated wounds of the scalp. Early in the morning, before daylight, he was found drunk lying on the rails. During the treatment the end of the tibia separated, and a piece of the patella was discharged. He left the Infirmary on the 23d of April, with a good stump.

A lad, aged 16, was admitted 22d July, 1852, under the care of Mr. Hansard; his right arm having been cut off a little above the elbow by a chaff-cutting machine. The projecting end of the bone was sawed off, the vessels tied, and the stump dressed. The lad was discharged on the 25th of August, with a good stump.

Secondary Operations.

There have only been 6 cases of Secondary Amputation; — 2 in the Thigh, 2 in the Leg, 1 at the Shoulder-joint,

and 1 in the Forearm. Three of the patients were not brought to the Infirmary till the period which would have been preferred for amputation was passed. All recovered, except a woman in whom the arm was removed at the shoulder-joint.

Of the 2 cases in which amputation was done in the Thigh, one was for mortification after compound comminuted fracture of the leg, and the other for gangrene, after simple fracture of the thigh-bone, with rupture of the popliteal artery and vein.

The patient in whom the arm was removed at the shoulder-joint, was a married woman, 45 years of age, under my care. She had scalded, or burnt, the arm and shoulder, 3 days before admission, during some "fit," or in an attack of mania. The operation was performed on the 7th day after admission. She refused all food after the operation, and became so unmanageable that the wound could not be protected from her violence. She died in 28 hours, — apparently sinking from maniacal exhaustion.¹ (234.)

This is the only case since the Radcliffe Infirmary was opened in which the arm has been removed at the shoulder-joint. In 4 late cases the operation might have been done, if it had been thought desirable so far to disfigure the patient. (137, 164, 196, 198.) In one of them there was a fracture through the neck of the bone, beside the injuries for which amputation was performed. (196.)

One other case might be added to these Secondary Operations, in which the patient underwent the danger, though not the actual surgical operation.

A boy, aged 13, was admitted 14th February, 1856, under the care of Mr. Symonds, with his left foot and ankle crushed in a thrashing machine 3 days before admission.

¹ The case is fully reported in the *Asylum Journal*, July, 1855.

The foot, which was gangrenous, was afterwards separated. The wound healed quickly, and the boy was discharged on the 9th of April, with a good stump.

There is not anything among the records of the Infirmary which will show how often a life has been lost in trying to save an injured limb. To supply this want, since my connection with the Infirmary, I have noted every case in which a patient has been admitted with any injury of the extremities which ended fatally. Through the kindness of my colleagues, who have afforded me every facility in this investigation, I have obtained notes of the cases under their treatment as well as my own. During this time, 17 patients, admitted on account of injuries in the limbs, more or less severe, not complicated with any injury of the head or trunk, and wholly within reach of amputation, have died from the effects of the injuries received.

In 3 of the cases the patient's life would perhaps have been saved by primary amputation of the Leg. In one the operation was advised, and the patient refused to submit.

A guard on a railway, aged 40, was admitted 22d November, 1851, under the care of Mr. Cleobury, with the left leg crushed by a train going over the middle of the limb. Immediate amputation was advised, which was refused by the patient. Gangrene followed, and the man died on the 28th. This is the only case within my knowledge in which immediate amputation has been advised, and refused by the patient.

A countryman, aged 32, apparently in good health, but rather given to drinking, and (as we learned after his death) subject to fits, was admitted 6th November, 1852, under my care, with a compound comminuted fracture of the right leg. He was riding, about half drunk, on a heavily laden waggon : in trying to get down he fell, and the wheel went over him. The skin, marked by the wheel, was injured all round the limb, but (as I hoped) not deprived of vitality. Both tibial arteries could be felt at the ankle ; and the limb was put up

in splints, without difficulty, in a good position. In three or four days it became clear that the whole of the contused skin had perished. Erysipelas afterwards appeared on the face and on the leg, spreading up to the hip. On the 18th the erysipelas was subsiding favorably: free suppuration was established from the wound, and from several deep incisions which had been made to let out the confined matter. That night he was very restless; and toward morning he kicked the bed-clothes off: the Nurse thought he had a "fit." About 3 or 4 ounces of blood were on the bed. He was in too low a state now for amputation to be justifiable, and he died quietly about noon. Several ounces of coagulated blood were found entangled with the broken pieces of bone, and injected among the muscles. The posterior tibial artery had given way by ulceration in two places, and the anterior in one place. The lower fragment of the tibia was driven firmly into the medullary cavity of the upper part.

A farm-laborer, aged 32, was admitted 21st January, 1854, under the care of Mr. Hester, with compound dislocation of the right ankle, and fracture of the outer malleolus, caused by a thrashing machine. I saw the man with Mr. Hester immediately on admission, and fully agreed with him that an attempt should be made to save the limb. I forgot to ask again after the man, and only heard by chance that he was, at his own request, removed from the Infirmary in a dying state on the 15th of March, and died two days afterwards.

The remaining cases, — 14 in number, — are added at the end of this paper: and my own opinion agrees with that of the attending Surgeon in each case, that there was no time, in any of the cases, while the patient was under treatment, in which it would have been desirable to perform amputation.

On referring to the Table of cases of Primary Amputation, it will be seen that 4 cases immediately following each other in 1853 were fatal; 2 in January, 1 in April, and 1 in May.

