

I. COMPOUND FRACTURES, THE

No.	Name and Age	Date of Admission and Discharge ; with Result	Injury
23	James G., 11	<i>Ad.</i> , June 23, 1876. <i>Dis.</i> , Nov. 23, " In process of cure.	Compound fracture of both bones of the leg. Admitted immediately after the accident.
24	William R., 50.	<i>Ad.</i> , Jan. 26, 1877. <i>Dis.</i> , March 15, 1877. <i>Result</i> , cured.	Compound fracture of tibia, caused by a kick from a horse. Admitted immediately.
25	Mary V., 55	<i>Ad.</i> , Nov. 9, 1877. <i>Dis.</i> , Aug. 14, 1878. <i>Result</i> , cured.	Run over by a cart which caused a compound comminuted fracture of both bones of the leg.
26	Andrew F., 38. (Septic case)	<i>Ad.</i> , March 15, 1878. <i>Dis.</i> , Dec. 2, " <i>Result</i> , cured.	The wheel of a van passed over his leg, producing a very bad compound fracture of both bones just above the ankle-joint. Great injury to the soft parts. There was also a compound Colles' fracture. See No. 42.
27	Cornelius N., 34	<i>Ad.</i> , May 24, 1878. <i>Dis.</i> , Dec. 18, " <i>Result</i> , cured.	Leg jammed between a stone and the wheel of a truck, resulting in compound comminuted fracture of both bones of the leg.
28	Maria L., 60	<i>Result</i> , cured.	Compound fracture of fibula, etc. (See injuries of joints, No. 10, p. 424.)

RESULT OF ACCIDENT (*continued*).

Treatment	Remarks
Wound injected with 1-20 carbolic lotion.	Aseptic course. The bone took a long time to unite, and was not absolutely firm, though almost so, when the patient was discharged wearing an immovable apparatus. (See T. Chart XIX.)
Wound injected with 1-20 carbolic lotion. Wound left open as usual.	Aseptic course. Beautiful example of organisation of blood-clot, without suppuration. Healing complete on February 28. The tibia was found to be firm on March 6. (See T. Chart XX.)
Wound syringed out with 1-20 carbolic lotion.	Apparently no constitutional disturbance, though the temperature was above 100° on several occasions. A portion of the skin sloughed. No exfoliation. Put up in plaster of Paris on January 23, 1878. Taken down on March 14, but the bones were not then quite firm. One or two apparatuses were subsequently applied, and when the patient was at length discharged, union was complete. (See T. Chart XXI.)
Wound washed out with 1-20 carbolic lotion. On the following day, in order to get the bones in position, it was necessary to saw off portions and tie the fragments together with silver wire.	The attempt to eradicate the causes of putrefaction was not successful, and the wound suppurated. The patient had fever. An abscess formed in the leg. The wounds were quite healed on June 5. The wire was removed on July 23. In November the bones were found to be soundly united. (See T. Chart XXII.)
Wound enlarged and pieces of bone removed. Wound washed out with 1-20 carbolic lotion.	The greatest difficulty was experienced in keeping the bones in position, and there was consequently great pain. The temperature was high for some days, but the pulse was not fast, and the patient seemed well with this one exception. For some days the bones became constantly displaced, but otherwise the wound did well. It remained aseptic, though as the result of the disturbance there was suppuration, but only a very little. As the wound got smaller it was found that the bones could be kept in position by a screw pressing on the upper fragment. The leg was put up in plaster of Paris, but on November 29 the bones were found to be still ununited. Eight to ten minims of tincture of iodine were therefore injected between the fragments. Some swelling and a small abscess resulted, and the bones united. When seen on January 30, 1879, union was complete. (See T. Chart XXIII.)
—	Patient did well.

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29	F. C., 6 (Septic case)	<i>Ad.</i> , Dec. 4, 1878. <i>Dis.</i> , April 20, 1879. <i>Result</i> , cured.	Leg run over by a cab. Large wounds on both sides of the leg, that on the outer side communicating with a fractured fibula. On the inner side the tibia was bare.
30	Alfred A., 6 . .	<i>Ad.</i> , Sept. 12, 1879. <i>Dis.</i> , Oct. 19, „ <i>Result</i> , cured.	Compound fracture of both bones of the leg. Tibia protruding. Cause not given.
31	Frederic H., 48	<i>Ad.</i> , Nov. 14, 1879. <i>Dis.</i> , Jan. 5, 1880. <i>Result</i> , in process of cure.	Compound fracture of the lower end of the right fibula and simple fracture of the middle of the right tibia. Result of a fall.

