Notes on Some Cases of Fracture.

Thesis

by

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The Infirmary

Halifax

Yorks

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In the present thesis I propose to consider some of the fractures that have been under my care as House Surgeon in Halifax Infirmary during the past two years.

I find from the hospital records that during the five years from 1891-96 there have been treated as out-patients 7053 accidents cases in patients 1413 accidents. Of the outpatients 482 were cases of fracture and 628 of the minor cases—a percentage in the former case of 6.8% in the latter of 4.5%. In one respect these figures are incomplete. They do not include all the cases of injury—simple or compound—to the metatarsal or metacarpal bones nor do they include fractures of the phalanges. In a manufacturing district these accidents are so common that no correct register has been kept to enable one to discriminate between fracture and laceration.

The 1111 cases of fractures out of a total of 8466 accidents represent a percentage of
13.12: a considerably smaller percentage than that got from Jenkin's figures as quoted by Clinch (On Fractures 135-6) where out of 520 cases 736 accident cases - 51936 were fractures - a percentage of 21.3. The difference is considerable even if we allow for the proportion of fractures of the hand & foot - 14% of the total fractures - in the tables Davignon. These, from their incompleteness constitute only 2.43%.

If one compare the table given below with those given in Clinch's work, it seems to occupy an intermediate position. On p. 36 he gives a table of 6310 fractures drawn from three different sources: The relative proportion of which is very different from that in the table given on p. 35 of 52000 fractures.

In the first table fractures of the head constitute 5.22% as contrasted with 3.85% in the 2nd 6.761 in mine fractures of the trunk respectively 16% 17.45% of the mine (including scapula). 9.931 of the upper extremity 49.11% 52.214.
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629 282 1111 100,000
in mine (excluding seaports) 40.96% of the lower extremity 31.41% 26.47% 38.63%

The explanation of the relatively high proportion of fractures of the upper extremity of the skull... in the table I have compiled as compared with the others, is easy to find - the district served by the hospital is fairly extensive rural one and thinly populated as well as the urban district. While we get a larger proportion of fractures of the lower extremity occurring in the rural district, very few of the upper extremity are sent unless there be some special complications rendering indoor hospital treatment desirable.

Of the fractures in the table quoted 84 have been compound, constituted as follows: - of the skull 28, facial bones 9, humerus 9, femur 14, shaft 10, tibia, fibula 25, metatarsal 2, 84 of the 628 fractures admitted 57 died from their injuries = 2 dying after simple fracture of the skull out of eleven cases and 12 out of 28 compound = 5 dying out of 7 cases of fracture spine.
1 out of 21 cases of fractured ribs
2 cases of fractured sternum
3 out of 13 cases of fractured pelvis
4 out of 31 fractures of neck of femur
7 out of 80 fractures of shaft - one being compound.
Of the simple fractures of the leg, none died.
Of the 25 compound 2 out of the
subdivisions entitled multiple fractures
17 cases died. In this group is included
all the cases where two or more bones are
broken - the cases vary very greatly from
for example a fractured femur and forearm
to a crush affecting ribs on both sides
sternum and one leg.

The majority of the cases detailed in the
following pages are included in the above
list - though I have added others which I
have had under treatment up to the
time of completing this Thesis.
I have made no attempt to consider all the
clinical and pathological features of any one
fracture - the points considered must be
made are those that arose out of any particular
case under treatment.
Fractures of the Skull.
Of these there have been 20 cases under treatment in the five years—wit 14 deaths. Eleven have been cases of simple fracture with two deaths, and twenty-nine cases of compound fracture, with twelve deaths.

Included are notes and comments on twelve cases of fracture—nine of which are included in the above forty—and one other case which I am induced to add on account of the difficulty of a differential diagnosis through the post-mortem revealed the fracture. Of these thirteen, seven recovered, one was dead on admission, the other five died at varying periods from a few hours up to 8 or 9 weeks after the injury.

Case 1. J. W. 13, Oct 12. a boy—was admitted into Halifax Infirmary about 11.45 A.M. July 1st, 1885, with the history that he had fallen from a wall ten feet high two hours previously. The boy was seen by a medical man shortly after the accident and found to be wholly unconscious and suffering severely from shock. There was a marked indentation
over the left frontal eminence—easily receiving the end of one's thumb. There was bleeding from the nose. Over the indentation in the bone the skin was bruised but there was no wound. The practitioner ordered his removal to the Infirmary a distance of 7 or 8 miles. On the way he vomited several times and passed feces unconscious.

On admission I found him partly conscious, very irritable if disturbed. He lay curled up on his right side. Would not speak or do anything he was asked. Screamed out if any attempt was made to move him. He vomited once after admission. Pulse was of good volume. Regular in time, volume. The pupils were equal, reacted to light. There was no subconjunctival ecchymosis. No bleeding from nose or ears. No symptoms of pressure on motor areas. Over the left frontal eminence was a large soft swelling entirely obscuring the indentation in the frontal bone previously noticed.

July 8. Patient quite conscious. Able to talk rationally. He has no recollection whatsoever of falling off the wall or of anything that happened.
subsequently. A further examination revealed nothing beyond what is noted. There were no other injuries. The patient presented no local symptoms and on July 15th was sent home. When seen several weeks afterwards he was quite well in every respect. Over the left frontal eminence there was a marked flattening corresponding to the ball of the thumb. It should perhaps have been mentioned that the body temperature never rose above 99.7°.

Case II. T. F. aged 1 yr. 8 mo. Admitted Sep. 30th, 1876.

He had wandered out of the house into the stable. Kept by his father, he was knocked down a rod on his head. He was unconscious when picked up, but had regained consciousness about three quarters of an hour after when admitted to the Infirmary. On examination of the head there is a depression which would about correspond to the bowl of a dessert spoon on the right side below the level of the frontal eminence. It would as nearly as
I can estimate the represented by the area in the diagram. Chiefly involving the temporal and might probably include the adjoining part of the occipital bone. There is no laceration of the skin — no haemorrhage from the ear or nose. Pupils are equal and react to light. 6. vomited several times after admission — vomited matter consisted of food chiefly — it was slightly blood-stained.

No unfavorable symptoms developed. Child was very observant the day after admission, and in a few days had regained his normal brightness seemed well in all respects. An ice cap was kept on four days — after that the child insisted on sitting up and could not be kept lying. The depression seemed to become more shallow after a few days but this may have been due to swelling of the superficial tissues — for after that no
further expansion was noticed.

The child was kept in the ward till Oct 21st when discharged apparently quite well but with depression in skull almost as marked as on admission. The temperature was 99° 6F on admission rose to 100 4F at 2 a.m. next day—thereafter gradually sank to normal on 3rd Oct or varied thereafter between 98° 6F. Heat the temperature taken in both axillae coincidently for the first few days was normal. As a rule the two sides were exactly alike—on four or five occasions there was a difference of 0.2°F at night being invariably the higher—there was never any greater difference.

The patient has been in good health and has so far remained well but without any further expansion of the depressed bone.

Case 14. A S Oct 33—a miner admitted 10 a.m. Dec 31st 1895. He had never been standing on the stage of a crane—over hanging a quarry. The boiler exploded and was knocked into the quarry and fell a—
distance of 20 - 30 feet. On admission about an hour after the accident he was in a maniacal condition - very noisy and restless - and apparently suffering intense pain. He was quite unable to give any intelligent answer and did not understand anything said to him. He was very cold - apparently suffering severely from shock. He was scalded badly about the face and neck. There was a lacerated wound over the left eyelid about 2 inches long. This was quite superficial and did not extend down to the bone. Another lacerated wound - 6 inches long, extending over the vertex, extending down to and exposing the bone for an area the size of a crown but causing no fracture. There was a third wound, superficial, over the external occipital protuberance. There were many bruises all over the body. There was an extensive laceration about the great trochanter of the right femur - extending deeply on both surfaces of the bone and stripping off the periosteum. There was also a further laceration of the left leg on its inner side.
Patient was suffering so much pain that a hypodermic of morphine (g1 1/2) was given.
He continued in the same restless condition requiring the constant attention of two nurses for about 2 1/2 hours and then collapsed suddenly and died in a few minutes deeply cyanosed.
I held a post mortem the same evening. Haemorrhages and wounds were as noted above. No fracture could be made out anywhere.
The thoracic viscera were healthy. Both sides of the heart were filled with dark clotted blood. The ribs were not injured.
The capsule of the spleen was ruptured in a number of places but none of the ruptures was extensive. The other abdominal viscera were intact.
On reflecting the scalp no fracture of the vault could be seen. On removal of the calvarium there was evident an extensive fracture of the anterior fossa, as depicted in the diagram subjoined. The right and left orbital plate was shattered into a number of loose pieces and the fracture
extended completely through the supra-orbital ridge, while there was no communication between it and the superficial wound immediately over it. The several fractures of the left orbital plate ran into the left fronto-sphenoidal fissure. There was distinct separation between the sphenoid and the frontal and ethmoid bones extending right across the anterior fossa-orbital crosswise into the middle fossa on the right side along the line of junction of the great wing of the sphenoid with the left frontal. On examination of the brain there was slight laceration of the under surface of both frontal lobes. The olfactory lobes seemed uninjured. There was blood stained fluid in both lateral ventricles. Otherwise the brain seemed uninjured.

Case IV. H. O: a miner aged 30, admitted Dec. 6th 1895: He had been working in a clay mine, had fallen a distance of twenty feet, alighting on his head.
extended completely through the supra-orbital ridge - while there was no communication between it and the superficial wound immediately over it. The several fractures of the left orbital plate ran into the left fronto-sphenoidal fossa. There was distinct separation between the sphenoid and the frontal and ethmoid bones extending right across the anterior fossa - then crossing into the middle fossa on the right side along the line of attachment of the great wing of the sphenoid with the left frontal. On examination of the brain there was slight separation of the under surface of both frontal lobes - the olfactory lobes seemed uninjured; there was blood stained fluid in both lateral ventricles. Otherwise the brain seemed uninjured.

Case IV. H.O. an 1875. He had been fallen a distance on this head.
On examination there was a wound about 2½ inches long on the left temple—not extending down to the bone—the wound ran upwards from the outer margin of the orbit. Patient was conscious, did not seem to be suffering from shock. There was no history of his having been unconscious: there had been no bleeding from the nose or ears, no other injuries could be detected. He was very drowsy & objected to be disturbed in any way—lay on his right side; would not answer when spoken to unless forcibly aroused & then seemed irritable. The pupils were equal & reacted normally. No sickness.

Dec 7th: There was marked swelling of both upper eyelids, the swelling being subconjunctival. Still drowsy and irritable.

The wound healed readily and in four or five days time the condition of drowsiness and irritability had quite passed away. Patient expressed himself as feeling perfectly well. The temperature rose on the 7th to 98.8° in the evening—thereafter was normal & subnormal.

The patient was discharged Dec 20th, 1875.
Case V. M.T. aged 5. admitted May 3rd 1893.
She had fallen down a flight of stone steps on to her head. She was quite unconscious and was screaming lustily.
There was an extensive scalp wound over the right frontal bone—beginning about 3/4 of an inch above the middle of the right eyebrow and running in a curved manner for upwards, backwards and outwards for about six inches so that the flap hung down over the temple. The frontal bone was stripped of its perosteum over an area the size of a shilling over the frontal eminence and running across this rent a strip on either side beyond it was fissure about 2 inches long, running in the line of the wound. The outer portion of the frontal bone entering into the fissure was depressed below the inner to an extent sufficient to expose the diploe.
I cleansed the wound under an anesthetic and left a draining tube in for two days. Wound healed by primary union.
The temp rose on 4th May to 100°. 2 F., fell next day to 99°. 7 F. On May 11th the child was
discharged perfectly well and remained so during three or four weeks subsequently in which she was kept under observation as an out patient.

Case VI  N. M. aged 6. admitted 9 a.m. Sep 6th 1895.  When coming home from school that afternoon, he had fallen from a long chair his head jammed against the wheel. He was seen by a doctor shortly after the accident and sent to the Halifax Infirmary - a journey of 6 or 7 miles. On admission, he was quite conscious, very restless, crying out with pain in his head and tossing his arms and legs about the bed. He had never, according to the history, been unconscious.

On examination there was a lacerated wound of the left side of the scalp - an oval flap of skin had been torn backwards exposing the calvarium. The flap was about 3½ inches round the edge, it began near the site of the posterior fontanelle, curved forwards, continued backwards to the left, then backwards, to end a little above behind...
the ear. The skin superficial tissues around the wound were much bruised and had a large quantity of mud ground into them. In the wound thus made the periosteum had been stripped off the bone from a surface about the size of a crown, chiefly over the left parietal bone. Running obliquely (as figured in the diagram) was a compound depressed fracture of the left parietal-temporal bones. There was a lacerated wound of the right cheek, quite superficial however, a sharper deeper wound in front of the right ear extending down to but not penetrating the cartilaginous portion.

The boy was anesthetized and attempts made to cleanse the scalp of the dirt ground into it. Then a tetracaine was applied to the depressed bone in the area marked. The small depressed fragment of the parietal bone removed. The rest of the depressed bone consisting of the posterior half of the parietal was then easily levered into position.
It was found on close examination that the fracture ran downwards towards the posterior fossa of the base of the skull, extending considerably beyond the limits of the superficial wound. The fracture ran into the base just behind the mastoid process, from its direction it extended either into the foramen magnum or raw across the occipital bone posteriorly. While the fractured edges of the mastoid fell back closely the pia mater gaped and extended towards the base. Behind the mastoid there was an interval of quite 2 to 3 mm. Part of the periosteum was destroyed and could not be replaced to cover the base bone. Staining tubes were inserted, the wound closed.

Patient was much collapsed after the operation, had a feeble flickering pulse. In an hour or two he rallied and pulse got stronger but became more rapid going up to 180 per min.

Sept 1st: Patient restless all night and all day. Palsy conscious - could recognize his mother. Had incontinence of urine. Complained seemed too Improve for a few days.
patient being more observant at temp
mournment fairly well. The pulse acceration
also became decidedly slower in rate.
Sep 11th Wound dressed. Portions of the
bruised tissues were alongship of the brae portion
of bone was exposed.
During the next week the condition seemed to
be getting gradually worse. Child became more
restless and irritable - the appetite fell off
as the child was getting manifestly thinner. Temperature
at same time showed increasing pyrexia pulse
rate remained rapid - child was drowsy
had a dull, heavy look on his face. There
were no obvious cerebral symptoms but as
the general condition was manifestly rapidly
deteriorating it was deemed advisable on Sep 19
to again anaesthetize the child to remove a
disc of bone in the line of fracture. There was
no pin between the dua and bone. The bone the
brain displaced naturally. The dua was
not opened. There was at this time free
suppuration of the superficial wounds
Sep 22nd Boy was very restless - bracing his
head with his hands. Giving uterine to a
local recommend and then was suction of the
Lead a occasional vomiting Patient was not conscious - did not know his mother. His eyes were wide a stang - pupils equal. We did not seem able to see atook no notice of anything said about him. No twitching. Sep 20 - He seemed a little better - had lost the peculiar cry that suggested meningitis. How again he had fits of restlessness - uttered a wailing feetful cry. We could see quite clearly got no notice of what went on. He was now very much wasted.

Sep 24 Temperature had fallen to normal a child seemed better - took his food better. From now onwards he steadily though slowly improved - there were no further cerebral symptoms a boy was quite intelligent and observant. There was still a considerable area left free to be covered in but by the end of October the bare bone had got quite covered over without any exploration. His progress was retarded by a rather capricious appetite & he did not get out of bed till the first week in November. By this time he was quite fit to be discharged but was kept in the Infirmary till Dec 13th.
account of the slow healing of the superficial ulceration. He lived in an out-of-the-way district where proper surgical attention was rather impracticable. Dec 17, he was discharged quite well in as good health as he had ever been. He has been seen at intervals since, remains in good health.

I am in附一份体温图表，显示头三天的体温变化。在12月27日之后，体温保持相对稳定。

The chart is a double one showing slight differences in temperature between the two

ascellites.
Case VII

q. O. aged 43 admitted May 24th 1838.