The symptoms observed during life were much alike in all the 4 cases ; and, in the 3 bodies which were examined after death, many similar morbid changes were noted. In the first 3 cases there was a large loss of blood *before* the operation ; yet the patients did not seem to sink from that cause. In the last case there were several attacks of hemorrhage *after* the operation ; and the man seemed to sink from exhaustion, with much the same symptoms during life as were noted in two men in 1852, who died after amputation of the thigh for disease of the knee, in both of whom there was profuse hemorrhage at the operation, or immediately after it. (183, 194.)

The circumstance that in so many fatal cases, happening about the same time, there had been a large loss of blood made us more careful about securing all the bleeding points at the time of the operation, as a means of checking what seemed one certain evil. After the chief arteries have been tied, and the tourniquet removed, every bleeding vessel has been tied with a firm thread. Since the fatal cases, — in none of which the veins were tied, — I have noted 26 cases in which the chief veins of the limb were tied ; — 13 in the thigh, in which the femoral vein, and in one the saphena also was tied, 10 in the leg, in which the popliteal, anterior and posterior tibial were tied, and 3 in the upper arm, in which the venæ comites were tied. No ill effect of any kind has been observed. In some cases, but not in all, I have observed that the ligatures on the large veins have been longer in separating than those on the large arteries.

There is not any reason to think that the result in any case was affected by the mode in which the knife was used, and the incisions made. The operation has been generally done by double circular incision, reflecting the integument before division of the muscular substance. Very few operations have been done by flaps, in cases where the soft parts were sound and admitted of circular incision.

Since the introduction of ether and chloroform, inhalation has been used at the operation.

It has been the custom to complete the dressing of the stump immediately after the operation, before the patient was taken back to bed. At one time two of the Surgeons (VII, IX) adopted the practise of leaving the wound open for several hours. In all these cases several vessels wanted tying when the wound was finally dressed ; and in many of them there was secondary hemorrhage.

The time a patient stays in the House depends on so many and such various causes, — some of them not at all connected with the operation, — and these, though often arising, are so seldom noted in the early part of the Register, that a fair estimate can not be made of the average time occupied in the healing of the wound, and the recovery of the patient.

Among the causes of delay may be mentioned the formation of abscesses after amputation of the thigh (1, 208), sinuses continuing to discharge, especially where the operation was done very near a diseased joint (224), secondary hemorrhage (193, 209, 231, 256), accidental illness, erysipelas (172, 206), smallpox (227), miscarriage (236). In 6 cases in the leg, 3 for disease (180, 236, 238), and 3 for injury (138, 170, 217), in which the knee was saved, the delay arose from the difficulty of keeping a sound covering for the stump.

Some causes of delay have been peculiar to primary amputation for injury ; such as wounds of the head and trunk, in addition to the destruction of a limb (126, 137) ; the wish to save the knee or the shoulder where laceration extended very high (137, 196) ; sloughing of skin, — in one case (in the forearm), where a flap was made of bruised integument (171½), but more commonly in the leg, after circular incision through soft parts perfectly sound, and at a

distance from the seat of injury (170, 213, 216). In one case it was followed by a tedious attack of eczema (216). Sloughing of integument has not been noted in any case after amputation for disease of a joint ; and only once in any other disease. (232.)

In one case, under my care, delay arose from an unusual circumstance. The right leg of a young man was amputated for old ulceration of eight years' standing, the result of a severe scald.¹ His left thigh had been amputated six months after the accident. After this loss of both limbs, in whatever position the poor fellow was placed in bed, he could not be kept there: he was continually shifting and rolling about, much interfering with the healing of the wound. (247).

Generally speaking, the Forearm healed rather sooner than the Upper arm, and the Upper arm rather sooner than the Leg. The Thigh is much the latest in healing. After amputation for diseased joints, the stumps healed sooner than in other diseases. The greatest delay is after primary amputation for accidents.

In reporting these cases, it has been the wish to present them to the Society as a collection of facts bearing on the question of the danger of amputation as an operation performed for the relief of suffering of various kinds. The important question of the propriety of the operation — of the fitness of the remedy for the lesion, — is not brought under notice ; for that must rest in every case with the Surgeon who performs the operation.

Whether the purpose of the operation is to relieve the continued suffering caused by disease, or to save life in circumstances of urgent danger, as in accidents, the recovery of the patient — though a proof of the success of the operation in a given case, — is not necessarily the measure of success in the treatment of such cases, if the estimate is formed from those only which are submitted to operation.

¹ Museum, Ch. Ch.

The plan proposed by Mr. James, of Exeter, for arranging cases in classes of different disease, has been followed, as far as the limited number of cases would allow; and his observations on the different proportion of mortality, are to a great extent confirmed by the result of these cases.¹

Though the number of cases, compared with other published lists, is small, and though, perhaps, many circumstances which it would be desirable to know, have been omitted, — imperfect as this Analysis is, — the Compiler hopes it will not be without interest as a contribution to the Statistics of Surgery.

Postscript. — October. — As the sheets are passing through the press, the opportunity has been taken to add the notes of some cases which have come under treatment since the paper was read before the Society; and, at the same time, to include the particulars of some information lately obtained.

Cases of Injuries of the Limbs, fatal without amputation.