There were thus under Mr. Lister's care during these years 26 cases of compound fracture of the bones of the leg, of which 4 died. Three of these deaths occurred within forty-eight hours, and the other was from diphtheria. None of the deaths was therefore preventible by any method of after-treatment of the wound.

In 5 of the 26 cases primary amputation was necessary. One of these cases died of shock.

Twenty-one cases were treated conservatively, and of these 3 died.

Of these 21 cases 2 required secondary amputation, of which 1 died of diphtheria. Of the remaining 19 cases 2 died, both from shock and exhaustion, within forty-eight hours.

Compound Fractures of

32	R. J., 23	<i>Ad.</i> , March 22, 1872. <i>Died</i> , March 23, „ The cause of death was shock.	The wheel of a railway waggon passed over his shoulder, causing a compound comminuted fracture of the humerus and scapula.
33	George G., 60 . .	<i>Result</i> , cured.	Compound comminuted fracture of the humerus.
34	Henry A., 12 . .	<i>Ad.</i> , Dec. 28, 1872. <i>Dis.</i> , April 17, 1873. <i>Result</i> , cured.	Cab wheel passed over arm, causing a compound comminuted fracture of the humerus. Patient brought to the hospital immediately.
35	Henry B., 22 . .	<i>Result</i> , cured.	Compound fracture of the humerus.

RESULT OF ACCIDENT (*continued*).

Treatment	Remarks
Wound washed out with 1-20 carbolic lotion.	Putrefaction was not avoided. Sloughing occurred to a considerable extent and the discharge had a foul smell. When this was evident, boracic ointment and boracic lint were used. The temperature chart cannot be found, but for some days the temperature varied from 100° to 103° F. On March 23, two pieces of dead bone were removed. When discharged the wound had healed and the fracture united.
Wound washed out with 1-20 carbolic lotion.	Aseptic course.
Wound enlarged and syringed out with 1-20 carbolic lotion.	Aseptic course. Wound healed about December 20. Fractures found united on December 27. Sent out with a silicate apparatus on.

In these 19 cases the attempt to eradicate the causes of putrefaction was unsuccessful in 4 instances. It was also unsuccessful in both the cases in which secondary amputation was necessary. Thus the attempt failed in 28·5 per cent. of the cases. One case putrefied after some days because the patient tore off the dressings.

In 2 of the 6 septic cases secondary amputation was necessary; necrosis occurred in 1, sloughing of the skin took place in 1, and in the remaining 2 there was inflammation and abscess formation.

In none of the aseptic cases was any operation necessary. In only 1 was there any appearance of necrosis, and the course of the others is markedly different in all respects from that of the cases where putrefaction was not avoided.

the Humerus (accidental).

Arm removed and also loose portions of the scapula.	The patient was suffering severely from shock when he was admitted, and he never rallied. Died from shock.
See Wounds of Joints (No. 2).	
Wound washed out with 1-20 carbolic lotion.	Putrefaction was avoided, but late in the case a little pus escaped from the wound. On probing it dead bone was felt. This was removed in June, and the wound healed rapidly. The bones were firmly united on April 11. (See T. Chart III., p. 438.)
See Wounds of Joints, p. 424 (No. 11).	

I.—COMPOUND FRACTURES, THE

Four compound fractures of the humerus were under treatment with 1 death from shock.

Of these 1 case was amputated primarily and died, while 3 cases

Compound Fractures of

No.	Name and Age	Date of Admission and Discharge; with Result	Injury
36	C. B., 40 . . .	<i>Ad.</i> , June 2, 1874. <i>Dis.</i> , July 6, ,, <i>Result</i> , cured.	A weight of 30 cwt. fell from a height on to his forearm, completely crushing it.
37	J. H., 16 . . .	<i>Ad.</i> , June 8, 1877. <i>Dis.</i> , July 16, ,, <i>Result</i> , cured.	Patient's forearm was drawn into a crushing machine and very badly smashed.
38	Thomas W., 17	<i>Ad.</i> , July 19, 1872. <i>Dis.</i> , Sept. 22, ,, <i>Result</i> , healed.	Hand caught in a printing-machine, causing a compound comminuted fracture of the humerus. Radial artery torn across. Fingers cold and pulseless. Extensive injury of the soft parts. Admitted at once.
39	John S., 34 . .	<i>Ad.</i> , July 7, 1873. <i>Dis.</i> , Aug. 14, ,, <i>Result</i> , cured.	Forearm run over by a vehicle. There was a small wound communicating with a fracture of both bones. The accident happened an hour and a half before admission.
40	J. F., 30 . . . (Septic case.)	<i>Ad.</i> , Oct. 29, 1875. <i>Dis.</i> , Jan. 31, 1876. <i>Result</i> , in process of cure.	Arm caught in machinery. Compound fracture of both bones of the forearm. Radius much comminuted. Soft parts much torn.
41	John O'H., 28 .	<i>Ad.</i> , Dec. 24, 1875. <i>Dis.</i> , Feb. 11, 1876 <i>Result</i> , in process of cure.	Compound fracture of the forearm from a piece of wood falling on it. Seen after two or three hours.
42	Andrew F., 38 .	<i>Ad.</i> , March 5, 1878. <i>Result</i> , cured. (See No. 26, p. 472.)	Patient had a compound Colles's fracture as well as the fracture of the leg.