He had been engaged in the removal of
some goods in the attic to a higher story,
when a heavy block fell from the rafter
and struck him on the head. He was
at first dazed but quickly recovered from
that. On admission to the Halifax Infirmary,
about half an hour after the accident, he
was quite conscious and could give a perfectly
clear account of the accident. He com
plained of pain in the head where he had
been struck and of inability to move his
left foot. On examination there was no
injury to the foot or leg but patient had
quite lost the power of moving the toes or
ankle joint. He could flex the knee but
not so well as the right knee, but there
was complete loss of power of lower portion
of ankle and toes. He complained of foot feeling
numb but localized sensations of touch
with fair accuracy though not quite so
nearly as on other foot. He could not
discriminate between sensations of hot
and cold tubes dorsum of foot & lower part
of the leg around the ankle. Exact details could not be made out as the operation had to be done soon.

On inspection of the head, there was a small lacerated scalp wound on the right side about one inch external to the for middle line (anteroposterior) or just over the upper back of the fissure of Rolando. The wound led down to a comminuted depressed fracture of the skull. The wound corresponded to the sharp edge of a heavy wooden block. It could have been covered by a 2½-piece.

Patient was anaesthetised and Mr. Mantle, the medical officer in charge, proceeded to trephine. It was found that the inner table was extensively splintered, more so than the outer; some of the fragments were driven through the dura mater, apparently into the brain. One large fragment ran towards the middle line. Its removal was attended with a very profuse gush of dark venous blood, evidently from the superior longitudinal sinus or a large branch.

The dura mater was not opened. The disc of bone removed by the trephine was replaced
The haemorrhage continued, by an occult form plug, the wound closed.

Patient rallied from the anaesthesia, had no pain and took his food well.

Healing was delayed by the debt of bone, failing to live. The plug was removed on May 28th - the 5th day - there was no more haemorrhage - on May 31st removed the bone of bone, thenceafter the wound granulated slowly.

For some time there was no improvement in the paralysis, but in 10 days time patient could just move his big toe - thereafter power slowly returned to the rest of the muscles - returning to the muscles moving the toes first half.

July 4th patient was discharged - the scalp wound was nearly whole - there being nearly a superficial sinus, the brain could still felt pulsating - there being no firm fibrous plate over the next yet.

The patient walked with a slight limp, could move his toes well but had not full power over his ankle. Sensation to touch to heal so old had returned.
Two months later patient had complete use of his foot. The limp had disappeared entirely and he walked as well as he had ever done. The scab wound was now quite white. A patient was discharged.

The temperature rose on the 3rd day to 99.6°F on the right side; a 100°F on the left, in the morning 99.4°F on the right side & 99.8°F on the h. in the evening. This was the maximum thereafter it gradually fell to normal. now and again showing a variation of 0.2°F or 0.4 between the two sides - neither side being constantly higher.
Case VIII.

C. O., aged 7, admitted Dec 14\textsuperscript{th}, 1896.

In the school cloakroom a heavy wooden section either fell or was involved over against her. She fell against the wall some of the bench wire cloak pins penetrated the skull just above the left ear. On admission shortly after the accident the child was much collapsed; she made slight inarticulate sounds but did not speak. There was a wound of the left temporal bone a little above and in front of the ear from which brain matter was protruding. Shortly after admission she had a fit of some sort apparently general from the description it had passed off before I saw her. She had had one such convulsion before admission; this fit caused further protrusion of brain matter—chiefly portions of convolutions. There seemed to be complete right sided paresis—face arm and leg with aphasia. The child was conscious became restless on examination and apparently felt pain but could not speak.

An anaesthetic was given (Chloroform) and I examined the wound. I found a linear wound
about one inch long running horizontally about two inches above the external auditory meatus. Lanced the wound removed the extended brain matter and a large lock of hair which had been driven in. There was then seen a gap in the skull large enough to receive one's thumb filled up with blood clot. Brain matter lying in this blood clot was the piece of bone which had been driven in. With a little manipulation this piece of bone was brought out. But its removal was followed by profuse venous hemorrhage, the blood simply pouring out. It seemed to be controlled by pressure so I left a plug of dressing gauge in the wound and applied a firm dressing of cellulose wadding.

Child speedily recovered from the anaesthetic.

Presented the condition above noted of complete right sided hemiplegia with aphasia. She remained conscious was able to recognize her mother. Respiration soon became marked accelerated. The pulse became rapid and feeble. The child was unable to swallow and was fed by a nasa
Tube: This she did not resent. She remained on the whole very quiet, occasionally getting very restless, throwing the left arm slightly about. She remained quite conscious and recognized her mother two hours before death. Her condition gradually deterioated and she died 8 p.m. Oct 18th, thirty-one hours after admission. Subjoined is the temperature chart taken in this case also for both sides of the body.

The cause of some derrangement in the brain I have figured below. It showed grooves on its inner surface probably in the branches of the posterior division of the middle meningeal artery. It was somewhat almond shaped, the long diameter being 1½", the short about 3½".

So violently had the spike penetrated the child's skull that it required some force to disengage the two.

Dec 19th. Made a post mortem examination. On removal of the calvarium the dura mater was congested and present a very ragged hole on the left side corresponding to the
Opening in the temporal bone. On stripping the dura off the surface of the left hemi-

sphere a little blood could be seen lying in the fissures between the various convolutions, but there was no clot or effusion on the surface. The plug having apparently been effectual. There was a ragged wound in the brain about the size of a shilling situated at the base of the ascending frontal convolution but also affecting the supramarginal and first temporal convolution. Convulsions were occurring complete laceration of the vessels running in the fissure of Sylvius.

The brain tissue of both ascending frontal and parietal convolution was undermined as represented. The surface was not actually destroyed but the lacertion lay
directly below. On the inner side of the left hemisphere corresponding to this track was a lacerated wound, so that the inner hook had gone completely through the right hemisphere was quite intact. There had been very little haemorrhage into the extensive depression caused by the injury.

There was no bruising of the skull in addition to the piece chipped out. The main branches of the middle meningeal artery were seen to be intact—lying respectively in front, behind the fracture.
Case IX

A man aged 44 admitted 9.15 am Dec 4th 1884. He was quite dead on admission. He had been standing on a ladder a distance of 8 or 10 feet from the ground and fallen lighting on his head. This had happened about half an hour previously.

On examination there was found a slight abrasion of the skin over the left frontal bone. Over the right parietal bone was a lacerted wound about two inches long running vertically above a slight depression in front of the ear. On reflecting the scalp this was found to correspond to a fracture of the right parietal bone running upwards to near the vertex. When the calvarium was removed the fracture was found to extend downwards through the squamous plate of the temporal bone slightly in front of the external auditory meatus across the middle fossa to the base of the skull.
as figured in diagram. The fracture showed numerous radiations as they crossed the base. The condyle of the lower jaw on this side projected through the base of the skull in the line of fracture & the thin shell of bone over it had been extensively splintered. It was the external wound that tempo splenoidal lobe showed slight laceration. Otherwise the brain was normal.

The heart showed slight aortic incompetence. Other abdominal & thoracic viscera were normal.

There was no bruising on the chin anywhere else about head or face.
Case X.

J. H. aged 55: a man. Admitted March 2nd 1896. This patient was not fully under my care, so my clinical notes are incomplete. He was admitted in the forenoon, suffering from head injuries the result of a blasting accident. There was a superficial wound about 1½ inches long over the root of the nose on the forehead. Another, also superficial, about 2 inches long over the lower anterior part of the right frontal bone. On the left side of the head, on the outer part of the left frontal bone above the eyeball was a lacerated wound about 2 inches long. This communicated with a compound depressed fracture of the skull. There was also injection of brain substance.

The wounds were dressed under anaesthetic. It was found necessary to bepithine and remove some bone fragments of bone. One large piece consisting of part of the root of the orbit and the external angular process of the frontal bone.

Patient rallied from the operation but never regained consciousness. His temperature...
rose the day after admission to 103° F. and remained about 102 or 103 till death, which occurred on March 6th about 8:30 a.m. C. became very restless and presented evident indications of meningitis.

At 8:30 the same night, I made a post-mortem examination. In addition to the wounds noted, there were slight bruises over the left hand and right knee and left foot. There was a small amount of fluid in the wound on the left temple. On removal of the calvarium and dura mater, the surface of both hemispheres was found to be deeply congested; there was a moderate amount of blood stained non-purulent subdural fluid. The left hemisphere was much the more deeply congested. Over the greater part of the left hemisphere there was acute purulent meningitis.

There was laceration of the portion of the frontal lobe of the brain that corresponded to the fractured bone. On removal of the brain the left half of the anterior fossa was found extensively damaged - the fracture running in various directions.
through the orbital plate of the left frontal, so that the orbital plate was in several loose pieces. One fracture ran with the ethmoidal cells - another opened up the globulum - another ran beyond the anterior fossa right across the greater wing of the sphenoid bone on the left side; the outer portion of the frontal bone external to the external angular process was loose. There was extensive hemorrhage into the tissues of the left orbit.

There were another injuries. Beyond, emphysema of both lungs & obliteration of the right pleural cavity by adhesions. The thoracic & abdominal viscera were normal.
Case XI.

This patient a man 42 years of age came under my care when assistant in Hospital Steppenshine. In March 1894 he came to me complaining of a small wound on his forehead on the left side, which had been caused six weeks before by a blow from a jug in a drunken quarrel. He had not been to any doctor a came now because it would not heal up. On examination I found a small punctured wound situated over the left frontal eminence; it was suppurating freely. On probing there was evident a small loose piece of bare bone. The man was rather apathetic— took little notice of anything but understood anything said and answered quite intelligently. His pupils were equal and reacted normally. He complained of no pain, headache, no vomiting—in fact had no symptoms whatsoever. His condition struck me as being rather peculiar & sent him to the Longton Cottage Hospital of which my principal were medical officers, & enlarged the aim—removing the bare bone. This was a
cubical piece midway up the whole thick
ness of the frontal bone. Before this
manipulation quite suddenly a consultation
was held & of the man's rather
peculiar mental condition it was decided
to watch the case it being thought that
the absence of any definite symptoms
rendered admission in the patient
justifiable. He remained in the hospital for about four
weeks during which time his condition was
as follows. He was listless & uninterested
never originating a conversation with any of
the other patients but answering quite
intelligently when spoken to. He had a dull
expression on his face. The pulse was
regular & varied between 70 & 80 - was
never lower. The temperature varied
between 98° & 98.5°. The pupils
were equal & regular - moderate mydriasis
in light & accommodation I could make
out no change in the fundus of the eye.
There were no parasthesia symptoms or alteration
in sensibility. He took his food well - slept
well & complained of nothing. The wound
still suppurred a little & the edges of the
bone had not yet got covered with granulations & the probe still struck the dura. At the end of four weeks, the patient seemed more stupid & listless. He began to be dirty in his habits, a thing he had never been before - & when remonstrated with, simply listened indifferently.

This alteration strengthened one previous suspicion that the patient had a cerebral abscess & nephritis was resolved on. A disc of bone was removed over the left frontal eminence including the seat of the injury. The dura did not pulsate & a fine needle plunged into the brain yielded a few drops. The dura & brain matter were accordingly carefully incised & an abscess cavity discovered in the anterior part of the left frontal lobe containing about two ounces of sweet creamy pus. The abscess cavity was washed out & a drainage tube inserted & patient got back to bed suffering very little from shock.

The operation itself I have mentioned was done by Dr. Jones of Longton.
Patient went on satisfactorily till the evening of the 2nd day when the temperature rose to 101°F and became restless. Next morning the wound was clean and there was no evidence of a cerebellar lesion. The wound was now less painful and the patient made good progress. The temperature was normal, 98° F. He was well on the morning of the third day, and he was able to move his right arm and leg. He was discharged on the fourth day after the operation. He was able to move all four limbs after the operation. He was discharged on the fourth day after the operation.

On postmortem examination, the brain was quite healthy. The dura mater was adherent to the bone, and the trephine hole was so that no material was removed. The brain was placed in a large glass vessel, somewhat irregular in shape, which occupied the entire anterior part of the right frontal lobe. A solid spread backwards below the level of the motor convolutions but above the level...
If the internal capsule nucleus there was
no indication of any definite abscess wall.
The brain was otherwise healthy and the
other organs presented no abnormalities.
Case X 11  

Jan 14: a message boy, admitted Jan 14 in 1896 with the history that in a spirit of bravado he had pointed a small pistol at himself not knowing it was loaded. The pistol went off and he was wounded in the centre of the forehead. On admission he was very pale, feeble pulse, became quite conscious. 2.5 cm in the centre of the forehead just above the glabellum was a punctured wound with blackened edges. there was no ooze from the wound but there had been some dronorage from the nose. The bullet passed inward a little to the left and completely through a small punched out hole in the bone – so into the interior of the skull.

Patient was kept quiet in bed, soon rallied from the shock. The wound was dressed with boracic compresses changed four hourly. There developed oedema of the eyelids around the wound but this subsided in a few days. The discharge from the wound was chiefly a clear yellowish
fluid—probably cerebral—was never very abundant. For the first day or two the boy was disinclined to talk. Looked drowsy & wanted to be left alone—thereafter he brightened up & seemed quite well. His pulse was about 80 to 70 rarely higher. The pupils were equal, reacted normally. The temperature rose the second night to 100° F. remained so on 3rd day. Thereafter fell to normal & rarely rose above 99° F. during subsequent stay. The boy complained of nothing—seemed quite intelligent. Had no symptoms of any description. The wound healed in a fortnight. In three weeks time (17 Feb 32) the boy was discharged—apparently quite well. Up to the present he has remained so & is fit for work.
Case XIII.

P. H. age 37, admitted Aug 13th 1895.

This is not a case of fracture of the skull but I have placed it with the other cases cited because of its peculiar unusual nature, the diagnosis being two several possibilities in which fracture had certainly to be considered.

The patient a powerfullooking man was admitted about 4 a.m. on Aug 13th in a state of complete unconsciousness. He had been found by the police, as they supposed fallen a distance of about ten feet. He smell of drink could not be roused to give any account of himself moved about a little when disturbed but did not move left arm at all, when it was raised it fell easily as if paralyzed. He had evidently been exposed for some time was very cold. There was a wound over the vertex slightly to the right of the middle line of the scalp about the junction of the parietal occipital bones but it was quite superficial, beyond a bruise on the left ear & another on the right thigh there
were no other injuries. There was no evidence of any haemorrhage from nose or ears. At 6 a.m. patient was still unconscious; there was heavy stertorous breathing. He was not restless or left alone, but if disturbed raised his right arm to protect himself and moved his right leg freely. The left arm and leg were as far as could be made out completely powerless. If they were pinched or pricked he did not try to move them as he did the right while he showed by his uneasy restless movements of the rest of the body that he had some sensation. The left pupil was slightly larger than the right—both reacted to light. There had been no convulsions. As patient responded to stimulation less readily than on admission, Dr. Snyers decided to operate on the line that the condition might be due to some interference with the motor centres in the cortex. A disc of bone was first of all removed through the superficial wound on the right side. But the brain reacted normally. Then another
Opening was made anterior over the centre of movement for the arm - the dura were pierced but felt dry. There was no extradural haemorrhage. The dura was incised and when a considerable amount of clear serous fluid escaped there was no apparent injury to the surface of the brain - it now presented quite normally. The wounds were closed - no further exploration being likely to be feasible. At 5 p.m. 9 hours after the operation patient had not spoken or seemed to regain consciousness. He had become very restless and irritable - throwing about his right arm and leg. He had drawn up the left leg at the knee once or twice once or twice. I saw him move the left arm and at the elbow and wrist, but these movements were very feeble compared with the vigorous movements on the other side. His breathing was laboured, his pulse of stronger volume and his colour good.

12 midnight. He was still restless and had moved the left leg a little more and put left arm up to his head once. So
Far as could be determined there had been no paralytic condition of the face. In the course of the next day the police brought no further information about the man—by which it appeared that the accident had happened about three hours before admission—& that he had fallen not ten feet as at first reported but sixty—right from the top of a high cutting into the road below.

On the 14th Patient was worse: took very little nourishment & did not seem able to swallow properly. The left side of the face was paralyzed: the left eye was half open. The right upper eyelid drooped. The pupils were small—the right still slightly the smaller. The left arm was moved very infrequently & very feebly. The patient was still very restless. Respiration was heavy, regular, rapid—not stertorous. Pulse got steadily more rapid in the course of the day. Rose to 160 volume of beat was small rather irregular. Rhythm was also irregular. Shewed no signs of regaining consciousness.
He passed urine unconsciously. Bowels were moved freely after 3 yrs Colonel. an enema later.