A feeble man, 75 years of age, was admitted 5th June, 1850, under my care, with a cut through the patella, extending into the knee-joint, inflicted by a bill-hook. No blood was lost. He gradually sank, and died within 48 hours.

A laboring man, 81 years of age, was admitted 11th June, 1850, under my care, with comminuted fracture of the lower part of the right thigh, involving the condyles, and extending into the knee-joint, and fracture of the left thigh in two places, and laceration of the skin of the leg. He was trying to get on to the shaft of a cart as it was going slowly down hill; in so doing he fell, and the wheel went over him. He gradually sank, and died on the 15th.

A laboring man, 60 years of age, was admitted 12th

¹ 'Transactions of the Provincial Med and Surg. Assoc.,' vol. xvii.

August, 1850, under the care of Mr. Hitchings, with a deep penetrating wound in the calf of the left leg, inflicted by a reaping hook. Profuse hemorrhage followed immediately, and continued till the wound was laid open, and the posterior tibial artery, and several smaller vessels, were tied; which I did in the absence of Mr. Hitchings. The man gradually sank, apparently from loss of blood, and died in 48 hours.¹

A baker, 60 years of age, was admitted 13th August, 1850, under the care of Mr. Hitchings, with his left hand and arm severely burnt, by falling into the fire during a fit. He died suddenly, in an apoplectic fit, on the 19th. Rapid decomposition followed; and the body could not be examined.

A lad, 19 years of age, was admitted in the middle of the night, 17th of January, 1851, under my care, with a pulse scarcely perceptible, all but exhausted by hemorrhage from a gunshot wound in the right popliteal space. The injury was received early in the day, 16 miles from the Infirmary, from a fowling piece, loaded with small shot, discharged accidentally within two or three feet of him. Much time was lost without any other assistance than that of a "Water-doctor," much consulted by the ignorant people of the neighbourhood. This man would not undertake the case; but late in the evening, in his capacity of Overseer (which he happened to be), he put the lad into a carriage, and brought him to the Infirmary, 14 hours after the accident. He died in 4 hours. A portion of skin, about the size of the palm of the hand, was gone, and the muscles were much lacerated. A large opening was seen in the popliteal vein; the popliteal artery was bruised, but not opened.

A half-witted man, 52 years of age, was admitted 16th of March, 1851, under my care, with a gunshot wound in the palm of the left hand, received from the accidental discharge of a fowling piece, as his hand rested on the muzzle before the shot was put in. The forefinger, middle and ring

¹ The case is fully reported in the 'Medical Gazette,' January, 1851.

fingers, became gangrenous, and were removed on the 17th of April. On the 26th, he was attacked with erysipelas of the head and face, which subsided in about a week. In the middle of May he was attacked with diarrhoea, by which he was greatly reduced. The wounds in the hand healed favorably. In the beginning of June, he began to show symptoms of increasing weakness; sloughs formed over the sacrum, and he died on the 17th. Both shoulder-joints were full of stinking pus, and the articular cartilages were ulcerated; in the left, this communicated with a large collection extending under the pectoralis major muscle. In the left wrist the cartilages were ulcerated.

A farm laborer, aged 34, was admitted 25th of November, 1851, under the care of Mr. Cleoburey, with a small unhealed wound in the palm of the left hand, between the little and ring fingers, received from an injury in a thrashing machine 4 days before admission. Some difficulty in opening the jaw was observed two or three days after admission; tetanus was fully developed on the 2d of December, and he died on the 7th.

A laborer on a railway, aged 37, was admitted late in the evening, 23d of March, 1852, under the care of Mr. Hester, with the right leg crushed by a train going over it. He was cold and almost pulseless, but sensible enough to understand the severe nature of the injury, and he gave his consent to amputation, if thought necessary. But he did not rally, and the operation was not performed. He died about 12 hours after admission.

A mason, aged 24, was admitted 19th of September, 1853, under the care of Mr. Hansard, with compound comminuted fracture of the right humerus, caused by a fall from a scaffold. Symptoms of tetanus were first observed on the 26th, and he died within 18 hours.

A laborer on a railway, aged 40, was admitted 4th of March, 1854, under the care of Mr. Symonds, with the left thigh and forearm crushed on the railway. He was sinking fast, and died in an hour.

A married woman, aged 38, was admitted 30th of

September, 1854, under the care of Mr. Hester, with destruction of the right foot and lower part of the leg, caused by a thrashing machine. She was sinking; and she died in 6 hours.

A boy, aged 11, was admitted 19th of February, 1855, under the care of Mr. Hester, with compound comminuted fracture of the left thigh, caused by the bough of a tree striking him as it fell. He was sinking fast; and he died in 2 hours. The femoral artery was not injured, and he had not lost much blood.

A laborer on a railway, aged 40, was admitted 20th of August, 1856, under the care of Mr. Symonds, with the right foot torn off, and the leg crushed close to the knee, on the railway. Very great hemorrhage followed. He died in 2 hours.

A married woman, about 35, was admitted 3d of September, 1856, under my care, with the right leg and lower part of the thigh torn off in a thrashing machine. She died in an hour and a half.

AMPUTATION FOR DISEASE.

Diseases of Joints.