There were thus 7 compound fractures of the bones of the forearm without a death. Of these, 2 cases required primary amputation. In one of the 5 cases treated conservatively the attempt to eradicate the cause of putrefaction was unsuccessful. In 2 of the 5 cases union occurred satisfactorily; in 2 union was delayed, and in one it did not occur on account of the great loss of bone.

If we sum up the results of compound fractures of the extremi-

RESULT OF ACCIDENT (*continued*).

were treated conservatively with good result. The attempt to eradicate putrefaction was successful in each of the 3 cases.

the Forearm (*accidental*).

Treatment	Remarks
Primary amputation through the lower part of the humerus.	Aseptic course. A minute superficial sore remained to heal, where the drainage-tubes were, when the patient was discharged.
Primary amputation above the middle of the humerus.	Aseptic course. Wound healed by first intention, except where the drainage-tube was. Here a small superficial sore remained to heal when the patient was discharged.
Wounds washed out with 1-20 carbolic lotion. Some loose fragments of the broken radius were removed. The wounds were also mopped out with chloride of zinc. Splints applied.	The fingers regained their warmth during the first twenty-four hours. Putrefaction was avoided, and the case went on well. So much of the radius was lost that union could not take place. The wounds were quite superficial on August 19, and had healed when the patient was discharged. (See No. 105.)
Wound enlarged and a solution of carbolic acid in spirit injected.	Aseptic course. Highest temperature 99.9, pulse 82. Date of healing is not given, but healing was complete and the bones were strong before the patient left the hospital.
Wound washed out with 1-20 carbolic lotion.	Putrefaction was apparently not avoided. The wound did very well, but when the patient was discharged it had not quite healed. Bones pretty firm. Patient discharged, wearing an immovable apparatus. (See T. Chart XXIV.)
Wound enlarged and injected with 1-20 carbolic lotion.	Typical course. When discharged to be treated as an out-patient, there was only a small point to heal, and the bones were getting firm. (See T. Chart XXV.)
Wound washed out with 1-20 carbolic lotion.	Followed a typical aseptic course. The arm had healed and the splints were left off on April 12.

ties produced by accident and treated by Mr. Lister, we get the following facts:—

Since 1871 there have been 41 patients (42 limbs) admitted into hospital suffering from compound fractures of the long bones; of these 8 died. In 6 the cause of death was shock and exhaustion, and death occurred within forty-eight hours after the accident; in 1 the cause was diphtheria, and in 1 bronchitis and cardiac disease.

I.—COMPOUND FRACTURES, THE

Of the 42 limbs injured 10 (10 patients) were amputated primarily, and of these four died (all from shock). I need not refer to these again, as they do not concern the point at issue. There were thus 31 patients (32 compound fractures) in which conservative treatment was attempted, and of these 4 died (2 of shock, 1 of diphtheria, and 1 of bronchitis and cardiac disease); but then only 1 of these deaths (case 4, which died of bronchitis and cardiac disease) can possibly be supposed to have any connection with the method of treatment of the wound. Hence, for our present purpose, we have to consider 28 cases (29 fractures) treated conservatively with one death. The fatal result in this instance is stated to have been cardiac disease and bronchitis, but the precise cause does not tell against the aseptic results, for in this case putrefaction took place.

Of the 32 limbs treated conservatively, only 2 required secondary amputation, and one of these patients died of diphtheria, or we may perhaps put it better, and say that of the 29 limbs (28 patients) under consideration, only one required secondary amputation, and this case recovered. One of the remaining 27 patients died of bronchitis and cardiac disease.