During the 15th patient got distinctly worse. He did not move his right arm or leg. He was restless. had stertous breathing and a rapid feeble irregular pulse, varying from 160 - 180. Early in the day a condition of paralysis of the diaphragm was observed. I became more and more comatose and died between 10 & 11.30 am on Aug 13th about 6.6 hours after admission.

Subjoined is a temperature chart of both arteries.

Sectio Cadaveris Aug 16th 1895. Head alone examined. Wounds on scalp as noted above. Skin reflected, calvarium examined. Two trephine holes on right side. No evidence of any fracture of the vertex. On removal of the calvarium. the dura mater allowed healthily & there was no extracranial hemorrhage. On removal of the dura a small amount of clear subdural fluid escaped. The surface of both hemispheres was congested - there was no elevation of
The brain was removed on the base. Brain removed & base of skull examined there was no fracture of the base nor any basal haemorrhage.

Sections of the cerebrum, cerebellum revealed many points of ecchymosis. Congestion of vessels - the condition found in severe fatal cases of concussion. These punctiform haemorrhages were more numerous, the basal ganglia's still more numerous in the pons varolii and medulla - there some linear extravasations could be seen about 2 mm long - but nothing larger. In slicing through the right crus cerebri I found a large haemorrhage in its substance of the size depicted (Fig). There were no other haemorrhages larger than the punctiform ones already alluded to.

The chest & abdomen were not examined - no was the spinal Cord.
Notes on the foregoing Cases.

The first two cases present considerable resemblance to each other. In both the depressed fracture has been so far attended by any serious symptoms - Of course the possibility of lead secondary to lead is not yet passed - although in neither case the fracture is over a region which, as far as can be ascertained yet, is not indisputable.

There are of course numerous cases on record of epilepsy following after some years interval, head injuries of all sorts from apparently simple to a fracture of the skull. There are unfortunately cases where the epilepsy has followed depressed fracture of the skull & has been uninfluenced by subsequent trepanning excision. Gram two cases which is supposed after depressed fracture of the skull.

The third & fourth cases also resemble each other - being fractures into the anterior fossa & my compound through their communication with the nose. In Case No 3, the fracture of the skull was one of a number of severe injuries, the combined shock
from which ensued death. The interest of
the case lay in the fact that there was a
lacerated wound of the left upper eyelid
exactly over the orbital ridge but not
giving down to the bone. The fracture ran
into the orbital ridge in two places but
carried no irregularity in its outline was
not detected till the post-mortem.
In Case 204 I thought the evidence on
the whole pointed to fracture—though
fortunately there was no verification. The
subconjunctival cedema of both sides of the
marked mental disturbances even both
totally different from what one would
expect to find in a simple scalp wound.
Subconjunctival haemorrhage of course
was recorded in fractures of the facial
bones associated with fracture of the
skull. Holmes records a case in the British
Medical Journal for 1885 (p. 567) where
it appeared from fracture of the malar and
superior maxillary ones. Of course one can
see how easily it may result from any fracture
involving the orbit— it may perhaps
result in some cases without fracture of the
orbit at all. In the case cited it was double - at the injury, a somewhat severe one, was confined to one side.

The fifth case presented no point of special interest.

The sixth was of interest from the extreme practice of the facts that the patient recovered after very dangerous symptoms. He had the eyeball of a case of meningitis - one thought that speedily passed - of course meningitis need not necessarily be fatal. From the situation of the fracture one would expect no motor phenomena - one got none. The line of fracture

snapped over the occipital bone, an area out of the centres perforation. I was unable to determine whether or not there was any interference with vision. At one time it seemed quite certain that the boy did not see - one day - when I was close by and he surprised me by telling the nurses to stand out of the way. At him, see what he was doing - yet that day before - he took no notice of a lighted match, but suddenly before his eyes. I could never convince to
examine his discs.

The case exhibits another interesting phenomenon which I have observed frequently in disease—a difference in temperature at corresponding moments between the two sides of the body.

Of course to make certain that this is so one requires to take special precautions. The method I follow is to use two thermometers—one in either axilla—then after noting the two temperatures reverse the thermometers to observe again—if there be the same difference on both occasions, one may rely on the observation. If this be the case the difference is slight and not constant—now one being higher, now the other—this difference hardly amounting to 1°F. Others of the cases present the same phenomenon. It is seen in Case VII where there was a distinct localized lesion from which the patient died—in Case VIII it existed at death to the extent of 2°F between the two axillae.

In Case VII I had the temperature carefully taken in both axillae for a week—found practically no difference—this was also the case in Case IX but in these two...
there was very little febrile reaction. It is worthy of further investigation whether this difference exists to any marked extent in severe unilateral cerebral lesions. In one case of suppurative meningitis with pus in the lateral ventricles and abscess of the right temporoparietal lobe the temperature was high during the two days the boy was under treatment in the infirmary on the side of the abscess, the difference amounting to 3°F at one time shortly before death to 0.8°F. The right temp. 102.6°F the left 103.6°F. In another case of basal suppurative meningitis secondary to right-sided temporoparietal lobe abscess with middle ear disease in a woman of 23 who was under treatment for eight days the temperature was uniformly almost uniformly lower on the side of the lesion but the variation was rarely more than 0.4°F-0.6°F. In a further case of fracture of the left frontal bone with extensive comminution of the brain comminution of the orbital wall where I operated on April 22, 1986
in the absence of the medical officer in charge, there is slight variation in the temp. of the
two arthae - but the variation is quite
irregular - not always present - when present
only 0.4£ for 0.2£ until today (Apr 21st) it has
been as much as 20F. (100.4 on the right
side & 98.0F on the left) - the left being
the side of the lesion. this alteration has
preceded by some hours a manifest
though slight alteration for the worse
in the patient. I cannot find references
for this having been noted in cases of fracture
of the skull. It is not confined however
to cerebral cases. I have observed it in a
case of enteric fever under treatment here
in January of the present year. where the
difference in temperature in the last few
days of life amounted to 0.8 £ at times; the
sides varying now one benefitting, now the
other. In all, it must be due to some
profound interference with the thermotaxic
mechanism - a mechanism which seems
bilateral though under normal conditions
the two sides work together as they do in bilateral
movements of the eyes - yet in conditions of
disease - each may operate irregularly and so far independently of the other. What action there is must because taken through the medium of the vasomotor nervous system. Although the blood is of the same temperature whichever side it goes to, it would other things being equal tend to act as an equalising force in the temperature of both sides.

In the above six cases there have been no objective symptoms of localised injury to the brain; in the two succeeding cases No. 7 & 8 there were well-defined paralytic symptoms successfully relieved in one case - in the other so extensive as to be practically useless. The patient short recovery of full power of usage the ankle in Case 7 was undoubtedly due to the detachment of the cortex by the fragments of bone driven through the dura mater. The localization of the injury in so small a region is more indicative of this than of pressure from any hemorrhage. In Case 8 the interest lay in the complete aplasia existing along with independency
what was said to the child.

In both these cases there was profuse
venous haemorrhage on the withdrawal of
a fragment of bone; in both the haemorrhage
was readily controlled by a plug left in
position. The blood in one case arising
from a wound of the superior longitudinal
sinus - in the other from vessels in the
pressure of Sylvius.

In case 8, the pulse is first noted when
I took it on admission; it was only
moderately fast from 100-110, but that
day it went up with a bound and continued
to go up till just before death it was
beating over 200 per minute. The exact
case I could not possibly count. When the
child died both pulse and respiratory rate
slow down comparatively suddenly.

Death seemed to be due to combined failure
of the two great central functions without
any element of asphyxia, struggling
with several long drawn inspirations
succeeding each other after an interval;
so common a phenomenon of death.
Why Case 7. should have died so suddenly is a little difficult to perceive - the fracture of the skull was not in close proximity to the medulla oblongata - nor was the laceration in any other part of the brain. Possibly the acute disease may have had some connection with the sudden death; yet he had never had cardiac symptoms so far as I could ascertain from his relations. The fracture, again, was of a very extensive nature - running medially across one half of the skull - to have resulted from so slight a fall. Probably he had sustained a blow on his chin as well as on the right side of the head - this blow had driven the condyle up through the skull which, at that point, is a weak shell. And this being fractured, the crack would spread from the condyle in both directions. The strain on the skull from the blow favouring its extension. Fracture from this cause is not a very common occurrence. Waterston (Lancet 1830 ii 1/2) cites a specimen in St. George's Museum as showing it.
The tenth case was somewhat similar in nature to the 9th but much more severe as far as the skull concerned: and yet the patient lived four days after operation. The meningitis while case 8 a young man died in a few hours of shock. I have also under treatment at present a very similar accident with extensive comminution of the orbital plate where the patient is still alive on the seventh day, has never presented symptoms of meningitis but now showing symptoms of intracranial suppuration.

In the eleventh case it is to be regretted that an operation was not undertaken earlier before the abscess had attained the size it did. The symptoms at first at least were in every subjective & might have been the normal state for anything we knew except no friends to give us information on that point. Death may have been due to septic infection. But it is a little
difficult to understand if that is so.

In the twelfth case the result proved highly satisfactory - there being recovery with practically no residual symptoms.

Mansell Monline in the Lancet for 1884 I 456 recorded a case presenting many features of similarity attended with the same favourable results the bullet passing in on the right side a little above and behind the outer angle of the orbit. He made no note of any escape of cerebrospinal fluid in the case I record there was constant though slight escape for some days.

Bennet & Harter (1880-61) record a case of bullet wound of the skull - rather above and in front of the external auditory meatus on the left side - the boy developed episcleral traumatic epilepsy and died from abscess in the left frontal & parietal convolutions six months after the injury. In this case the bullet was found on the right side in the white matter of the
Frontal lobe laceration.

I have included Case 13 although it turned out not to be a case of fractured skull amongst the others on account of the difficulty of diagnosis it presented. An error of diagnosis was committed and nephrectomy undertaken, unnecessarily as it proved. But this mistake could not have affected the ultimate fatal result.

The history was imperfect and incorrect of the case on admission as that of a man who had sustained a fall of about ten feet and, in consequence, apparently a paralytic condition of the opposite side of the body to that on which the scalp wound was — the paralysis apparently deepening in the course of the eighth minute. It elapsed after admission of an admission there was no affection of the right 3rd cranial nerve such as was observed next day to delay an operation from the fear of basal lesion. The wound was superficial and there were no
Fracture in association with it but that of course went for nothing and do not exclude the possibility of a fracture of the skull. Morgan records a case in the Lancet for June 15th 1830 (x 1881) where there was a depressed fracture of the skull causing paralysis and convulsions associated with a scalp wound on the same side but quite apart from it - there being a distance of two inches between the scalp wound and the fracture. The fracture was not discovered till the scalp had been cut through so that in the case recorded fracture of the skull could not be excluded. There was no hemorrhage from ear or nose - point to a fracture of base. The possibility is considered most likely were intra-axial hemorrhage over the right motor convolutions - perhaps associated with a depressed fracture of the inner table. There were certain features that did not fit in with this diagnosis - there had been no convulsions such as one would expect in a case of progressive pressure on
a motor centre - but then for eight we
knew there may have been in the four
five hours between the accident and admissi
for paralysis was well marked on
admission. And convulsions are not unusual
concomitants of slowly increasing pressure.
Lance (Lancet 1890 Apr. 26 p. 887) records a
case of fracture of skull causing a wound
a branch of the right middle meningeal
artery & left sided hemiplegia where there
were no convulsions before the operation.
The pupil was slightly dilated on the
side opposite the injury which failed to
correspond with the case as recorded
Lancet 1892 Vol. 2 p. 905. Here the dilatation
of the pupil on the side of the injury as
a valuable diagnostic middle
meningeal haemorrhage - guiding Hutchinson
in support of this. But as this phenomenon
is ascribed to a precipitation of the blood so
as to affect the third nerve at the base
it need not be an unusual phenomenon.
The case might have been one of haemorrhage
into the internal capsule. But the man
was a thin young fellow who had
been recorded as occurring in association with head injuries - the combination is exceptional. Rehnberg was undertaken therefore under the view that while an operation might not be successful - it certainly could not make the man worse - that there was sufficient evidence to warrant me exploring the region of the right motor centres. As named there was nothing found beyond a somewhat abundant amount of cerebrospinal fluid. At no time or event did it seem to be some improvement in the symptoms, but this disappeared again on the 16th there was further development of the in the shape of left facial paralysis and partial paralysis of the right third nerve dropping of the upper eyelid from atrophy of the levator palpebrae superioris. Curiously enough the pupil still remained smaller on the right side showing that the 3rd was not completely paralysed. I could not settle the patient to move his eyes so as to satisfy myself if the other muscles
If the eyeball were affected—there was no strabismus however.

The combination now presented of left hemiplegia with paralysis faciei of the third right cranial nerve pointed to the right column of the cerebellum as the seat of the lesion. Jones and others regard this association as diagnostic of a lesion in the cerebellum. This was verified at the post-mortem when a large haemorrhage was found. The patient recovered from paralysis, followed by a return to a more severe extent of interest.

Probably the haemorrhage did not destroy all the conducting fibres, so allowing a partial recovery, while this power was again lost when a degree of inflammation set in in the injured tissues surrounding the haemorrhage. The patient died from concussion—The haemorrhage could not have caused the medullary paralysis which was the direct cause of death. The gradual invasion of the medulla is seen by the development of paralysis of the diaphragm.
some hours before the circulatory centre was seriously affected. Respiration went on from the action of the subsidiary centres in the spinal cord governing the intercostal muscles.

Bate in his lectures published in the Report (1880) drew attention to some points of importance in fracture of the skull. He lays stress on abscess over the mastoid as a symptom of fracture of the skull. I have never observed this in cases—although in Case 6—the fracture ran into the ear just behind the mastoid.

In no case either has there been the profuse hemorrhage from ear or nose some writers describe. Nor has there been the profuse discharge of cerebrospinal fluid. In Case 13—the Wassermann reaction was exceptional—accumulation of cerebrospinal fluid. Had there been a fracture communicating with the ear the symptom would probably have been present in this case.

In none of the cases have been noted
necrosis - probably from want of skill in diagnosis of an early stage - as the condition seems to be common in fracture of the skull.

Battle describes a symptom in fatal cases, associated with bronchitis - a clogging of the mouth with foamy mucus. I have not seen this in any of the cases of fractured skull. But I observed it lately in a fatal case after a subdural abscess suppurative meningitis over the cerebellum. The patient had no bronchitis as seemed breathing extremely strongly. She was restless, but the mouth without clogged up with foamy mucus. I tried to cause it away while I was doing so. Her respiration stopped. The pulse beating quietly about 70 per minute. The failure was not from asphyxia, but from respiratory paralysis. After a short interval the pulse two stopped altogether very rapid. The accumulation of mucus may be due to paralysis of the muscles of the mouth, preceding those of respiration.
would be likely to occur in any case causing interference with the centres in the medulla.
Fractures of the Ribs and Sternum.

While all authorities are agreed in the great rarity of fracture of the sternum - estimates vary as to fracture of the ribs. In Goutt's table of fractures already quoted - there are 52 cases of fracture of the sternum out of 5,200 - a percentage of 1.0%. While fracture of the ribs average 15.9% other estimates range from 10 to 18 percent.

Hamilton on the other hand is more cautious in his estimate. He says (p. 107) "Gibson records only 32 patients as having had broken ribs. If however I had always accepted the diagnosis made by the surgeons the number would have been much greater since I have been repeatedly assured that the ribs were broken when upon the most careful examination no evidence beyond the existence of a severe pain of difficult aspiration has been presented.

The total number of cases seen in the period noted is rather below the average - there being 85 cases out of 1,111 fractures - a percentage
of the course would have added one or two cases from the class of multiple fractures as in 1873 - a case of very severe shock was admitted in which the 1st to 6th ribs on the right side, the 2nd to 8th on the left, the sternum were fractured. There was excavation of the root of the right lung. Patient died practically on admission.