No. in Reg.	Day of Operation.	Patient's Age.	Limb Removed.	Joint Diseased.	Day of Discharge.
1	1838				
2	February 4th.	Married woman, 21.	Right thigh.	Knee, some years (V).	April 25th. Cured.
4	March 9th.	Man, 33.	Left forearm.	Wrist, some months (VI).	April 18th. Cured.
	March 23d.	Mason, 28.	Leg.	Ankle, 6 months (VI).	May 16th. (The stump never healed: he died in about 4 years.)
7	July 27th.	Man, 53.	Thigh.	Knee, 8 months (VII).	October 9th. Died; "long-continued diarrhoea."
8	August 23d.	Lad, 17.	Leg.	Ankle, 2 years (VII).	October 24th. Cured. (Died with phthisis about 8 years afterwards.)
9	September 24th.	Girl, 17.	Right thigh.	Knee, 12 months (V).	October 24th. Cured. (Died with phthisis, 26th May 1839.)
13	December 31st.	Lad, 19.	Right thigh.	Knee, 9 months (V).	February 13th. Cured.
15	1839				
	January 7th.	Girl, 13.	Left upper arm.	Elbow, 2 years (VI).	February 13th. Cured. (Disease reappeared in the end of the stump, and she died in about 6 months.)
16	February 8th.	Plasterer, 28.	Right thigh.	Knee, nearly 7 years (VI).	April 3d. Cured.

18	June 14th.	Man, about 20.	Left leg.	Ankle, some months (VII).	August 21st. Cured. (Died with phthisis, in January, 1840.)
21	August 22d.	Lad, 18.	Right thigh.	Knee, many months (V).	September 18th. (The stump never healed: abscesses formed in various parts, and he died with phthisis, February 21st, 1841.)
22	June 4th.	Man, 40.	Left forearm.	Wrist, many months (VII).	June 19th. Cured. (Died with dropsy and lumbar abscess, October 2d, 1845.)
26	November 15th.	Man, 25.	Left thigh.	Knee, 10 months (VII).	February 19th. Cured.
27	November 26th.	Girl, 15.	Right thigh.	Knee, several years (IX).	April 1st. Cured. (Died with phthisis, in November, 1849.)
30	April 13th.	Man, 26.	Right thigh.	Knee, several years (V).	June 3d. Made out-patient; (died with phthisis August 29th, 1840.)
36	July 13th.	Woman, 20.	Right thigh.	Knee, 2 years (VII).	October 14th. Cured.
37	July 13th.	Man, 45.	Left leg.	Ankle, 5 months (VII).	September 9th. Cured.
43	January 4th.	Man, 24.	Left thigh.	Knee, many months (VII).	March 24th. Cured.
44	January 11th.	Baker, 19.	Left leg.	Ankle, 12 months (VI).	March 3d. Cured.
48	March 29th.	Woman, 21.	Left thigh.	Knee, many months (V).	May 5th. Cured.
49	April 30th.	Man, 49.	Right thigh.	Knee, many months (IX).	September 8th. Cured. (Died with phthisis, in 1843.)
51	July 12th.	Man, 29.	Left leg.	Ankle, many months (VI).	September 15th. Cured. (Died with phthisis, in 1848.)
52	August 2d.	Lad, 16.	Left leg.	Ankle, years (VII).	September 8th. Cured. (Died within a year, with acrofula. His mother died with cancer, in 1854-55.)
54	November 8th.	Lad, 18.	Thigh.	Knee, more than a year (VI).	January 12th. Cured. (Died with phthisis, 4th December, 1854.)
57	January 10th.	Girl, 12.	Right thigh.	Knee, a year (VII).	April 20th. Cured. (Continued well till killed by a fall down a staircase, October, 1847.)
58	January 3d.	Girl, 11.	Thigh.	Knee, many months (VII).	February 24th. "The stump healed, but having a cough of consumptive tendency."

No. in Reg.	Day of Operation.	Patient's Age.	Limb Removed.	Joint Diseased.	Day of Discharge.
59	February 17th.	Man, 22.	Thigh.	Knee, many months (V).	March 24th. Died with phthisis; the stump nearly healed.
62	May 16th.	Girl, 19.	Left thigh.	Knee, many months (IX).	July 6th. Cured.
63	May 16th.	Girl, 19.	Upper arm.	Elbow, more than a year (VII).	July 6th. Cured.
69	1843 January 2d.	Man, 33.	Right forearm.	Wrist, 2 or 3 years (V).	January 25th. (Other joints became affected, and he died with phthisis, July 4th, 1843.)
70	January 16th.	Boy, 15.	Leg.	Ankle, many months (V).	May 1st. Died with phthisis; the stump having healed some weeks.
72	April 20th.	Lad, 18.	Right thigh.	Knee, many months (VI).	July 12th. (Died with phthisis 23 weeks afterwards.)
74	July 20th.	Man, 51.	Left thigh.	Knee, many months (V).	September 27th. (Died with phthisis, November 5th, 1845.)
76	September 18th.	Man, 53.	Right forearm.	Wrist, many months (V).	October 18th. Cured. (Died with phthisis, December 25th, 1846.)
77	September 25th.	Boy, 10.	Left thigh.	Knee, 12 months (VII).	November 15th. Cured.
80}	1844 March 22d.	Man, 26.	Left thigh.	Knee, years (VI).	May 1st. Cured.
81	April 26th.	Girl, 15.	Right thigh.	Knee, 2 or 3 years (VII).	June 1st. Cured.
82	May 9th.	Man, 27.	Right leg.	Ankle, some years (VI).	July 10th. Cured.
83	June 27th.	Woman, 40.	Left upper arm.	Elbow, years (VII).	July 31st. Cured. (Died with phthisis 2½ years afterwards.)
84	July 28th.	Man, 40.	Left leg.	Ankle, 20 years: slight injury 6 months (V).	September 4th. (Died with phthisis, in April, 1845.)
88	August 30th.	Man, 24.	Left thigh.	Knee, 3 years (V).	October 2d. Cured. (Died with phthisis in the spring of 1854.)
89	November 21st.	Boy, 11.	Leg.	Ankle, a year (VI).	December 18th. Cured. (Died with phthisis in about 9 months.)