Of the 30 limbs treated conservatively in patients who did not die within forty-eight hours, the attempt to eradicate putrefaction

Compound Fractures

No.	Name and Age	Date of Admission and Discharge; with Result	Injury
43	William S., 18.	<i>Ad.</i> , Jan. 29, 1872. <i>Dis.</i> , May 30, " <i>Result</i> , cured.	Compound depressed fracture of the right temporal bone. Patient quite sensible on admission.

RESULT OF ACCIDENT (*continued*).

was successful in 22 instances, and none of these required further measures; all healed. But in 8, or 26.6 per cent., the attempt was unsuccessful; of these 1 died, in 2 secondary amputation was necessary, one of which patients also died of an independent disease, while in some of the remainder the further progress of the case was unsatisfactory. This is a striking fact, as showing the difference in results between cases treated aseptically and those treated with antiseptics. These figures do not, however, rightly represent the present probabilities of rendering compound fractures aseptic, for the majority of the failures occurred early in the treatment, while of late the greater number of attempts have been successful. Thus from the end of 1871 till the end of 1875, 18 cases were treated, and of these 6, or 33.3 per cent., failed. On the contrary, from the end of 1875 till 1880, 12 cases were treated, only 2 of which, or 16.6 per cent., failed. The chief improvement which has led to this greater success is no doubt the method of washing out the wound thoroughly by means of a catheter attached to a syringe—a method introduced since 1875. The chance of success depends, however, almost entirely on the nature of the wound and the amount of dirt in it. If it be complicated and dirty the result is doubtful; otherwise success is almost certain.

of the Skull (accidental).

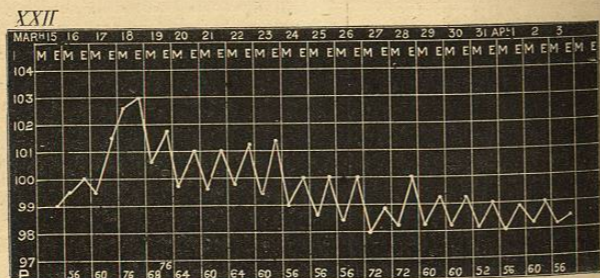
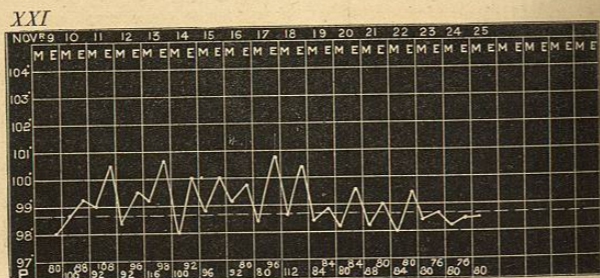
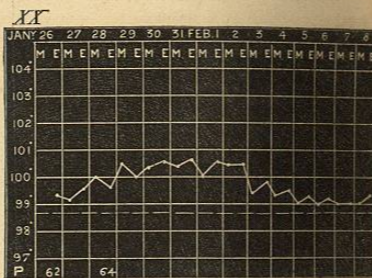
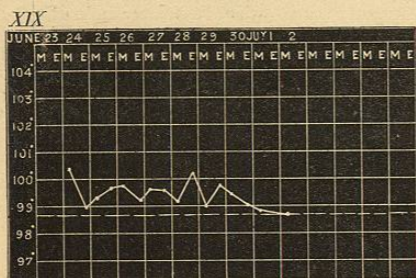
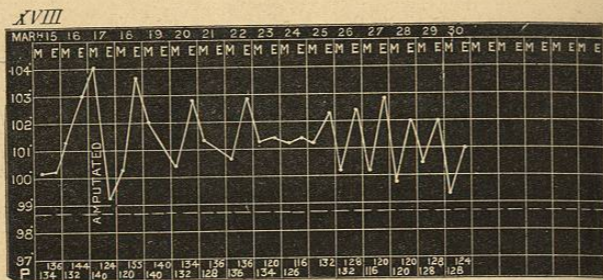
Treatment	Remarks
Clots removed, and the wound syringed out with 1-20 carbolic lotion. Gauze dressing applied.	The wound remained aseptic, but in a few hours the patient became restless and complained of pain in his head. He soon became unconscious. Trephining was therefore performed on January 31, the depressed bone elevated and some fragments of the internal table removed. Patient recovered consciousness after the operation, and progressed rapidly towards recovery, the blood-clot lying exposed in the wound. At one part, at the time of the operation, the bone was felt bare for some distance, but none separated, and it was all completely covered on February 22. The wound had completely healed on May 2. When the patient was discharged, the pulsations of the brain could be seen to raise the cicatrix. (See T. Chart XXVI.)