I have notes of 14 cases, all men, where the ribs have been broken. In all, the diagnosis has been made by the presence of crepitation in most these cases, subcutaneous emphysema. The cause has been direct violence in all the cases. Two cases have died - one somewhat suddenly without assignable cause after ten days, after a fracture on the left side, one on the eighth day after admission for fracture of the ribs posteriorly due to a fall on the back from a scaffold. His lungs were extensive and died manifestly of an acute pneumonia. A post-mortem was refused. A third case of death will be referred to under fracture of the helvis.
In one case fracture of the 6th and 7th ribs on the right side seemed to bring on an attack of acute gout - to which the man had been subject for a number of years.

There is a present under treatment a patient of very considerable interest from the extent of his injuries & the fact that he has recovered from them. He is a man aged 63 - a casket was admitted on March 12th 1836 with the history that he had been run over by a looey. He was in great pain and much collapsed from the injury. On examination I found that he had sustained a fracture of the ribs on the right side from the 2nd to the 10th - the line of fracture running through the ribs in the upper through the costal cartilage in the lower. There was marked oedema - the outer end being in front of the ribs. There was also a fracture of the 2nd left costal cartilage close to the sternum with projection of the outer end - a dislocation at the costosternal articulation - there was a transverse fracture of the sternum just above the second costal cartilages. There was considerable bruising and subcutaneous
Employing. He had in addition a fracture of the left leg, just above the ankle. I was unable to raise the depressed ends of the rib-casing device, I did not make many attempts as I did not expect the man to live. However, he showed signs of rallying—eventually slowly came around—being troubled for long of course by the difficulty of respirations, he could not fix the chest properly.

At the present time (April 16th) the sternum is united with some bulging forwards at the site of fracture. The projecting ends of the broken ribs on the right side are getty rounded. A third seam, called thrown out, the second left costal cartilage is still united. He can use painless on a deep breath—is getting up about the ward in a wheeled chair. I have not thought it advisable to let him use crutches yet. The sole treatment adopted was the application of a many-tied flannel bandage, the respiration was so laboured I did not deem it advisable to apply tragesse, for the
nile. For the cough he was given an expectorant
mixture containing Cale of Ammonia, Spirit.
Cohlen, salepinga, Hydrocyanic Acid.

The chest was not percussed for the
first fortnight as I did not deem it advisable
to disturb the patient; at a later period I could
find no evidence of any injury to impor-
tant. It is exceptional for such severe
injuries to recover, especially in a man of
this age. Buchanan (I 580, Ed. 1788)
cites a case of a young man who had
seven ribs broken on one side and five on the
other, yet lived.

It's a little uncertain whether the stemma
was fractured through the manubrium
or whether there was separation of the
joint between the manubrium and clavus.
The patient was old enough for the two
tissues united, the crepitus was that of
fracture. In either case, it was an
instance of the most common fracture of
the sternum. If we can use reduction
when an fracture is seen, fractures
through the clavus & oblique or
transverse being more uncommon.
In this case there was very little displacement - no overriding of the lower in front of the upper as is said by authorities to be true. All that was merely a projection at the line of fracture with abnormal mobility of the upper fragment and crepitation on movement. The fracture dislocation of the 2nd left costal cartilage is somewhat exceptional - the lower cartilage being the one usually broken as was seen in this case over the right side where the fracture ran through the cartilages 6, 7, 8, 9, 10, & 11 ribs. Of course at this age the cartilages would have lost most of their resiliency & become calcaneous and brittle, consequently more easily broken.
Fractures of the Scapula.

A comparatively rare fracture according to statistics—about 0.8 to 8% from Gralla's table already quoted.

I have notes of two cases—one of which is included in the introductory table—the other was associated with more severe injuries which caused the death of the patient in eleven days from admission.

Accepting Thomsen's Classification (p. 343) both belonged to group 1 of the eight groups into which he subdivides fracture of the scapula.

Case I. S. aged 13 was admitted August 9th, 1898.

He was leading a horse in a field when it ran away with him, dragged him off his feet, and struck as he was still holding on to the bridles with his arms outstretched in front of him; the horse kicked him in the right armpit.

I saw him within twenty minutes of the accident and found the right arm hanging uselessly—the patient being unable to move it; the right shoulder drooped—the bone irretrievably tilting his spine.
There was bruising over the right scapula and a moderate sized swelling. On palpation there was a comminuted fracture of the body of the scapula. The lower fragments being driven up between the ribs of the bone and the chest wall. There was a marked indentation in the anterior border of the bone. There was a haematoma over the fracture. Reduction was attempted but in no position of the arm could I get sufficient purchase on the lower fragment to bring it down into line with the upper. As a result I simply applied a bandage to keep the arm at rest & kept the boy in bed.

On Aug 20th. The swelling had subsided. The deformity in outline was evident. The indentation of the anterior border of the scapula about its middle - many ones finger down one felt the projection marking the lower end of the upper fragment. All movements of the arm and shoulder were quite free, no matter displacement.

Case II. In this case the fractured scapula was comparatively unimportant. A young man aged 19 was admitted June 17th 1833 after falling down a well a distance of over 70 feet. He struck his head several
times in gaiting as far as could be made out. fell on his back at the bottom of the well. In addition to his severe head injuries there was a shattered fracture of the lower part of the body of the scapula communicating with an external wound. There was no fracture of the ribs. Patient died of his head injuries in eleven days time.

In the first of these two cases the scapula was in the position most exposed to fracture. The arm fully extended at the axillary border coming well forward. Had it not been for the scapula the blow would have fallen on the ribs with probable more disastrous results.

Hamilton's conclusion is that inability to effect reduction in the case of displacement is of very little consequence. This case certainly supports this view as there was no interference with function whatsoever.

As treatment he (F 197) recommends the application of a roller bandage with the patient recumbent. The others fractures of the scapula are of rare occurrence with the exception of
Fracture of the acromion. Estimates have varied as to the relative frequency of fracture of this bone—some going so far as Dame who stated at a meeting of the Medical Chirurgical Society that he had in the past twenty years found the acromion more frequently fractured than any other bone. Although I have seen cases of localised tenderness over the acromion I cannot recollect a case where I felt myself justified in diagnosing a fracture. Again, as to the same statement one must bear in mind that was investigated laid before the Edinburgh Medical Chirurgical Society June 6th, 1826, to the effect that there was a condition of separate acromion processes simulating fracture.
Fracture of the Spine.

There have been under observation seven cases of fractured spine during the period of five years - taken in - they represent a percentage of 0.03 which is a little higher than the percentage in Gull's tables but the cases are too few for comparison. Of these seven, four have been through the cervical region - all died - three have been in the dorsal region - two died - one of them having associated a fracture of the femur.

One of these cases came under my own observation - four others - the four fractures of the cervical region were examined after death. Portions of the spine removed and preserved in the museum by the pathology house surgeon.

The first case was one of fracture dislocation of the lower dorsal vertebrae where the patient recovered from the shock of the accident but remained with complete paraplegia of both lower limbs.

E. Ward 42 was admitted July 22nd 1895. He had been engaged among the wooden framework of a furnace chamber in some chemical
works when the whole structure collapsed &
he got wedged amongst some of the beams.
Patient on admission complained of very
severe pain in the back & was unable to
move his legs. On examination there was
abnormal prominence of the lower dorsal
spines the 10th, 11th, & 12th & obviously
the 12th was the most prominent. There
was evident a fracture or fracture dislocation
of the lower dorsal vertebra causing pressure
on a lesion of the lower part of the cord & the
spinal nerves. There was on admission
complete paraplegia of both lower extremities with
entire absence of sensation from the pelvis
downwards. There was no micturition reflex
& the superficial reflexes were also absent.
This was the condition 1½ hours after the
accident. It was deemed advisable to
anaesthetize the patient & attempt extension
to pelvis & shoulders. But there was no
alteration in the contour of the back or so
doing, & no further attempt was made.
A patient was placed on a water bed & left alone. The pain in the back subsided
after a day or two, on the 25th - three days after admission the condition was as follows. There is complete analgesia of the lower extremities - all the muscles of the leg, thigh, buttock being affected. The abdominal muscles in the abdominal wall are not affected. All sensations are completely lost on both sides below the middle of the thigh. On the left side sensation is present over the abdomen, upper part of the thigh, extending rather lower on the outer aspect than the inner. On the right side there is also sensibility to touch over the lower part of the abdomen and upper third of the thigh, also extending rather lower on the outer aspect but sensation on the right side is not so complete as on the left. Patient replies to questions being hesitant and less accurate than when the left side is touched. Sensibility to pain to heat and cold is also affected similarly to sensibility to touch. Posteriorly there is anaesthesia over the sacrum. I did not unfortunately determine the upper border of the anaesthesia.
Anteriorly there is complete absence of sensation to the level of the malleoli, & probably rather below this - but at the level of the anterior superior spine on the right side there is certainly some impairment of sensation. Localization of sensation is rather less perfect than discrimination between a touch & a prick. Patient often failed to localise more closely than two inches over the thighs. There was no patellar reflex & no plantar gluteal cremasteric reflexes on either side. Patient had had complete retention of urine since admission & required the regular passage of the catheter, but by this date (the 25th) he began to complain of pain & weakness of the left leg with a distended bladder. The bowels moved on administration of an enema, otherwise there was marked & rapid muscular wasting in the course of the ensuing weeks & no alteration in the area of sensibility.

I give merely a resume of the case not full detail on every point.

On July 23rd, the day after admission the
Following measurements were made:
R. Thigh (middle) 17 in. Left 17 inches.
- Leg 11 3/4 & Leg 14 3/4
July 28.
R. Thigh - 16 " Left 16 1/2.
- Leg 11 " Leg 11 1/2
Aug/1.
R. Thigh 15: L. Thigh 15 1/2.
Leg 10 1/2 Leg 10 3/4.

The leg then showed most wasting of the condition was more marked on the right side - the side where sensibility was most affected. Wasting continued till eventually there seemed to be no muscles at all around the bones of leg & thigh.
Sensation was tested from time to time & found not to vary appreciably from the note made save that it became more definite on the right side over the abdomen & upper part of the thigh but the lower limit remained the same as before in either case on Oct 6th about 2 1/2 months after the accident.
The bladder condition varied rather, amount there was at first complete retention
return the passage of a catheter regularly. This lasted for a fortnight or rather more. Still one occasion when the patient had been left rather long without attention, the distended bladder emptied itself - thereafter he had incontinence, not a constant dribble away, but an intermittent evacuation without the patient having any control over it. The urine had become ammoniacal before the retention passed. If the bladder was washed out daily for some time a boreoacetic solution was given internally. This relieved the cystitis - in about six weeks the urine was tolerably clear. The patient did not require a catheter passive at all. The bowels were never moved unless after an enema.

Patient was very anxious to believe that she was getting better and after about ten weeks declared that she felt more needles prick in his legs. But examination revealed no alteration in sensibility. still the complete loss with complete atrophy of the muscles which did not react to an electric current at all.
He was discharged amenable 23rd 85 in a fairly good condition of general health apart from his paralysis.

Before considering this case I should like to submit the result of an examination of the four specimens of fracture dislocation in the cervical region—illustrating the pathological features of a fracture of the spine. They occurred in four men—two were the result of a fall on the head; one was too drunk to tell how the accident happened; the other I have not the cause. The first in order of time was a millworker aged 32—admitted Sept 20th 1891—died Sept 25th. The next a porter at the station aged 15—was admitted Oct 26th 1891—died the 25th. He died of phthisis.

The third—a carpenter aged 21—was admitted Dec 7th 1891—died on Dec 25th. 1891.

The fourth a labourer aged 50 was admitted June 28th and died 11 1/2 weeks.

Two of the specimens show fracture—dislocation affecting the 3rd—6th—other two the 6th—7th cervical vertebrae.
In the first specimen there is a fracture across obliquely backwards through the body of the 5th cervical vertebra, commencing at the articulation of the lower part of the body of the vertebra. The line might be represented in a transverse section as above: the cavity of the neural canal was slightly encroached on but there was no laceration of the dura mater. The interspinous ligament was torn between the 2  3rd spines. There was a transverse fracture through the lamina of the 6th vertebra on the right side, a separation of the 5th & 6th articular processes on both sides, from laceration of the capsular ligaments. The dura mater was intact & the cord was merely slightly compressed. No microscopic examination was made on this or any other specimen.

In the second case the dislocation was so marked as to practically obliterate the neural canal. The posterior corner of the 
Body of the 6th cervical vertebra touching the lamina of the 5th; there was at the same time a fracture through the body of the 6 cervical vertebra as represented by the blue line marking the fracture-dislocation. In addition there was a complete bilateral dislocation of the articulations between the 5th and 6th vertebrae — the articular surfaces of the 6th overlapping those of the 5th — with course complete laceration of the capsular ligaments. The cord was completely lacerated.

In the next case there is a fracture through the anterior part of the body of the seventh cervical vertebra with projection backwards over the interarticular disc. A considerable stripping of upper surface of the 7th cervical vertebra — the anterior and posterior common ligaments were lacerated. The spine or laminae have been chipped away in the specimen so the injury to them cannot be made out. The spinous laminae are chipped away removed — but it can
only have been compressed.

In the fourth specimen there is a fracture through the anterior part of the 6th cervical vertebra with projection backwards of the intervertebral disc. The cord is compressed but not broken. There is intradural haemorrhage surrounding it at level of 1st and 2nd dorsal vertebra. Haemorrhage posteriorly below the spines of the 6th and 7th vertebra.

The spines with one found but there is laceration of the capsular intersegmental ligaments binding the 6th and 7th vertebrae together. The third and fourth specimens might be represented diagrammatically thus:

![Diagram](image)

In none of these cases was it possible to reduce the deformity after deathly the moderate use of the manipulation mea-

sure during life. The second specimen was of course an illustration of severe anoxia - the patient only living 1 1/2 hours.
that our treatment was harmless. Reduction could not have altered the fact that there was complete laceration of the spinal cord. In the other three, the projection into the neural canal was caused by the severity of the crush. The opposed surfaces of vertebrae at the intervertebral joint being crushed together by the fall on the head (which was the injury in all three) forced backwards along the line of least resistance so as to form a distinct projection into the neural canal compressing the cord. If manipulation could have rectified this same one which would have decreased the cord from its severity, amputation would have spared the brain. If the canal at the point of projection saved the posterior columns from compression but could not have prevented the cord being bent over this projection allowing which would probably have caused motor paralysis to persist. In one of the cases of course the injury to the cord itself is probably of a very severe nature from the
extensive haemorrhage round it within the
ducts. Thus though only one of the four
cases presented evidence of very great
displacement with the fracture - none of the
other three afforded - on pathological
examination - much hope for laminectomy
being successful - had it been undertaken

With regard to the case of fracture of the
lower dorsal region in which recovery took
place - the points of most consideration
are - the site of the lesion - the extent of
another whether laminectomy would afford
any hope of even partial recovery. The injury
affected the lower dorsal vertebrae - the 10th
and 12th. The cord of course was injured in
the lumbar enlargement - part of the
injury may have been to the cord - part
to the lower dorsal and lower lumbar nerves
originating at a higher level or applied
to the cord at the position of injury before
they ran out through the intervertebral
foramina. From the indication yielded
by motor paralysis every nerve below
including the 2nd lumbar was affected
as the extensor muscle was paralyzed.
which is supplied by the 5th lumbar root
through the genito-rectal nerve. The abdomenal muscles which are supplied
from the dorsal roots were not affected
the muscles of the both thighs and legs
especially the latter wasted markedly
rapidly. Upon that one would be warranted
in concluding there was destruction of the
corona that supplies the anterior rami to from 2nd lumbar
downwards or else complete rupture of
the nerve after they left the spinal column.
From the sensory disturbance in this case
there was permanent complete anaesthesia
in the region supplied by 4th and 5th lumbar
and the sacral nerve roots. There was
initial loss of sensation over the areas
supplied by 2nd and 3rd lumbar roots.
on both sides - there was interference
with the sensibility in the area of supply
of the 1st lumbar on the right side but
the pain there was ill defined radiating
there was never at any time an area of
hyperesthesia. The distribution seen
above is that accepted by Jackson
Bay in his Clinical Medicine.
The extensor superficialis reflexes were abolished completely and never returned.
Reynolds in an exhaustive paper in "Brain" (1876 pp. 150) considers the condition of the reflex in total transverse lesions of the cord. As a result of an injury totally dividing the cord in either in animals or man it has always been taught to hold to the view by many of the best observers that after a period of shock, during which the reflexes are absent: the reflexes supplied by the parts below the injury gradually increase till they become excessive and a great muscular rigidity sets in a condition similar in fact to that which occurs in brain lesion. — A contradiction of this view he quotes Bowley — who found in eleven cases of complete crush where the patient lived more than three days the element of shock could be eliminated — there was total paralysis of sensation, emotion below the lesion. The same was retained. The face pressed unconsciousness. The deep reflexes were permanently lost in all the cases.
The superficial reflexes were generally lost immediately after the accident. They, unlike the deep reflexes, were returned in course of time. In these cases of partial paralysis of motion a sensation the muscles were in a state of rigidity, the reflexes were all increased.