92	1845 February 14th.	Man, 50.	Right leg.	Ankle, 2 years (VII).	May 7th. Cured. (Died about 6 months afterwards.)
99	October 27th. 1846	Boy, 12.	Left thigh.	Knee, several years (IX).	December 24th. Cured.
101	January 4th.	Carpenter, 48.	Left forearm.	Wrist, many months (VI).	February 25th. Cured.
103	February 9th.	Shepherd, 48.	Right thigh.	Knee, 4 years (IX).	April 22d. Cured.
104	March 9th.	Postillion, 26.	Left thigh.	Knee, many months (VII).	May 27th. Cured. (Died with granular kidneys, in the Infirmary, 25th June, 1852.)
105	March 12th.	Woman, 37.	Right thigh.	Knee, about 18 weeks (VII).	June 24th. Cured. (After suffering from scrofulous abscesses, she was attacked with small-pox in a severe form, and died 11th December, 1854.)
106	April 6th.	Coachman, 24.	Right thigh.	Knee, some months (VII).	June 10th. Cured.
107	April 6th.	Baker, 19.	Right thigh.	Knee, about 16 months (VII).	May 27th. Cured.
108	April 30th.	Man, 46.	Right forearm.	Wrist, about 22 weeks (IX).	June 3d. Cured.
109	May 25th.	Boy, 14.	Right upper arm.	Elbow, 9 months (V).	June 20th. Made out-patient with phthisis, and died in 5 weeks.
110	June 22d.	Widow, 33.	Right thigh.	Knee, 10 months (V).	July 22d. Made out-patient, the stump not quite healed, and died with phthisis in about 4 months.
111	June 29th.	Woman, 19.	Right leg.	Ankle, 9 months (V).	July 29th. Cured.
112	July 6th.	Carpenter, 25.	Right leg.	Ankle, 3 years (VI).	August 12th. Cured.
113	August 10th.	Married woman, 30.	Left thigh.	Knee, 8 years (VI).	September 9th. Cured.
114	August 13th.	Man, 43.	Left thigh.	Knee, 21 months (VI).	October 21st. Cured.
118	1847 March 29th.	Boy, 6.	Right leg.	Ankle, 8 months (IX).	June 9th. Cured.
121	June 28th.	Girl, 17.	Right leg.	Joints of tarsus 6 months (V).	August 4th. Cured.
125	November 6th.	Butcher, 50.	Right forearm.	Wrist, 9 months (X).	December 1st. Made out-patient. (Abscesses formed in his other arm, and he died with phthisis, 26th September, 1848.)

No. in Reg.	Day of Operation.	Patient's Age.	Limb Removed.	Joint Diseased.	Day of Discharge.
129	1848 January 3d.	Man, 29.	Right thigh.	Knee, 12 months (VI).	March 1st. Cured.
134	April 24th.	Carpenter, 35.	Left thigh.	Knee, 8 months (IX).	October 4th. Cured.
136	May 12th.	Man, 31.	Left forearm.	Wrist, 11 years (VI).	August 2d. Made out-patient. (The stump never healed, and he died with phthisis, in September, 1849.) Cured.
144	July 24th. 1849	Married woman, 40.	Right forearm.	Wrist, 2 years (VI).	September 1st. Cured.
149	April 2d.	Married woman, 21.	Left thigh.	Knee, 12 months (V).	May 9th. Cured. (Died with phthisis, 12th December, 1852.)
150	April 6th.	Married woman, 43.	Right thigh.	Knee, 2 years (V).	April 20th. Died, exhausted.
151	April 23d.	Girl, 15.	Left thigh.	Knee, 9 years (VI).	May 10th. Died, exhausted.
157	September 21st.	Married woman, 29.	Left upper arm.	Elbow, 9 months (XI).	October 24th. Cured. (Died with phthisis in about 2 years.)
158	November 1st.	Woman, 22.	Left thigh.	Knee, 16 months (VI).	December 26th. Cured.
159	November 5th.	Girl, 19.	Right thigh.	Knee, 10 months (XI).	November 19th. Died, exhausted : (secondary hemorrhage, November 11th).
160	November 12th. 1850	Lad, 18.	Right thigh.	Knee, 9 months (v).	May 26th. Died, diarrhoea.
167	March 21st.	Man, 35.	Right thigh.	Knee, 18 months (VI).	May 8th. Cured.
173	September. 1852	Woman, 50.	Right leg.	Ankle, 5 months (XI).	November 6th. Cured.
183	February 23d.	Man, 20.	Left thigh.	Knee, 18 months (XI).	March 17th. Died, exhausted : secondary hemorrhage.
186	March 29th.	Boy, 14.	Right thigh.	Knee, 7 years (XI).	June 9th. Cured.
194	September 13th. 1853	Sawyer, 38.	Left thigh.	Knee, 18 months (XI).	September 27th. Died. Phlebitis, pyæmia.
202	June 13th.	Girl, 18.	Left thigh.	Knee, 7 years. (Limb wasted, and hip dislocated by former disease) (XI).	July 20th. Cured. (Died with phthisis, 17th, October 1854.)