I.—COMPOUND FRACTURES, THE

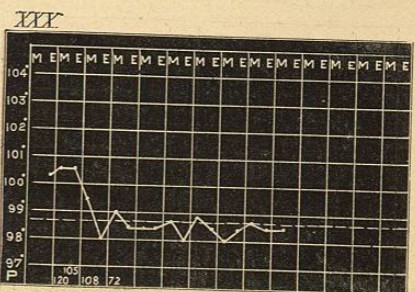
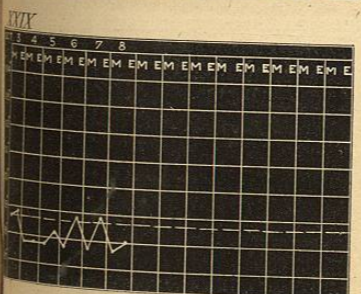
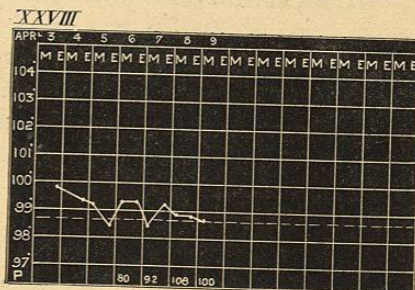
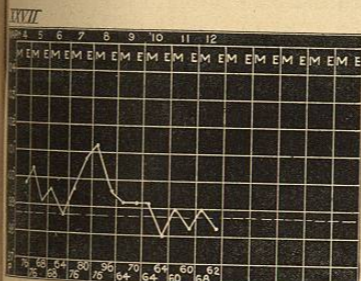
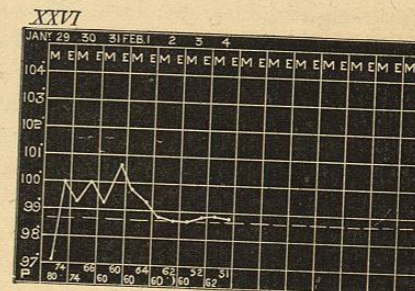
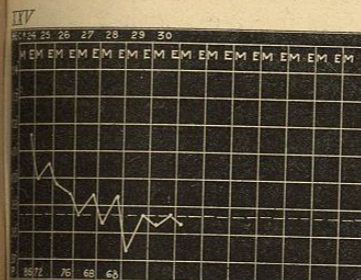
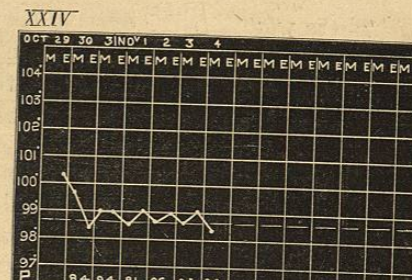
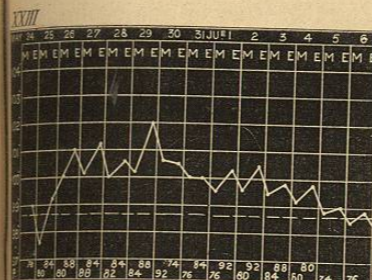
No.	Name and Age	Date of Admission and Discharge; with Result	Injury
44	George S., 18	<i>Ad.</i> , Feb. 12, 1872. <i>Dis.</i> , Feb. 18, ,, <i>Result</i> , in process of cure.	Compound fracture of the os frontis. No depression.
45	J. McC. (adult)	<i>Ad.</i> , March 4, 1872. <i>Dis.</i> , May 2, ,, <i>Result</i> , cured.	The handle of a windlass struck patient on the forehead, causing a depressed compound comminuted fracture of the os frontis. Fracture of nasal bones. The patient was conscious when admitted.
46	J. McK., 7	<i>Ad.</i> , June 14, 1872. <i>Dis.</i> , July 22, ,, <i>Result</i> , in process of cure.	Depressed compound fracture of temporal bone.
47	William L., 32	<i>Ad.</i> , Nov. 15, 1872. <i>Died</i> , Nov. 17, ,, The cause of death was injury to the brain substance.	Patient fell from a height of 20 feet, sustaining a compound fracture of the skull. Patient insensible, pupils dilated, surface cold, had several convulsive fits before admission.
48	Andrew P., 7	<i>Ad.</i> , Sept. 15, 1876. <i>Dis.</i> , Oct. 8, ,, <i>Result</i> , cured.	Compound fracture of temporal and frontal bones. Bleeding from the ear and nose. Run over by the wheel of a cab, head markedly flattened.
49	G. W. E., 12	<i>Ad.</i> , April 2, 1878. <i>Dis.</i> , April 15, ,, <i>Result</i> , cured.	An iron gate fell on his head detaching nearly half the scalp, which was hanging down. Bone fissured.
50	George H., 36	<i>Ad.</i> , May 14, 1878. <i>Died</i> , May 15, ,, The cause of death was fracture of the skull, &c.	Patient fell 10 feet, striking his head and causing an extensive compound comminuted fracture of the skull. Patient insensible, but muttering and restless.
51	David McC., 30	<i>Ad.</i> , Oct. 3, 1880. <i>Dis.</i> , Oct. 18, ,, <i>Result</i> , cured.	Struck on the head by a bottle, causing two incised wounds and fissure of the skull. Patient drowsy, but sensible.
52	A. C., 15	<i>Ad.</i> , Jan. 22, 1880. <i>Dis.</i> , Feb. 9, ,, <i>Result</i> , in process of cure.	Fell on his head from a height of 35 feet. Large scalp wound, fracture of parietal bone, and other injuries, no depression. Patient quite insensible when admitted into hospital.
53	Thomas G., 32	<i>Ad.</i> , April 9, 1880. <i>Dis.</i> , April 20, ,, <i>Result</i> , cured.	Fell 68 feet, and struck his forehead, receiving a compound fissure of the frontal bone. Patient sensible; other bruises present.