Reynolds further quotes Morbison as concluding that in total transverse lesions of the cord, from injury both the superficial and deep reflexes are permanently abolished. It is only in partial lesions that there is retention or exaggeration of these reflexes, while the abolition of the reflexes is the result of isolation of the spinal centres from their cerebellar connections. All the cases were due to injury — in all except two the injury was above the medullary region, in all there was no evidence of the lumbosacral region being affected.

The injury in the case I have cited was probably at the upper part of the lumbosacral enlargement except at the lumbosacral nerve roots as well as the cord — that there was a complete transverse lesion.
the cord seems hardly likely. The patient had retention with overflow incontinence for a few days indicating that the lumbar centres were not destroyed - even the first day or two he declared there was urine if the bladder were allowed to get distended - plus could only have occurred had there been a communication between the posterior column sensory bladder centre in the medulla enlargement & the cerebrum - later on this passed off as well as the retention until bladder never contained more than a few drops of water - probably from the secondary transverse lesions causing total destruction of the cord. There was never paresis which has been mentioned as a condition present in total transverse lesions of the cord above the lumbar enlargement. The presence in the bladder was the only evidence I got of retained sensibility in the region supplied by the sacral nerves. That the injury affected the nerve roots and nearly the cord as shown by the ill defined upper border
sensory sensibility and the absence of any area of hypesthesia.

Thorburn (Brain 1883 f. 357) has pointed this out—that the anaesthetic area resulting from disease or injury of a nerve root has a jadumpagin.

The left lumbar on the left side was unaffected—but on the right was probably compressed or injured whilst the second & third were inter-connected with on both sides—the third entirely destroyed so far as its motor root was concerned. The paravertebral adductors & flexors of both thighs have paralyzed & also subject to muscular wasting & loss of electrical reactions. Again consciousness persisted over part of the area supplied by the third lumbar even in the area of the fourth lumbar. There was some sensibility. The nerve roots would be of course lighter than the cord & more resistant so that they were not entirely destroyed is shown by the occasional feeling of pins & needles down the thigh as below the knee—through when tested actual sensation.
did not extend so low.
It is unlikely that lammetony would have been of any service here: the injury to the cord itself & to the nerves was the seeming so severe, after condition pointing to a lesion nearly complete except nerve a compression.
The condition of the spine's cord now is of course merely one of conjecture. Probably there is complete fibrous transformation of the cord about the level of 11th or 12th dorsal vertebrae, with involvement of the lumbar nerves as well as blown out.
The man's condition has just been reported to me (April 21st) 9 months after this accident. He has still incontinence of urine, requires enemas for evacuation of bowels also, the same distribution of the paralysis of sensation & motion but is a little stronger can sit up in bed with some assistance when no bed soles although there is a tetanic condition of the skin of legs & thighs indicating some tension disturbance. There is complete muscular flaccidity.
Fracture of the Clavicle.

The clavicle, according to most writers, is, excepting the radius, the most frequently broken bone. In Simmons' table (p. 323), quoted from Holmes' System of Surgery, fracture of the clavicle constituted about 28.5% of fractures of the upper extremity treated at Middlesex Hospital during fifteen years, while in a table given (p. 335) compiled by John T. of fractures treated at the London Hospital for a period of 35 years, fractures of the clavicle constitute 15.1% of all fractures in a total of nearly 52,000.

As previously mentioned, there have been treated 99 fractures of the clavicle out of a total of 1111 treated in five years—yielding a percentage of nearly 9.

Fracture of the clavicle is however held in very high esteem by people here; they are more concerned at a fractured forearm than a fractured clavicle. The bulk of the cases are treated by private practitioners.

One would expect amongst one's records to find...
football accidents claiming a fair proportion of cases of fractured clavicle. On the contrary however, out of thirteen cases which I have treated here, I find only two were football accidents. Two others occurred from indirect violence, while the other nine had some special feature in addition causing them to be brought to the Infirmary.

In one case, the fracture was very oblique—i.e., a navy set 65' who presented himself Dec 23rd, 1886 with a history of having fallen in a quarry on to his shoulder three days before. The fracture was through the outer part of the middle third and was very oblique with a considerable amount of overriding. I kept him in the hospital for a time, the more so as he was very refractory to treatment and generally succeeded in waggling his arm loose in a day or two after it had been put up. On his discharge on Jan 20th there was still a large amount of callus a marked shortening. About a year before, he had had a blow on his left shoulder which he had left
untreated. As a result of the accident he had impaired mobility in the direction of abduction - he could not lift his arm to his head. There was some deformity about the outer end of the clavicle - possibly he had sustained a fracture there.

Five cases have been the result of direct violence - two were associated with severe head injuries. In both the fracture was transverse - in a third a man aged 27. a bolt weighing six lbs. had fallen on his shoulder - beyond slight dimpling of the shoulder there was no deformity. Union took place without much callus being formed.

A fourth - a girl aged 17. came to outpatients Sep 6th complaining of pain & mobility to use the right arm - two days before a basket of boxes had fallen on her shoulder. There was distinct formation of callus with pain & crepitus on manipulation but no displacement. In both these cases the fracture was rather outside the middle and was transverse.

A fifth case - J. E. a drayman aged 27. admitted Dec 12th 1896 - resulted from a wheel of a
drag passing over the man's chest, neck.
He was much collapsed on admission and
remained delirious during the rest of the
day, for several days complained of
severe pain in neck & upper part of the
sternum. I could make out nothing at all
beyond a bruise on examination, she complained
of no pain over the clavicle. On examining him
twelve days after I allowed him to
get up I found a fracture - transverse -
through the middle third: a small
amount of callus had been formed, no pain
being got on manipulation but there
was no displacement. This fracture I
treated simply by a splint supporting the
elbow not did perfectly well.
It is unlikely that these were cases of
incomplete fracture described by
Hamilton in his treatise (1856) as he
describes all cases of incomplete fracture
as due to indirect violence - the age
moreover was in favour of complete fracture:
The fragments probably being united by
fibrous tissue and not having moved
from their original position. In the case just quoted, though
the probability is all in favour of direct violence from the nature of the injury - the amount of bruising was comparatively trifling.

The next case of fracture of the clavicle from direct violence presented features of special interest which induced me to record it in the Quarterly Medical Journal for April 1886 as - A Case of Pneumothorax from Fracture of the Clavicle by Direct Violence — Recovery.

On the afternoon of Sep. 6th, 1884, H. W., a colored aged 27, was brought to the Halifax Infirmary, with the history that he had fallen off his cart on his head and that the cart which was a light one unladen had gone over his chest. The wheel passing obliquely over the right clavicle and left side of the chest. Patient was suffering severely from shock, though conscious, was quite unable to give any account of the accident. The lips were pale, somewhat cyanosed, hands and feet cold. The respiration laboured, the pulse feeble and rapid. He was admitted, and on examination found to have sustained a fracture of the
Left lower jaw and a simple fracture of the right clavicle about its middle. There was slight bruising about the chest where the wheel had passed over him but no fracture of any of the ribs. The patient's injuries seemed moderate to account for the severe collapse, but nothing further could at this time be discovered. There was no head injury as far as could be discovered. There was no indication of rupture of the subclavian artery or vein, no swelling about the shoulder or arm, nor any difference in the two radial pulses.

Patient's temperature on admission was 97.6. He was kept warm, an ounce of Brandy was administered by the mouth, and in a little time he rallied.

At 3:30 p.m. Found him again much collapsed — pulse feeble — 110 beats, respirations accelerated and bloomed. Patient was very restless, occasionally delirious. He had vomited at intervals since admission, the ejected matter being stained with blood from the fracture of the jaw. He had no cough. One hundredths of a grain of sulphate
A strychnine was given hypodermically, but
patient relieved very little and during the
night his state was very critical.
Next morning (Sept 7th) patient's condition
was as follows: the face showed great
anxiety; his breathing was rapid, varying
between 50 to 60 respirations per minute
caused much embarrassment. The extra-
ordinary muscular respiration being
brought into play. The pulse was 160 per
minute. Feeble beat. Temperature 98.6 F.
Patient was most comfortable with his head
and shoulders raised. He was very restless
and had partly got his right arm out of
the bandages applied to keep the fractured
clavicle in position. On examination of
the chest the right side was seen to be
in the position of complete inspiration,
the right intercostal spaces were effaced,
and there was no movement of the right
side save what was caused by the very
rapid laboured action of the left. On
percussion there was a tympanic note
all over the right side in front. The liver
was displaced downwards, liver dulness
was obtained at the seventh rib in the right mammary line. The heart was displaced to the left, the apex being in the 5th left intercostal space 1½ inch outside the left mammary line. Cottely, the percussion sound was very hyperresonant in the right suprascapular region and below the seventh rib. This hyperresonant sound was continued sound into the axilla and merged into the distinctly sympathetic note got in front. In the interscapular region the percussion sound seemed to be the same on both sides. Auscultation over the right side in front, the respiratory sound was faint and distant, distinctly bronchial in type, and inspiration was accompanied by numerous fine ruminations, almost metallic in character. Posteriorly, in the interscapular region, respiration was aphonic on the right side, in the right suprascapular at the base and in the axilla it was similar to the respiratory sound in front, only less distant. The bruit d'airain was obtained
over the right side of the chest. Vocal resonance and vocal fremitus could not be satisfactorily tested as patient could not get to speak above a whisper. The condition of severe dyspnoea continued for several days, the physical signs remaining practically the same. The temperature rose to 107°F at 6 p.m. on Sep 8th at 6 a.m. on Sep 9th was 98° 4°F at 6 p.m. on Sep 9th 103°F. Thereafter the evening temperature gradually fell and coincidently patient passed out of his critical condition. The respiration became less hurried, the right side of the chest less distended as the percussion over it less hyperresonant. On Sep 12th patient began to be troubled with a hacking cough without expectoration. For this he was ordered.

By the 18th the evening temperature was 98° 6°F. The cough was less troublesome and respiration varied between 20 and 30 per minute. On examination of the right side of the chest
The percussion was still hyperresonant down to the sixth rib anteriorly. The apex of the heart was in the 5th left space 1/2 inch external to the nipple. Respiration was deficient on parts over the right side: at the level of the 3rd riban front it was of loud blowing character but scarcely amphoric and was accompanied by constricting respirations. Dulness was got at the 8th rib in a line vertically downwards from the lower angle of the right scapula. An exploring syringe drew off some blood-stained fluid. Patient steadily improved, the conditions gradually subsiding. Two months after the accident no evidence of the previous condition could be obtained on examination of the chest. There was no difference in the range of respiratory movements on the two sides. The percussion sound was equally resonant at corresponding points. Superficial dullness began at the 6th rib in the right mammillary line. The apex of the heart was in the 5th inter space about 1/2 inch internal to the left mammillary line.
There was no evidence of pleural effusion. The left lung extended 2 1/2 inches above the clavicle as determined by percussion. The right slightly over two inches (this difference remained two months later). Both apices were thus slightly higher than is customary. The respiratory sound was normal over both lungs. There were no accompaniments. Vocal fremitus and resonance were both slightly greater on the right side.

The fracture of the clavicle united perfectly, but there was delayed union of the fracture of the jaw. There was some necrosis and an abscess formed externally 1/2 inch in front of the angle of the jaw. Patient was discharged on Jan 17, 1886.

I have seen patient once or twice since then. He remains fairly well. Has slight cough and does not hurt on flesh. Six months ago I attended his mother with whom he lived for cancerous pulmonary tuberculosis which proved fatal.

Pneumonic pneumonia is not at all an
uncommon occurrence from fracture of side, but I can find no references to any cases occurring in association with a fractured clavicle. In this case, there was no evidence of the fracture — had the bone been broken, it would in all probability have been on the left side, over which the wheel of the cart passed most. Thus in this case there are really only two feasible hypotheses: (1) that the pneumothorax was really caused by the jagged end of the clavicle; (2) that the pneumothorax was one of those cases, which West mentions for arising simply from pressure without there being any injury to the important nerves or vessels. I'm not aware of several cases of spontaneous pneumothorax arising from fracture of clavicle without any injury to the important nerves or vessels adjoining. These cases then establish the possibility of the lung being wounded by a fractured clavicle without other injuries. If this is so, there is no greater improbability that pneumothorax will result than in the case...
The fractured side-subtendinous emphysema is common from fracture of ribs while pneumothorax is as decidedly uncommon, still it does occur. Thus it may fairly be argued that the association of the fractured clavicle and pneumothorax is a causal one, quite apart from the theory of trauma.

I have records of two cases of fracture of clavicle from muscular action.

The first case, a strong well-developed man, aged 27, came to the dispensary on April 26, 1886, complaining of pain in his left shoulder. That morning he was raising from a stooping position with a load of iron bars on his right shoulder, steadying them with both hands grasping the end in front. The load tilted a little, she made a sudden grip with his left hand to prevent the bars slipping off. He felt something snap about his left collar bone and was unable to use his left arm for the rest of the morning without pain. On examination I found a good deal of thickening of the bone in middle third; crepitation was felt on movement. There was slight drooping of the
left shoulder—otherwise there was no displacement to patient could move the arm fairly freely although it ached him. Patient was quite clear there had become fall on the left shoulder & the weight was entirely on the right. Evidently the accident had occurred from a sudden strain caused by the pectoral major—while the minor a tight group of muscles posteriorly kept the shoulder joint rigid—thus all the strain of the contracting pectoral would bear on the clavicle. The fracture united readily.

The other case I had considerable hesitation in attaching any credence to, but the account was so clear & unvarying:

J. C. set 67 a cabinetmaker was seen at home on Sept 15th '94 & found to be suffering from an exacerbation of his customary bronchitis. But he gave the history that a week before he had had a very severe attack of coughing which he felt something snap and had pain in his left collar bone. Next day he went to a doctor who told him his collar bone was broken.
When he came under the Infirmary a week after this had happened there was a large thickening about the inner third of the arm just outside the biceps ligament. Crepitation was felt on movement. The patient was perfectly clear about the occurrence and it is possible that the fixation of the shoulders in the violence of limb may have caused the fracture; for there had a fracture, however caused is beyond doubt.

(p. 332)

Stimson refers to two papers by Delens (Archives Generales 1873, 1875) giving particulars of eight cases of fracture of the inner end and sixteen of fracture of the body, and Hamilton (173) gives two cases of his own due to muscular action.

Ishmeid have mentioned well refer to the last case that there was an exaggeration of the normal bend forwards at the fracture so that the fractured end.

quite firmly eventually.

The eleventh case of fracture of the clavicle of which I have notes occurred in a boy aged 12 who came into the Infirmary Oct 19
1894 with acute suppurrative periostitis of
the left femur. He had had according to
this doctor's statement an acute suppurrative
periostitis of the right clavicle about a month
previously, and no invasion had been made but
this condition had subsided. There was
no signs or any evidence of disease of the
clavicle on admission beyond slight
thickening. The boy was in a strange
mental condition on admission—almost
maniacal requiring at times considerable
restraint put on his movements for about
three weeks. Thereafter he became
quite rational. About six weeks afterwards
that is about two months after admission
the clavicle broke about it immobile
as he was tumbling in bed & in the course of
a week a sinus formed leading down to
the bone. The case would be described
as one of pathological fracture—the strange
point here was that the bone did not break
when the boy was restless & reared often
in the bed. I think the curves of the bed
but at a later stage from
a much slighter strain. Eventually perfect
union took place of the separation of several
The fourteenth and last case is one of gunshot wound of the clavicle. The chief importance of the clavicle in which however was that it served to deflect the bullet to cause a fatal injury.