203	July 15th.	Woman, 20.	Right thigh.	Knee, between 3 and 4 years (XV).	September 14th. Cured. (Died with diabetes and phthisis, October 11th, 1855.)
208	October 7th.	Woman, 20.	Right thigh.	Knee, 6 years (XV).	January 25th. Cured.
210	December 19th. 1854	Boy, 9.	Right thigh.	Knee, 12 months (XC).	December 27th. Died, exhausted.
219	June 5th.	Man, 21.	Left thigh.	Knee, 4 years (XX).	August 9th. Cured.
221	July 14th.	Woman, 46.	Right forearm.	Wrist, 18 months (XI).	August 16th. Cured. (Died with phthisis, in August, 1855.)
223	August 7th.	Married woman, 36.	Right leg.	Ankle, 4 years (XI).	September 8th. (Died with phthisis, in the third week of October.)
224	August 21st.	Maid-servant, 21.	Right thigh.	Knee, 4 or 5 years (XV).	November 8th. Cured.
229	November 27th.	Maid-servant, 19.	Right upper arm.	Elbow, 18 months (XI).	January 17th. Cured. (The eyes and the other arm became affected, and she died with phthisis, in March, 1856.)
230	1855 March 19th.	Man, 38.	Left thigh.	Knee, 9 months (XX).	April 26th. Taken home, and died the next day with phthisis.
231	March 26th.	Butcher, 19.	Right thigh.	Knee, 9 months (XC).	May 30th. Cured.
237	June 25th.	Married woman, 31.	Left leg.	Joints of tarsus, 6 months (XC).	August 1st. Cured.
239	July 23d. 1856	Boy, 11.	Right leg.	Ankle, 3 years (XC).	August 29th. Cured.
248	March 17th.	Widow, 34.	Left thigh.	Knee, 15 years (XI).	May 21st. Cured.
249	April 7th.	Married woman, 38.	Left thigh.	Knee, 5 years (XC).	May 28th. Cured.
250	April 21st.	Glover, 25.	Left thigh.	Knee, 18 months (XV).	June 29th. Taken home, and died in two days: phthisis.
251	(Same day.)	Weaver, 68.	Left leg.	Ankle, 9 months (XV).	July 2d. Cured.
252	May 9th.	Wheelwright, 19.	Right thigh.	Knee, 21 months (XV).	July 9th. Cured.
253	May 29th.	Married woman, 32.	Left upper arm.	Elbow, 3½ years (XI).	June 25th. Cured.
254	June 16th.	Young woman, 18.	Right forearm.	Wrist, 9 months (XC).	July 26th. Made out-patient. (P.S. Stump not healed: health failing rapidly.)

¹ Museum, Ch. Ch.

AMPUTATION FOR DISEASE.

Various Diseases.

No. in Reg.	Day of Operation.	Patient's Age.	Limb Removed.	Nature of Disease.	Day of Discharge.
38	1840 July 13th.	Lad, 19.	Left thigh.	Necrosis of tibia, 4 months (VII).	September 23d. Cured.
39	August 25th.	Woman, 45.	Leg.	Caries of tibia, 2 years (V).	September 29th. Cured. (Disease appeared in the other leg and sternum, and she died in about 2 years.)
60	1842 March 18th.	Man, 47.	Left thigh.	Ulceration of cancerous appearance on the stump, about a year, after loss of the foot from gangrene many years before (V).	May 11th. Cured. (He died in about a year; "the complaint killed him.")
64	May 16th.	Man, 52.	Left leg.	Disease of tibia, following injury, many months (VII).	August 17th. Cured. (Died with some inter-nal disease, September, 1855.)

65	May 19th.	Man, 38.	Thigh.	Cancer of the bones of the leg, several years (IX).	June 17th. Died; exhaustion.
71	1843 March 23d.	Man, 23.	Left leg.	Fungoid disease of the bones of the foot, many months (VI).	June 14th. Cured.
79	November 20th.	Married woman, about 25.	Right thigh.	Caries of tibia, a year (V).	January 10th Cured. (Continued well for two years, when she died with smallpox after 3 days' illness.)
94	1845 March 31st.	Woman, 40.	Right thigh.	Caries of tibia, 17 years (V).	July 15th. Cured. (Continued well for about 7 years, when she was attacked with uterine disease and "flooding," and died exhausted, 6th February, 1853.)
117	1847 March 4th.	Girl, 16.	Right thigh.	Necrosis of tibia, without reproduction of bone, 3 years (IX).	June 16th. Cured.
146	1848 September 19th.	Boy, 12.	Right thigh.	Necrosis of tibia, 3 months (IX).	January 17th. Cured.
165	1850 February 4th.	Porter, 35.	Left thigh.	Gangrene after ligature of femoral artery for aneurism (Nov. 26), (XI).	March 13th. Cured.
180	1851 December 15th.	Man, 48.	Left leg.	Elephantiasis,* 14 years (VI).	February 18th. Cured. (Died with typhus fever, 9th March, 1855.)