RESULT OF ACCIDENT (*continued*).

Treatment	Remarks
Wound injected with 1-20 carbolic lotion, and for the most part stitched.	Aseptic course. No suppuration, the wound healing by first intention and organisation of blood clot.
Wound injected with 1-20 carbolic lotion, depressed bone elevated, and portions of loose bone and of the internal table removed.	Aseptic course. The wound had quite healed on March 16. As there was slight redness and pain at one part of the scar, it was opened up on March 27, and one or two minims of pus escaped. This had soundly healed by April 19. There was an elevation of temperature on March 7, apparently due to derangement of the bowels, as it subsided at once on administering a laxative. (See T. Chart XXVII.)
Wound injected with 1-20 carbolic lotion, and left quite open.	This case followed an aseptic course till July 12, when, probably owing to the restlessness of the patient and consequent displacement of the dressings, the wound was found to have become putrid. By this time, however, the deeper parts had closed. When discharged there was still a small suppurating wound, and a portion of the os frontis could be felt to be bare.
Comminuted portions removed, and depressed bone elevated. Wound washed out with 1-20 carbolic lotion.	Absolute insensibility, with occasional convulsive attacks, continued till his death, about 36 hours after the injury.
Wounds injected with 1-20 carbolic lotion. Ears stuffed with gauze.	Aseptic course, except that an abscess formed on the side of the head behind the eye. Everything had healed, and was apparently sound when the patient was discharged.
Wound thoroughly washed out with 1-20 carbolic lotion, catgut drain and numerous horsehair stitches.	Aseptic course. The wound healed entirely by first intention, except at one point where a little piece of horsehair drain was employed. On April 12, there were just three tiny points to heal. A collodion dressing was applied. (See T. Chart XXVIII.)
A portion of loose bone was removed, and the wound was syringed out and left open.	The patient never recovered consciousness, and died about 27 hours after the accident. The skull was found to be very extensively fractured and hæmorrhage had occurred in various places but no lesion of the brain was found.
Two small pieces of the outer table were removed and the wound was washed out with 1-20 carbolic lotion.	Aseptic course. On October 13 two additional pieces of bone were removed. (See T. Chart XXIX.)
A portion of bone was loose, and was removed, wound washed out with 1-20 carbolic lotion.	Aseptic course. The wound had almost healed when the patient was discharged, to be treated as an out-patient. (See T. Chart XXX.)
Wound washed out with 1-20 carbolic lotion.	Aseptic course. The wound had quite healed when the patient was discharged.



TEMPERATURE CHARTS OF MR. LISTER'S CASES OF COMPOUND FRACTURE.



TEMPERATURE CHARTS OF MR. LISTER'S CASES OF COMPOUND FRACTURE (cont.)