J. W. G. a boy of 16 was admitted 9th Dec. 1899 at 7:40 p.m. with a gunshot wound below the left clavicle - self inflicted. It happened about an hour or 15 minutes before admission. On admission he was much collapsed, very pale, restless. Feels rapid pulse. Pulse was conscious could speak but would give no account of the injury. There was a small wound just below the left clavicle about 3/4 in. in diameter. The left clavicle was broken. The wound was numerous small points. The skin just around was blackened. There was some blood on this shirt but not much - no oozing from the wound. On palpating. Nervous was felt. Patient complained of much pain in his legs but was able to move them freely. He got gradually feeble and died apparently.
from internal haemorrhage at 9.40 p.m.

I made a post mortem on Oct 23. The
skin & muscle were reflected by incision
along the upper border of the clavicle and
a second incision in the middle line.

The chest was opened in the usual
manner, the pleural cavities being at first
left unopened. On reflecting the muscles
from the clavicle the bone was found
splintered on its inner side. The clavicle
was then disarticulated & an open found
lying between the cavity in the clavicle & the
rhomboidal ligament from which blood
welled up freely. On gaping the left
pleural cavity the left lung was found
collapsed and the cavity filled with dark
glazed blood. The stump seen above
opened directly into the pleural sac. The
lung was not wounded. On further dissection
the blood was found to come from a large
rent in the left subclavian vein just close
to its junction with the internal jugular.

On further examination the body and
left transverse process of the first dorsal
vertebra were splintered. The bullet was
found flattened and imbedded in the bone.

There was haemorrhage into the spinal canal;
but the cord seemed intact.

The pistol had been fired upwards and
slightly outwards (from the back down to the
clavicle), the bullet after splintering the
clavicle had been deflected from its course
passed backwards - almost transversely
and slightly inwards towards the middle
line - the probability is that the haemorrhage
into the spinal canal explained the pain
referred to the legs.

With reference to the treatment of fractures
clavicle there has only been one case out of the
whole number where the treatment presented
any difficulty - that of J. C. where the
fracture was oblique. Patient was so
intolerable of restraint that as soon as dressing
was done in less than a day the same thing
happened even when a flannel roller was
applied over the dressing. As a result I
simply kept the arm as quiet as possible &
kept the man in bed. The fracture united
but with considerable shortening.
In cases treated as out-patients I prefer to use Sayre's dressing as a rule. But in certain cases I have found that the patients could not endure it; it caused so much irritation to the arm. In these cases I have used a plaster roller applied after the method of Dr. John Duncan. In no circumstances have I used an auxiliary pad—nothing beyond a layer of wool where two skin surfaces were opposed. In cases where the patient has had to be kept in bed, the treatment by means of an ordinary bandage to restrain movements of the arm has been quite sufficient. The recumbent position itself rectifying part of the deformity.
Fractures of Upper Arm.

These constitute according to statistics about 8% of all fractures.

I have treated 27 cases of fracture of upper end of the humerus. Two of these had been fractures of the shaft part of the humerus. Both in women, one aged 59, the other 67. Both were produced by a fall on the shoulder, that in each case there was shortening amounting to an inch in one case. When seen some days after the accident the swelling was considerable & excluded any exact diagnosis as to the kind of fracture but they were in all probability instances of the common fracture of the supraclavicular neck. Recovery was tedious; the shoulder-bell jump movement impaired for many months. In fact both patients passed from under observation with imperfect movement at shoulder, inability to abduct rotate or extend fully.

Case 7. This case presented great difficulties in the way of an accurate diagnosis.

The patient, aged 14, a laborer, fell down a flight of stairs with a distance of about eight feet height.
on the front of his right shoulder. This happened early on Oct 22nd, 1838. Patient did not present himself at the dispensary till evening. On examination there was very extensive bruising all around the right shoulder, over the pectoralis major, deltoid muscles down the inner side of the arm, a very great swelling but, as far as could be made out, no deformity other than the swelling. The arm hung by the side and patient expressed himself as quite unable to use it. The clavicle and acromion were intact as far as could be determined that there was no fracture. On manipulation a flexion was got high up over the shaft, a provisional diagnosis was made of fracture - possibly through the surgical neck. I kept the arm in lead, applied lead and pinned the arm in a sling. A week later, when much of the swelling had subsided, I made a further examination. There was evidently no fracture of the shaft of the humerus. The head of the bone was in the glenoid fossa rotated with the shaft - there was marked antero-posterior thickening and fusion of the bone in the neighborhood of the
the shaft rotated. There was still
caliber swelling; however, a gap
could be made out between the greater
head and the shaft. Patient had
now power of movement in the arm could
abduct and extend; did not seem able
to rotate. I considered the question of
the exact injury; one could exclude with
certainty any injury to the clavicle or
acromion; there was also no dislocation of
the head of the humerus. No fracture at
the surgical neck or the head of the
humerus felt in the axilla moved
with the shaft. Palsie at the accident
is one was driven to the diagnosis of fracture
of the greater tuberosity from direct
violence. The patient having fallen directly
on the forwards on to the shoulder. If this
were a fracture of the greater tuberosity it
was not accompanied by any dislocation—
according to Thomson (19362) this fracture
is as a rule accompanied by dislocation
of the shoulder. He cites illustrative cases
given in detail a case of his own of fracture
By muscular violence & separation of the greater tuberosity from the shaft. He verified his diagnosis by passing a pin between the shaft and the trochanter. In the case mentioned I did not employ any such method of verification but made the diagnosis by a process of exclusion of other possible injuries in addition to the history of a fall on the projecting greater tuberosity — the presence of symptoms of rotation — the increase in size of the upper part of the bone when the superficial swelling had gone down & the impaired mobility after the first week. The man was discharged at his own wish on 25th & shifted out of our cognisance altogether.

There have been seven cases of fracture of the shaft of the humerus about the middle — two, rather oblique in women of 17 & 36 years respectively — both united rapidly without deformity — one, a woman of 36 — was seen first March 7th, 1896. She is at present (March 1896) in the wards for rheumatic gout. It is just possible to tell that there has been a fracture from the slight thickening that at present remains. There is
perfect union accompanied movement of the arm and pain except on a change of weather. A third case occurred in a boy aged 2 - a transverse fracture resulting from a blow. A fourth was in a man of 49 who sustained a transverse fracture of the left humerus accompanied by a fracture of the left radius-ulna. Recovery was complete in both these cases. The fifth case of fracture of the shaft occurred in a boy the subject of congenital syphilis with great deformity of the ends of most of the long bones with necrosis of both frontal bones. He was removed from bed, supposing himself on his left arm when it snapped about the middle. Very little cellulitis was thrown out but fracture united readily. Admitted the boy three months later in order to remove the necrosed frontal bone; but that time there was firm union of the fracture. [485].

In the absence of fractures occurring in syphilis, but the cases he cites are of acquired syphilis. The case I have cited occurred in a boy of 19 who had the mental and physical development of a boy of 12. There was a well marked history of syphilis derived from the father.
and a history of varous affections of the
ends of the long bones from the age of 4 onwards.
He had had necrosis of the frontal bone
resulting from a fall for six years. The
arm is quite useful now. Recovery occurred
without any antispastic treatment.

The case - one of Compound Fracture
of the left humerus with fracture of the forearm
in a log of 16 presented nothing noteworthy.

One W.D. a laborer was admitted on the
evening of March 16th. He walked into the
accident room, constantly a stupid. Could
give no account of his injury but it seemed
that he had been in charge of a heavily loaded
drag which had been run over. This happened
out in the country several hours before.
The left arm hung helplessly in a sling.
There was severe laceration of the middle
of the upper arm but the skin was not
broken. The extravasation of blood
extended upwards along the posterior axillary
fold and on to the axillary surface of the chest.
The bone was comminuted in the soft
structures apparently torn completely across
though there was no wound. The arm from
above the condyles of the humerus was cold and dead and the muscles were in a condition of'rigidity'. Amputation was performed at the shoulder joint by Dr. Crooks. Wright - the flaps unfortunately showed to be taken from bruised tissues. Patient made a perfect recovery however - was discharged with the wound quite whole April 15th. On examination of the specimen there was found complete denervation of the muscles of the upper arm - the shaft of the bone was extensively comminuted - the brachial artery was its outer coat intact - the nerves two were completely ruptured - the nerves veins - muscular arterial branches were completely torn across. The amount of haemorrhage into the tissues was sufficient to broach from the ruptured brachial.

I have notes of two cases of fracture of the humerus into the elbow joint (Cases 11/12.

Case 8: C.W. a boy aged 11, was admitted Nov 3rd 1880. He had been riding on a donkey - fell off & the humerus was broken in the back of the left
elbow. On admission I found a wound about two inches long near the inner side of the bicipital tendon; above the humerus, was exposed at the bottom radius tubercle, with the condyles were displaced backwards, there was manifestly a transverse fracture of the humerus above the condyles. It may have been a separation of the epiphysis but the gapping was more suggestive of a fracture. Under an anaesthetic I made a fuller examination; found in addition to the transverse fracture an intercondylar fracture—the two condyles being displaced 20 degrees to form a sort of arch with the apex posteriorly. The fracture was readily reduced but as readily slipped out again. I closed the wound in front of the joint entirely—made a corridor through at the most dependent point behind a misdirected drainage tube into the joint. I then fixed the arm at a right angle with a splint fitted along the inner surface of the humerus and the inner surface of the forearm. Traction
to the dressing preventing any displacement
forwards of the lower end of the upper
fragment. The posterior wound healed
readily - the tube was removed in a week
and there was little or no septic reaction. I
kept the anterior splint on without
disturbance, it at all for three weeks.
Then the limb was fixed in a splint of
plaster soaked in plaster of Paris &
the boy sent out. There was still some
much swelling about the elbow joint
quite obscuring the relations of the bony
joints. In three months time these
condition was as follows. There was
no anesthesia - the arm could be
extended perfectly and motion
supination were complete but on
any attempt at flexion the an obstacle
was felt when the arm got to the
position of a right angle - this obstacle
was not in any way relieved under an
anesthesia. It was plainly the result of
a backward displacement of the condyles
The parents would not consent to
excision of the elbow joint & an attempt
made to relieve the condition by clipping away part of the projecting bone was not successful. The present condition is still that of restricted movement. Possibly had I made a posterior incision over the lower end of the humerus before the fragments the result might have been more satisfactory as the condition arose solely from the splint being unable to maintain the fracture in proper position.

Case X. J. S. aged 40, was admitted June 17th, 1855. He was thrown into a grave by the hoisting of a crane and fell about 20 feet. He had various scalp wounds, several fractures of the left forearm, an oblique-committed fracture of the right upper arm. There was considerable bruising with a good deal of displacement of the fragments. It was difficult to make out whether the fracture ran into the elbow joint and ended above the condyles. Great mediocrity anesthetize. The displacement was not rectified. The fracture casted in bed between sandbags for three weeks. Thereafter passive movement
was employed. The elbow was very stiff at first but movement was slowly gradually re-established. Unfortunately on June 10th patient had to be discharged for insubordination as passed from under our observation.

There has been one case of fracture of the external condyle in a woman of 38 who fell on the left elbow. The fracture was into the joint showed well marked erythema in a day or two considerable swelling of the joint. The accident is rare and according to some writers almost entirely confined to children. But the distinct presence of erythema slight displacement rendered it liable in this case. Thought there was no actual verification.

In two cases have seen fracture of the internal epicondyle one on Apr. 25th 1855 in a boy of 9 the other on Sep. 20th 1856 in a boy of 12. Both were in the right elbow area produced by direct violence. A fall on the elbow - in each case there was displacement downward of the fragment by the action of the extension.
muscles. Both cases, occurring in children, may have been. Probably were, dislocations.
One case - the boy of 9 - was accompanied by much effusion into the elbow joint.
In both there was a good deal of pain along the distribution of the ulnar nerve. Both recovered complete use of the arm. The deformity remaining however.

With reference to the treatment of fractured humerus. Fractures of the upper and lower treated by keeping the forearm in a sling, allowing the elbow to hang or pulling on a shoulder cap to protect the shoulder. In fracture of the shaft in addition to the sling I have fitted a piece of good flannel and wound the fracture with bandage to the whole arm to the side. Taking care not to hit the elbow-bump so as to constitute a permanent extending force. In dealing with fractures of the lower and I have employed a rectangular splint & often a week or two as the case may be. I have employed passive movement as much as in excision of a joint.

The last case of fracture of the humerus
occurred in a child aged 3 who came under observation a month after the injury. The fracture which had apparently been transverse occurred above the level middle of the shaft had been treated in Manchester had united in a bad position - so far as I could determine from neglect on the part of the parents. The bone was bowed outwards at the fracture. The parents refused to have it re-broken. I accomplished the effect of a rectangular splint applied along the outer surface of the arm upper arm going well above the projection - a pad was also placed over the projection & an splint then bandaged firmly to the side. After five weeks the bowing was appreciably diminished, but the mother grew impatient then of the restraint to which the child was subjected & refused to allow a further treatment. Otherwise there was considerable reason for supposing that with a recent fracture the soft bones of a child to deal with - the whole deformity might have been rectified just as one can overcome early rachitic deformity of the tibia.
Fracture of the Bones of the Forearms.

These fractures which constitute according to Gurlt's tables already quoted - 18.17% of all fractures treated at the London Hospital from 1842-1879 - constitute 23.4% of all fractures treated at St. George's in the period of five years eleven - there being as shown in the table given 260 such fractures out of a total of 1111.

My own cases number thirty-two in all made up as follows: Twelve have been cases of fracture of the radius alone. Five cases of fracture of the ulna alone. Twelve cases of fracture of both bones. Five cases of compound fracture of both bones, one requiring amputation. In addition, three cases I do not propose to consider of compound fracture with severe laceration the result of respectively of gunshot wound, laceration in a mill, railway crush.

(a) The Radius.

Hamilton gives a table of 124 cases of fracture of the radius he had treated.
of these three belonged to the upper third. Due to the middle one hundred and fourteen to the lower. Of the fractures of the lower third, 103 were so-called Colles fracture, seven were through the shaft.
69 were in males and 38 in females. 61 were in the left arm, 41 in the right. The other 25 not chronicled.

Hamilton 7 263.

Of the twelve cases of which I have notes, eight have been of the lower third, two of the middle third, three of the upper third. One of the cases of fracture of the lower third showed a symmetrical double Colles. Seven have occurred in males and 5 in females. 4 occurred in the left arm. 5 in the right and one was double.

Fracture of the neck or head of the radius is a rare accident. Evidence does not mention it. 1888 Ed. ""Senev System of Surgery."" 1824 mentions the possibility and gives a figure of a specimen in University College Museum. A fracture through the head of the radius associated with...
Fracture of the cornoid process.

Hamilton pp. 263-267 differentiates between fracture of the head of fracture of the neck. He quotes well authenticated cases of the former injury, gives reference to a number of others, and quotes Poisot as saying - "It is most frequently the result from indirect cause, such as a fall on the hand, the arm being extended." In some cases there has been long deformity, and removal of bone has been necessary to restore a useful arm. The latter (fracture of the neck) he regards as exceedingly rare, uncomplicated with any other fracture or dislocation. He refers to one case of his own as probably a case of uncomplicated fracture of the neck of the radius.

The following case seemed to me to be capable of no other construction than that of uncomplicated fracture of the head or neck of the radius.

D. A. aged 19: a labourer was admitted into Halifax Infirmary March 6th 1836. That morning while he was unloading some casks of loaves, the cory lifted a stack...
and, he thinks, some of the casks fell on him. This happened about four hours before admission. He was brought in the ambulance on admission and still suffering from shock very severely. There was an extensive lacerated scalp wound over the left side of the head. The skin laceration right back from the temple through the ear. The left elbow was greatly swollen and bruised. The swelling extended from the hand up to the middle of the upper arm. Swelling very tense - the radial pulse could not be got. Under an anaesthetic, which was required for the scalp wound, a laceration was got in the neighborhood of the elbow joint but the exact situation could not be made out. Flexion, extension, pronation, supination were unimpaired. But much of this was due to the swelling. The arm was put in a sling and lead - cream lotion applied. The swelling went down rapidly soon. March 12th the arm was much less swollen, painful. There was now crepito
get on Pronation & Supination | by no
other movement felt most distinctly
over the upper end of the radius. With
the arm in the flexed position no
Deformity could be made out. The lower
end of the humerus was immured. The
diastematus shaft of the ulna was
inact with head of the radius at an
deflection of the humerus.