* Museum St. Barth. Hosp.

† Museum, Ch. Ch.

No. in Reg.	Day of Operation.	Patient's Age.	Limb Removed.	Nature of Disease.	Day of Discharge.
193	1852 September 3d.	Butcher, 51.	Right leg.	Sinuses about ankle; with ankylosis following former disease (XI).	November 3d. Cured.
207	1853 September 16th.	Woman, 37.	Right thigh.	Useless limb, distortion of knee with ankylosis,* years (XV).	November 16th. Cured.
209	December 12th.	Man, 21.	Right thigh.	Useless limb, from paralysis, 19 years (XX).	March 1st. Cured.
225	1854 September 18th.	Boy, 14.	Left thigh.	Necrosis of tibia; — hemorrhage from perforation of posterior tibial artery (XI).	November 1st. Cured.
226 227	October 5th. October 5th.	Woman, 25. Woman, 29.	Right leg. Left leg.	Ulceration, 4 years (XI). Inconvenient stump, after amputation at the ankle-joint for injury, 13 years (XX).	January 3d. Cured. February 28th. Cured.
232	1855 March 27th.	Widow, 63.	Left leg.	Cancer of tibia, 8 months* (XV).	April 8th. Died, exhausted.
233	April 26th.	Blacksmith, 45.	Right thigh.	Ulceration of cancerous appearance, many years; with caries of the tibia (XI).	June 13th. Cured.

* Museum, Ch. Ch.

235	May 7th.	Girl, 19.	Left leg.	Caries of tibia, 5 years (XI).	July 4th. Cured.
236	May 7th.	Married woman, 29.	Right leg.	Spreading ulcers, 8 years (XC).	July 18th. Cured. (P.S. Ulceration is spreading on the stump.)
238	July 16th.	Shoemaker, 30.	Left leg.	Enlargement and suppuration of tibia, 4 years (XV).	September 8th. Cured.
247	1856 February 1st.	Silkweaver, 22.	Right leg.	Ulceration, after a scald, 8 years* (XV).	May 14th. Cured.
256	June 30th.	Gardener, 65.	Left leg.	Gangrene of foot, 36 days; tibial arteries impervious (XI).	October 1st. Cured.
258	July 14th.	Boy, 12.	Left thigh.	Necrosis of tibia, 3 months* (XV).	September 24th. Cured.
259	July 25th.	Carpenter, 48.	Left hand, at wrist-joint.	Diffused abscesses, sloughing of tendons, and necrosis of bones, after a punctured wound, 3 months (XV).	September 3d. Cured.
260	August 11th.	Saddler, 48.	Right leg.	Inconvenient stump, after former amputation, 12 years (XI).	(P.S. Convalescent.)

* Museum, Ch. Ch.

AMPUTATION FOR INJURIES.

Primary Operations.

(FROM THE ADMISSION BOOKS.)

Day of Operation.	Patient's Age.	Limb Removed.	Injury.	Day of Discharge.
1810 March 19th.	Man, 61.	Forearm.	Gunshot wound (III).	May 3d. Cured.
September 2d. 1813	Man, 50.	Forearm.	Accident (III).	November 8th. Made out-patient.
June 11th. 1814	Young woman, 18.	Upper arm.	Torn by machinery in a mill (IV).	August 12th. Cured.
September 24th. 1820	Man, 35.	Leg.	Injury with a scythe (IV).	March 19th. Cured.
March 26th. July 29th. 1822	Lad, 16. Girl, 15.	Upper arm. Right upper arm.	Gunshot wound (IV). Torn by machinery in a mill (VI).	May 25th. Cured. October 19th. Cured.
June 13th. 1827	Man, 36.	Forearm.	Bursting of a gun (IV.)	August 1st. Cured.
January 26th.	Man, 30.	Upper arm.	Explosion by gunpowder in a quarry (V).	February 15th. Died; "inflammation of the chest."

1830 December 16th.	Boy, 10.	Forearm.	Torn by machinery in a mill (IV).	February 10th. Cured.
1831 October 20th.	Boy, 10.	Forearm.	Torn by machinery (IV).	December 15th. Cured.
1832 May 17th.	Man, 30.	Leg.	Accident (VI).	August 2d. Cured.
1833 February 7th.	Woman, 18.	Right upper arm.	Crushed in machinery (IV).	June 20th. Cured.
1834 October 24th.	Lad, 16.	Upper arm.	Accident (V).	November 28th. Cured.
December 2d.	Plasterer, 20.	Forearm.	Fall from scaffolding (VI).	January 14th. Cured.
December 16th.	Man, 40.	Left forearm.	Gunshot wound (VII).	January 28th. Cured.

(FROM THE REGISTER OF OPERATIONS.)

No. in Reg.	Day of Operation.	Patient's Age.	Limb Removed.	Injury.	Day of Discharge.
24	1839 October 5th.	Woman, 55.	Left upper arm.	Torn off at the elbow by machinery (IX).	January 1st. Cured.
46	1841 March 5th.	Boy, 14.	Right forearm.	Torn by machinery (V).	March 31st. Cured.
67	1842 November 14th.	Man, 24.	Right upper arm.	Torn by machinery (V).	December 14th. Cured.
87	1844 August 17th.	Man, 47.	Thigh.	Injury to knee from a scythe (V).	September 8th. Died; gradually sank.