The arm was now kept on a rectangular
splint applied along the outer side,
March 29th. All the swelling has now gone
except from upper end of the radius.
On Pronation & Supination there is still
marked elevation the head of the bone
does not rotate under the finger. Flexion
extension are both imperfect. hand
cannot be made to touch the shoulder
without causing pain & my attempt
at complete extension meets with resistance.

The exact site of the fracture cannot be
determined but it seems to lie somewhere
above the tubercle of there is no evident
mushroom forwards of the lower end of the
upper fragment of the various long bones.
around the joint can now be made out clearly. As the fracture was still manifestly ununited, the rectangular splint was reapplied.

The fracture is still under observation—
one waits with interest to see the amount
of movement lost when union takes place. At
present, though motion & subflexion
are imperfect, motion & extension are
most interfered with. The diagnosis
of the fracture seemed to be that of
the radius. One could safely exclude
the Cuneiform of the bone & the
oblique ossa of the nerve. The
head is generally split longitudinally
by indirect violence - the neck by direct
violence. The injury in this case was
caused by direct violence, probably
a fall from the elbow or forearm.

The next case of uncomplicated fracture
of the radius occurred in a man aged 24;
whom I admitted into the Felix Dispensary
Aug 22, 1836. He had, while at work, put
at the building, been struck by a block—which
fell on his neck & glanced off the neck to strike his left arm just below the elbow. On examining him I found a fracture of the left radius just below the insertion of the biceps. The upper fragment was pulled forward & was supinated. I put the fracture up in a rectangular splint, putting the forearm midway between pronation & supination. Sept 1st the patient was discharged. The fracture still ununited. Unfortunately the drift out of my observation before the fracture had time to unite. The treatment in this case was based on an imperfect realization of the deformity. The result would probably be that figured by Isles (System of Surgery, I, 826). Hamilton discusses the treatment very fully:

frontopost the complete supination with flexion that occurs in the upper fragment & the necessary, therefore to place the thumb & the lower fragment in apposition with the other by complete supination of the forearm. He refers with approval to
Scothe rectangular splint applied along the outer aspect of upper arm and dorsal aspect of forearm and hand. It would
indeed be found however that the use of this splint would not be practicable for a patient walking about - the strain of the position would become intolerable.

On June 3rd, 1835, I saw a boy aged 13 who had met with an injury to his right radius, the result of a fall. There was marked bowing of the radius forwards about the middle of the shaft. It was evidently an impacted or more probably a greenstick fracture of the radius. I tried to straighten the bone but could get no sufficient grip. The radius above and below the elbow being uninjured. I do not use great violence for fear of fracturing both. It occurred to me to move the hand forcibly at the same time keeping the elbow firm - the result of the manoeuvre was to make the fracture of the radius complete then on bringing the arm back to the normal
position - midway between pronation and supination - the fragments were opposed. The limb made a perfect recovery without interference with mobility. Anterior and posterior splints were applied.

The only interest in the case arose from the device necessary to reduce the fracture. Any attempt at local pressure being quite inadequate to remedy the bowing.

I have treated in cases of fracture of the radius just above the wrist - Colles' fracture. The youngest being a child of eleven who fell from a considerable height on her right hand; here there was very firm impression, reduced under anaesthesia by the employment of considerable force - four occurred in women between 32 & 46; three in men aged 38 & 57. The fractures presented no special peculiarity - all being caused by a fall on the hand - two of those in adults were firmly impacted requiring some force in rectifying the deformity.

The ninth case was one of double Colles'
occurring in a boy aged 15, who was admitted into the Infirmary June 5th, 1895. He had been swinging a sled forward, falling on his outstretched hands. The fall was between 10 and 20 feet. On examination there was an impacted fracture of both radius at the lower end — the deformity being much greater in the left than the right. In both there was marked broadening of the lower fragment in addition to displacement of the hand to the radial side.

Under C.A.O. I reduced both fractures — the right got into a comparatively normal condition. The broadening of the lower fragment disappearing after the imbibition had been carried. Probably the lower end had been shattered but the middle had been held together by the periosteum. The left could not be got reduced as satisfactorily but beyond the thickening of the bones and of the radius there was no deformity. Both fractures were put up on straight splints - anterior and posterior. He was discharged from to come as out
Patient June 10th. After a fortnight, passive movement & massage were employed. In a month, time after that, patient was discharged - the right wrist was quite free in its movements & there was no deformity. In the left, there could still be made out the thickness of the bone, but the patient could use the hand freely - there was no pain in either.

The condition according to Hamilton is rare. He refers to two cases (p. 257) occurring in men who had fallen from a considerable height.

In reducing a Colles' fracture, I have found it sufficient to grasp the patient's hand firmly & pull steadily, inclining the hand at the same time towards the ulnar side & press with my other hand the radius just above the fracture. As a rule, this has been sufficient to disengage the fragment allowing them into apposition. The forearm has then been placed between anterior & posterior splints. The anterior
beginning below the elbow & just long enough to allow the fingers to bend over the end. The posterior extrusion to the middle of the metacarpal bones. The hand is put in its normal position in relation to the forearm, not forcibly placed towards the ulnar side. A small pad is placed on the radial side of the second metacarpal & bandaged in position to prevent the hand slipping over to the ulnar radial sides reproducing the deformity. The splints are bandaged on firmly & kept on for a month. Taken off regularly after the first fortnight to allow of massage and passive movement. With this treatment all the cases but one recovered complete freedom of movement. Slight and fingers in a short time. That one case recovered ultimately though for some months there was considerable pain & stiffness.

Many of the splints specially made for this fracture are in group to great a burst of the hand to the ulnar side. The position the hand is put in is unnatural; strained
and as a result very fruitful. Such splints are to a certain extent mere devices to delude one into believing one is still doing something for a fracture, not properly reduced at the beginning. Boyd in his works advocates the anterior posterior splints. Hamilton sums up his views as follows: "in most cases all of our success will depend not so much upon the particular form of apparatus employed as upon whether we have properly reduced the fracture in the early stage of the accident. When once reduced, it is with rare exceptions easily kept in place."

In my further cases of Colles' fracture, I may have, I shall feel inclined to apply a splint made of flannel soaked in plaster—applied after reduction of the fracture from below the elbow to the bases of the phalanges. It would fit accurately to the normal contour of the arm, would prevent any tendency to deformity.

I have had four cases of fracture of the olecranon—one already mentioned associated with oblique fracture of the humerus on the opposite side—one about the middle of
the process in a man of 68, caused by a fall from a scaffold, attended by considerable bruising resulting in temporary troublesome stiffness of the elbow. One in a man of 20, was caused by a kick from a horse. The fracture was oblique, extending through the shaft from above downwards and inwards: there was 5/8 inch separation. When the arm was placed in the upper fragment was fitted by the nurse. The fracture was treated on a rectangular splint. There was recovery with complete power over all the movements at the elbow joint. There was still left however the tilting of the upper fragment—the lower edge projecting against the skin.

A fourth case of fracture of the olecranon occurred in a boy aged eleven from a blow—the fracture was transverse and incomplete. There was recovery without stiffness. I have seen one case of fracture of the shaft of the ulna in a child of eleven. The bone was broken in the lower third from direct violence.

There have been twelve cases of simple fracture of both bones of the forearm— the site varying from the upper third to just
above the wrist. The greenstick fractures have required the bones to be completely fractured. I have found least trouble to the patient's satisfaction as completely remedying the deformity.

In fracture of the ulna high up at the junction of middle and upper thirds, I have found it necessary sometimes to use a third splint in addition to the anterior posterior. There is a tendency to bowing at the fracture. Notable from the action of the biceps drawn on the olecranon upper fragment causing the upper fragment to rotate round the elbow joint as a fulcrum. In such cases a small splint applied along the under surface of the upper fragment has served to remedy the deformity.

Fracture of both bones at different levels I have found the most troublesome to realign without deformity. The origin and insertion of muscles are so varied that the position suitable for one bone hardly suits another & a certain amount of slipping of deformity has resulted in the case of two
One of the most troublesome fractures to retain in position occurred at Lowestoft. The patient - a strong and well-developed man aged 28 - had got his hand caught in some machinery. As a result there was a transverse fracture of both bones about 1½" above the wrist. There was considerable swelling and some laceration of the back of the hand. The fracture could easily be reduced but would not stay so between anterior and posterior splints. The lower end of the upper fragment falling downwards by its own weight the same displacement occurred when the patient was put in bed. I tried an angular splint reaching above the elbow with extension to the fingers. This corrected the deformity but patient could not bear the strain. Finally I found a great resource to bandage the hand and arm on a pistol splint - this remedied all deformity at the same time allowed free movement of the fingers. After a
After the wound had healed, the edges were left straight anterior and posterior, and no stitches were used during the remainder of the treatment. Recovery was complete.

On Aug. 1st, 1856, I looked into the Halifax Infirmary, where a boy aged 18, who had been engaged by his father to serve as a belting in a mill, both hands were outstretched above his head; the ulnar surfaces turned towards each other - holding a belt. In his arms were dragged down suddenly on a shaft completely over the shaft. Before he could release the belt...

On examination there was considerable swelling of both forearms, especially on the dorsal aspects. There was a compound fracture of both arms, with dislocation of both ulnar bones at the wrist. In the right arm, both bones were broken about the middle of the shaft - the upper ends of the fragments being pushed inward (with arm prone) so that there was overlap. In addition, there was a dislocation of the ulna forwards at the wrist. The end of the bone lying in front of the lower
end of the radius. In the left arm, the radius was broken about the junction of middle lower thirds - then in about the junction of the middle upper thirds. Here too there was considerable displacement in a dislocation of the lower end of the radius, towards downwards, upwards in front of the radius than in the right arm. In either case reduction of the dislocation was easily effected - the bone slipping into its place with a distinct snap when pushed outwards inwards, upwards or downwards, in tendency to become dislocated. Both arms were treated in a rectangular splint along the front of the arm; a dorsal splint a patient was kept in bed for the first fortnight. The left arm united readily without deformity; the movement regained on patient's discharge 3 Sept was very satisfactory. In the left arm there was a good deal of callus thrown out at the time of patient's discharge; the power of supination had not been regained at all. As an 8½ cm regained partial power of supination after four weeks longer. But there
was still impaired movement. In neither case did the dislocated ulna cause any inconvenience. The case is of a somewhat exceptional nature, as dislocation of the lower end of the ulna forwards even associated with fracture is not very common. It is still less so as a double symmetrical fracture dislocation. Hamilton refers to the dislocation as occurring either forwards or backwards in association with fracture of the radius. In some of the cases he notes there was permanent tendony to displacement.

Dick (on Fractures, Dislocations) in Lewin's System of Surgery refers briefly to the injury but do not discuss it.

There have been six cases of compound fracture of the forearm: one the result of a crush by a railway wagon wheel requiring immediate amputation; one a second — a man of 32 — the right forearm was twisted round a shaft. Both bones were fractured about the middle, extensively comminuted, stripped of
periosteum the extensor muscles were completely torn across. The arm hung in fact by the flexor group of muscles; fortunately radial median arteries were intact. Removed the loose fragments and stripped off muscle around the ends, then closed the muscle by a sartor suture. The wound healed after free suppuration. Patient recovered with a head that he could partially use—he had limited power of flexion extension but none whatever of pronation-supination.

There were four other cases of compound fracture but none presented any peculiar or special feature.

The last case is one of those more often referred to than seen; fortunately, it is an instance of the deplorable result that may result from an improperly treated fracture.

A boy aged 12 came under observation on Nov 25, 1895 with a slurred and useless right forearm. He gave a history that it had been broken in May, had been set by a 'miracle practitioner,' he thought bandaged too tightly, as a result, the skin became necrotic, left with a useless band & arm.
I came to the infirmary to see if any operation was advisable. On examination I
found a longitudinal cicatrix in neither aspect of the forearm. The cicatrix was
adherent to the bones and both bones were clearly approximated. Both flexor and
extensor sets of muscles were atrophied and involved in the cicatrix. The hand was
could like a claw—like fingers can neither be flexed nor extended. Nor was there any
voluntary movement at the wrist. Radiation
confirmation was quite lost.

I did not enquire too closely as to how the
condition originated. Fear to aggravate
my discredit the practitioner may have
incurred. Probably it was one of those
cases that had been bandaged too tightly
at first, then neglected for some days.

Fracture after fracture of the forearm has
occurred of course to men of the highest
reputation. Hamilton cites a case of his
own (p. 324), but such an accident
cannot occur with systematic daily
inspection during the first week or ten
days.
Fractures of the Pelvis.

In the hospital records I find references to thirteen fractures of various parts of the pelvis. Of these thirteen I have seen three—all of whom have died. The first case denied its interest more from the concomitant injuries.

W. & Id. 4 & 6—a quarryman—was admitted about 12 noon—on Aug 18th, 1884—suffering from a severe crush. He had been under a large stone in a quarry. The earth which was under the stone was being hoisted up and allowed the stone to come down on his body. The accident happened about 1 1/2 hours before admission. He was very collapsed on admission and did not react to stimulants and died about 1 1/2 hours after admission.

This case was so hopeless that every enquiry examination was made—but there was evident a fracture of the pelvis in two places and a fracture of the left lower side.

Death ensued with symptoms external hemorrhage.

Performed an autopsy on 20th Aug. There was considerable extravasation of blood into the
on opening the abdomen and examining the pelvic bones there was a fracture of the pelvis to the right and left of the pubic symphysis and displacement inwards of the wedge of bone. There was further fracture into the right obturator foramen running through the rim of the pelvis— and a complete separation at the sacro iliac synchondrosis. The rectum was completely torn across— the bladder was apparently uninjured.

The examination of the chest the heart presented no peculiarities. The left lung was adherent at its apex. The left pleural cavity contained about a teaspoonful of dark fluid blood. There was a fracture of the 8th, 9th, 10th ribs. The broken ends projected into the pleural cavity. There was apparent injury to the lung. The right lung was collapsed and the pleural cavity filled with blood. There was a fracture of the 9th, 10th ribs with projection of broken ends through the pleura.

On examining the abdomen of the pelvis there was considerable extravasation of blood into the cellular tissue of the pelvis.
The liver spleen stomach intestines and left kidney were uninjured. The right kidney was completely torn across practically ground into a pulp and was lying among extravasated blood. The peritoneum around it was intact however from the right kidney there was a distinct tract taken by the blood upwards in the cellular tissue behind the colon liver & diaphragm. A lower part of the pleural cavity to the wound in the pleura made by the ribs - the right psoas muscle was ruptured. The blood in the pleural cavity coagulated came from the kidney - from the severe crush the wound became applied all over the back from 8th or 9th rib down to the sacro iliac synchondrosis.

The blood on the left side probably came from the intercostal arteries. Wounds of which from fracture of the ribs have occasionally been recorded. Hamilton (168) refers to cases in which death has ensued from a ruptured intercostal artery. Emerson (308) quotes a case from Guilt
when five pints of blood were found in the right pleural cavity, they appeared to have come from a lacerated branch of an intercostal artery. In the case just detailed there was certainly no hemorrhage of the lung to account for the hemorrhage.

The interest of the second case lay in its unfortunate sequel. The patient, a young man aged 22, was brought into the Infirmary about 6 a.m. on May 24th 1886 by the police. They thought he had been run over—the man himself was too drunk to give any account at all. On attempting to pass a catheter but could not get it past the triangular ligament—the condition pointing to rupture of the urethra. The Honorary Medical Officer was sent for. On arrival did Cock's perineal section—leaving a tube through the perineum into the bladder. Very little urine came away at the time of division. Patient's condition did not improve—he developed symptoms of peritonitis. Very little urine came through the perineal tube. Patient
gradually sank and died on the morning of May 28th.

The post mortem was performed the same day. There were bruises over both buttocks and the right ankle.