No. in Reg.	Day of Operation.	Patient's Age.	Limb Removed.	Injury.	Day of Discharge.
95	1845 June 14th.	Woman, about 23.	Left leg.	Foot and ankle crushed by machinery (IX).	September 24th. Cured.
102	1846 February 2d.	Man, 21.	Left forearm.	Shattered by a gun bursting (V).	February 25th. Cured.
126	December 7th. 1848	Miller, 22.	Left upper arm.	Torn by machinery (V).	January 13th. Cured.
132	February 17th.	Boy, 14.	Right upper arm.	Crushed on railway (X).	April 26th. Cured.
137	May 26th.	Boy, 13.	Left upper arm.	Gunshot wound (VI).	July 19th. Cured.
138	May 29th.	Man, 35.	Left leg.	Crushed on railway (VI).	December 13th. Cured.
139	June 3d.	Boy, 14.	Right upper arm.	Compound fracture, &c., by machinery (IX).	August 30th. Cured.
140	June 5th. 1849	Lad, 19.	Right thigh.	Crushed on railway (IX).	Died in 24 hours.
154	August 1st.	Constable, 34.	Left thigh.	Leg, crushed on railway (XI).	December 12th. Cured.
162	December 21st. 1850	Boy, 16.	Right leg.	Crushed by waggon (XI).	March 13th. Cured.
164	February 1st.	Paper maker, 38.	Right upper arm.	Torn by machinery in a mill (VI).	February 4th. Died, exhausted.
170	August 2d.	Married woman, 45.	Right leg.	Destroyed in a threshing machine (XV).	October 2d. Cured.
171	August 14th.	Man, 70.	Left thigh.	Limb nearly severed by a scythe ¹ (VI).	August 19th. Died, exhausted.
171½	August 23d.	Man, 57.	Right forearm.	Torn in a threshing machine (XI).	October 30th. Cured.
172	September 10th. 1851	Man, 30.	Left forearm.	Torn in a threshing machine (VI).	October 16th. Cured.
174	March 3d.	Married woman, 54.	Right leg.	Torn in a threshing machine (VI).	May 21st. Cured.
175	May 21st.	Lad, 19.	Right forearm.	Crushed on railway (VI).	July 9th. Cured.

¹ Museum, Ch. Ch.

176	June 13th.	Man, 45.	Left forearm.	Torn by machinery (V).	August 6th. Cured.
196	1852 December 15th.	Boy, 12.	Left upper arm.	Crushed by a cart going over it (XV).	February 16th. Cured.
197	1853 January 1st.	Boy, 14.	Left thigh.	Compound fracture, &c., in a threshing machine (XV).	January 22d. Died: pyæmia.
198	January 3d.	Man, 20.	Left upper arm.	Crushed on a railway (XV).	January 24th. Died: pyæmia.
199	April 7th.	Man, 28.	Right thigh.	Crushed on a railway (XX).	April 30th. Died: pyæmia.
200	May 13th.	Lad, 19.	Right forearm.	Torn by machinery in a mill (XI).	June 12th. Died: secondary hemorrhage, pyæmia.
204	July 18th.	Mason, 60.	Right leg.	Compound fracture, &c., by a fall from a scaffolding (XV).	September 28th. Cured.
205	August 11th.	Married woman, 52.	Right upper arm.	Torn in a threshing machine (XV).	September 28th. Cured.
206	September 10th.	Breaksman, 30.	Left leg.	Foot and ankle crushed on railway (XV).	November 9th. Cured.
213	1854 February 24th.	Man, 37.	Right leg.	Crushed on railway (XV).	May 12th. Cured.
216	March 28th.	Married woman, 54.	Right leg.	Torn in a threshing machine (XV).	June 28th. Cured.
217	April 8th.	Boy, 11.	Left leg.	Laceration in a threshing machine (XC).	June 14th. Cured.
261	1856 August 24th.	Boy, 12.	Left forearm.	Gunshot wound (XC).	October 1st. Cured.
262	October 2d.	Man, 31.	Left leg.	Crushed in a threshing machine (XC).	

AMPUTATION FOR INJURIES.
Secondary Operations.

No. in Reg.	Day of Operation.	Patient's Age.	Limb Removed.	Nature of Injury.	Day of Discharge.
20	1839 July 23d.	Postillion, about 55.	Thigh.	Mortification following compound comminuted fracture of leg, July 15th (VII).	September 11th. Cured.
122	1847 June 28th.	Boy, 13.	Right forearm.	Sloughing after laceration by machinery, June 22d (V).	July 21st. Cured.
153	1849 May 22d.	Gamekeeper, 41.	Right leg.	Gunshot wound, May 1st. Admitted May 3d (VI).	July 4th. Cured.
155	August 23d.	Man, 26.	Left thigh.	Gangrene following fracture of the thigh, July 27th, admitted 28th: rupture of popliteal artery and vein (XI).	October 24th. Cured.
169	1850 June 24th.	Lad, 19.	Right leg.	Sloughing after injury on railway, January 1st (V).	August 7th. Cured.
234	1855 April 30th.	Married woman, 45.	Right upper arm at shoulder-joint.	Scald or burn, April 21st, admitted 24th (XV).	May 1st. Died; maniacal exhaustion.