On opening the abdomen there was slight general peritonitis but very little fluid in the peritoneal cavity. The intestines were much distended. A coil of small intestine hung down into the pelvic cavity and was a cut, inflamed. It was adherent to the pelvic floor con removing it there was seen an opening in the pelvic floor which led into the bladder. On passing a finger in through the perineal wound it passed directly through the bladder and into this opening into the peritoneal cavity. The bladder was collapsed and anterior and posterior walls were approxed. Evidently at the operation the bladder had been empty, the knife had passed through both walls of the bladder into the pelvis. The cellular tissue around the pelvic bones was infiltrated with blood. There was a fracture just
to the right of the symphysis pubis, extending through the right pubic ramus into the obturator foramen, with overriding of the fragments. Neither fracture could have caused the wound in the bladder. The wound was located about the triangular ligament.

The case was further interesting from the fact that the left pleural cavity contained about a pint of dark fluid blood which clotted readily on removal. There was no fracture of the ribs nor any injury to the diaphragm or pericardium. The left lower lobe was much congested - a dark mufilous color - so solid to the feel but no wound of its pleural covering could be discovered. The blood in this case must have come from a wound of the lung; however, as there was no other injury to cause it.

The third case is one of very extensive injury to the pelvic bones.

The patient - a man aged 45 was admitted July 22nd, 1885 - having been
injured in the same accident as the case of fractured spine already recorded. He was much collapsed and died in 1½ hours after admission or 3 hours after the accident.

There was extensive bruising of skin and soft parts over the sacrum and left side of the pelvis. There was separation of the pubic bones at the symphysis to the extent of an inch. The bladder was ruptured. The bladder and rectum the left os innominate was intact. The right was extensively shattered. There was one fracture running down into the obturator foramen. — Another ran obliquely outwards to the right anterior superior iliac spine splintering the iliac bone. There was separation of the right sacroiliac synchondrosis; there were also several smaller splinters chipped off the iliac bones. There was extensive hemorrhage into the peritoneum. On examination the right common iliac vessels had been ruptured as they crossed the sacroiliac synchondrosis.
There was no injury to any of the viscera other than the injury to the bladder just recorded.
Fractures of the Femur.

Estimates have varied as to the relative frequency with which the femur is broken. Pick in his work on fractures considers it as one of the most frequently broken bones next to the clavicle. Cullon on the other hand quoting Gruber's table of 5200 fractures, shows that it occurs relatively infrequently constituting about 0.2% of the whole. In the case noted, treatment at Halifax Infirmary there have been 131 cases of fractured femur, uncomplicated by any other fracture & excluding cases of severe vascular lesion of all tissue—this yields a total of 10.8%.

I have notes of thirty-three cases of fractured femur—five of which are still under treatment—of these thirty-three cases—four have been fractures of the neck—one of the right side—one of the left. Twenty-two have been fractures through various part of the shaft—eleven on either side—four have been fractures at the lower end—one in the right side—a three on the left.
I of direct examination - so that accounts are ceased entirely on clinical examination. In no case have I seen the fracture described as intracapsular fracture produced by slight violence in an elderly individual - on Nov 12th, 1886. I admitted two women - one aged 71, the other 76 with a fracture of the neck of the left femur. The history was practically the same in each case that the patient's foot had caught in the carpet - she had stumbled and then fallen on the left hip. In the first case - the woman of 71 - there was about 1.5 inches of the foot ejection and + pain on any attempted movement at the hip joint - no thickening or deformity could be made out at the around the great trochanter. Before the accident she had been an active intelligent woman, but after admission she was quite demented. At times delirious, also in attacks of restlessness she moved the affected leg - feeling it slightly at hip & knee. No attempt was made to treat
The fracture, beyond sandbags, that was packed up in bed, but she gradually became worse. Threatened to weigh very extensively, & died twelve days after admission.

In the second case there was only about ½ shortening; the elevation was more marked. The thigh was slightly flexed, & could not be completely extended. Any attempt at standing up the elevation was not marked, & yielded to severe pain. She got better, however, and was discharged on Jan. 20th, 1886. Since then, I have seen her at intervals. She is unable to walk, with assistance cannot bear weight on the limb, to any extent; the whole limb is wasted. As an admission slightly flexed at the hip—flexion can be performed to a right angle, but not beyond. The power of rotation is altogether lost. This is so thickening to be made out about the great trochanter.

A third case in a man aged 60 was sent in for examination & diagnosis.
Dec 6th, 1823. With a history of injuring a week before. Patient falling on his left hip. On inspecting thereafter inability to move it or walk on it. There remarked:

- Eversion of the limb with pain on attempted movement - there was much bruising on inner side of thigh, & prominence. There was no thickening around the great trochanter. On examination under ether the movement at the hip joint was much restricted; flexion being impossible beyond a right angle and the trochanter moving through a smaller arc than on the other side. There was about 1/2' shortening. There was no effusion, but no attempt was made to break down any suspicion.

- Patient was examined to be lame in spite of treatment expressed a wish to go home. Passed out of my cognizance.

In this case, though the trochanter was not broadened it was displaced rather upwards - the hip being above relation's line at the perpendicular by Poussin's method, being 1/2" less in length. This was the
only means there was festination shifting accurately in this case as the knee was contracted from some old disease.

These three cases were most probably cases of impacted fracture of the neck.

From the history it is quite possible the two former were impacted intra-
capsular fractures such as Hamilton Figures (N 336) to Sever's System Fig.

Surgery Vol II 838. The fracture may equally well however have extended
outside the capsule - that is a point clinical evidence alone could not
make certain. According to Ericsson impacted intra capsular fracture is not
common.

In Dec 8th 1881 a tall well built man
of 72 was admitted with the history that he had fallen heavily on his
right hip that afternoon when coming from church. On examination the right
leg was high leg helplessly on the other side could not be moved by the
patient. There was rather over shooting
There was well-marked capitis and the great trochanter was broadened and flattened. There was no impaction of the limb could be readily brought straight & the shortening reduced to ½ inch. A
lision splint was applied with extension to the amount of 8 lbs. The treatment had to be modified after a few days on account of patient's general condition. He was placed on a waterbed with head & shoulders well raised & the splint shortened, extending only a little above the crest of the ilium. This was rendered necessary by a threatening massive congestion of the lungs. He was very restless, constantly trying to get out of bed - even taking his pillow 1/2 if not watched. The result of treatment on Feb 18 when the fracture was well consolidated was as follows:

There was about ½ inch shortening, slight version of the limb below the fracture & slight overriding of the two fragments - the upper being anterior on the outer side of the limb just below
the great trochanter the sharp lower end of the outer fragment could be felt. Union was good and patient was able to walk with crutches. He could move the limbs freely. Here the fracture was in all likelihood comminuted extending through the neck and also closely through the trochanter major. The result was not as satisfactory as it might have been. But the extreme restlessness of the patient rendered it difficult to maintain the femur in proper position. As a result there was reversion of the leg which when the fracture consolidated.

The next three cases illustrate what I take to be the results of unrecognized fracture of the neck of the femur or separation of an epiphysis.

A girl aged 13 was brought to me on Sep 4th, 1884 at Halifax Infirmary. Her mother had observed her limping for some weeks. On enquiry I could get no history of any injury to the hip. There was no pain complained of.
at night the girl walked with a well marked limp. The left side being the one affected. On placing her on the couch examining the hip there was rigidity on attempted movement of arch of the back when the limb was first straight - the pelvis too tilted upwards on that side. On bringing the pelvis straight the back flexion on the couch the left leg was markedly flexed & adducted. In fact apparently a well marked case of the second stage of hip joint disease. The twelfth too was broadened. I admitted the case as one of hip joint disease despite the absence of pain - reported to such to the Honorary Medical Officer on his return. I placed the girl on bed with extension to the left thigh, at first in the line it occupied when the back was straight - then in the flexed adducted position - then the line was gradually altered till in a fortnight time the limb was brought straight without the other without lordosis or
Tilt up of the pelvis. There still remained thickening around the great trochanter and restricted movement at the joint in all directions. The pelvis moved when the leg was manipulated. There was no examination made under an anaesthetic, but then the child never complained of pain.

After some weeks she was discharged walking with a slight limp but much better than on admission.

Twelve months later I found the limp unchanged as ever. On examination then—The tip of the great trochanter was well above the level of the iliac crest. There was broadening of the great trochanter. On manipulation a grating sound was got on rotation of the thigh. Rotation was free but the head of the great trochanter moved through a smaller arc than on the right side. Flexion was free up to a right angle unattended by any tilt up of the pelvis. The girl could walk on the leg quite well. The only
inconvenience being the marked shortening from
the shortening of the limbs.

The second case was that of a girl of 17
who was admitted Dec 2nd 1875 for anemia
and lateral curvature. There was an obscure
history of a fall on the right hip when
patient was aged 7 - it was apparently a
somewhat severe injury at the time & left
her, her mother says, "delicate". On
examination of the hip, the hip of the
great trochanter was considerably above
Nebel's line, there was more than an inch
of shortening. Movements were quite free
at the right hip, even more so than at the
left. Rotation was very free but gave
one the impression as if there were no
cervix femoris - the trochanter seems to
turn round as the shaft did and to
rotate in a segment of a circle like the
left trochanter. In addition there was
a peculiar grating or creaking noise on
movement of the hip. There was no
difference in the fullness of the two
buttocks. The girl was suffering from
scoliosis resulting from this irregularity.
in the length of the two limbs. The consequent
slipping of the pelvis along when she walked.
The third case was that of a girl aged 28
who was admitted on Dec 16th 1892. Her doctor
wrote stating that she had had a severe
fall on the left hip in August that
since then in spite of treatment the limb
remained weak and practically useless. He
had not been able to make out any fracture
she declared.
Patient lay in bed with the knee somewhat
flexed on the left side. When the knee
was straightened on the bed the back
arched. All the movements at the left
hip joint were greatly restricted. Flexion
of the thigh on the abdomen could not be
carried out beyond a slight angle. Rotation
wasless complete than on the other side.
There seemed to be about 3 inches shortening.
Dec 16th Examined the patient under an
anaesthetic and found that the condition
rigidity above noted was not due to muscular
spasm. Rotation caused the trochanter to
move through a smaller arc and was
accompanied by a grating sound not
beard on the right.

The patient was treated with extension
in a Johnston's long splint for eight weeks.
At the end of that time she was still
very lame - could not get about without
a crutch. The pain had gone on examination
the popliteal could not be elicited
but the restriction of movement was just
the same.

The two first cases quoted must have
been either fractures of the neck of the
femur or separation of the epiphysis.
In the first case occurring in a girl of 13
I was misled by the absence of history of
any injury. The physical conditions all
pointed however on more careful
consideration to fracture of the neck, which
had been partially impacted. The case
was certainly not one of morsus coxae, as
certain not a case of congenital dislocation
of the hip, to which it presented no
resemblance; nor could the condition
have been brought about by an epiphysis.
The morsus coxae is the entire
absence of history of any injury or pain.
This I B: course we do find—though only—ni fractures. I had under treatment about six months ago a man who had sustained a great transverse fracture of his tibia—\( \_\_ \_ \_ \)—\( \_\_\_\_\_ \) weeks before he had been at his work—a jump—\( \_\_\_\_\_ \)—the week. He had no pain on movement; there was well marked ecchymosis.

The second case seems more closely to resemble a case of separation of the epiphysis of the cervix femoris at the age of 7. These cases are not so excessive of fracture of the neck of the femur at that age. Gray's System of Surgery p. 826 refers to the case of twenty cases published by Hutchinson in the Archives of Surgery for 1832. On Aug 26th of that year Mr. David Wallace published a case in the Lancet when there was reason to suspect that this had occurred in a child. At a meeting of the Clinical Society of London Feb 26th 1832. Mr. Davies Colley exhibited a boy of 14 whom he believed to have undergone this accident. In the case I have cited there was no suspicion of any...
There was a well-defined history of an injury.

The third case was unmistakably one of impacted fracture, which had, unfortunately, not been diagnosed with the result that there was probably at the end of six months less satisfactory movement than should have been obtained. The case was treated outside as merely a severe bruise. The patient was encouraged to use the limb after the first pain and inflammation had passed away.

The treatment I have carried out in all cases has been that of a corporal splint (Linton) with extension in the case of impacted fractures. Adhering to the conservative method of leaving them alone. Southam [handwritten: Nov. 17th 1840, Dec. 21st 1835] has advised break-down the impaction restoring the limb to its normal contours as far as possible. He advises this not with in healthy adults such as his first case of aged 25 years, but in old people such as second communication a less successful result in
a woman aged 75. The failure of the treatment lies in the impossibility of
knowing the various lines of fracture. The fracture of the hip bone is not interfused
with the line of the bone by forcible
manipulation but when the fracture
runs in various directions through the
neck of trochanter it is difficult to see
how forcible manipulation can give a
more successful result. It is difficult
to see how such a method could give
satisfactory result in a case such as Eichen-
figures on pp. 619. While the method
again might be adopted in a healthy
adult it could not but increase an
already great risk in a person advanced
in life by setting up fresh extravasation of
blood. A diagnosis I have found considerable
help from the line of measurement lately
suggested by Mr. Mayo Robson at the
Leeds Medical Chirurgical Society
Nov 25th 1835. He draws a transverse
line inward from the tip of each great
trochanter and a perpendicular one each
from the corresponding anterior superior
iliac spine. A comparison of the two shows the amount of shortening on the injured side.

The method is more convenient than fixation of the hip as the patient need not be moved; but it has the advantage over Bryant's triangle in that both perpendiculars are in full view at one time and can be more readily compared with each other.

Of the twenty-two fractures of the shaft four have occurred in children under 5 years of age, two of which were in a loose hula. Three have been transverse, all through the middle third of the shaft. The rest were at right angles as could be determined without any appreciable shortening. One case, in a child of 15 months, treated by extending the limb carrying the tibia on a platform of a wooden cradle, so that the leg and thigh were at an angle of about 120° with the body. The child was perfectly comfortable, the limb was quite straight. At the same time the child could be attended to much better than if the limb had been laid on the bed between the patient's legs.
Of the other sixteen – one was a fracture through the upper third just below the sternal ends inclined obliquely from above downwards forwards. The patient was a man of 62 who had fallen from a ladder twisted his right thigh in falling. Insp treatment he was very restless – almost unmanageable at times. He recovered with about 1½ shortening. There being slight tilting forwards of the upper fragment. He was treated with a的历史 correction applied under an anaesthetic. It was important to set the patient up on account of bronchitis.

In the case of the others – including four at present under treatment. The fracture has been at various levels through the middle third. It has been transverse in three cases. The resulting union being unattended by shortening. Oblique from the remainder. The shortening varying from ¼” in the case of several to ribbons instance ½”.

In two cases the fracture has been of the
lower end of the shaft. Caused in both by a fall on the knee. Both patients died: one an old man of 72 from delirium tremens— the other a woman of 67 from Bright's disease.

On March 12th, 1885, I admitted a girl of 14 who had fallen and broken both femora. Osteotomy for genu valgum had been done on the right thigh about six months previously. Patient fractured this leg through the old line. The other about the middle of the shaft. She made a satisfactory recovery.

On March 7th, 1886, I admitted a woman aged 57 who had broken both thighs. About a month previously she had tripped and fallen on the carpet on her right hip, breaking the femur hip. For this she was attended by a private practitioner. For six months previously she had been under treatment for anaemia. For some weeks before the accident she had had very severe pains about the right hip bone. After the accident she had the same pain in the left femur one day when it was being rubbed. The left femur snapd across just about the junction of middle and upper thirds, although
there was no strain on it at the time of fracture. Patient was sent in the same day. On examination I found a fracture apparently nearly transverse with bowing forwards at the seat of fracture shortly. The fracture was in situ noted. There was evidence of an old fracture not yet united running through the greater trochanter on the right side. When extension was applied to the leg both became of the same length. Since admission patient has improved markedly in health. She had been for some weeks severe sciatic pains in one or other femur. By April 21 there was fairly good movement on the right side but practically none on the left. Every little callus turned out. By April 22 the patient had had no pain for a fortnight. The leg was much firmer. A dorsal cast was applied. There is no assignable cause for the failure of the bones - no evidence of typhoid or malnutrition - no albuminuria. As far as of the cases referred to (24 80 81) of apparently primary disease in the remaining three cases the fracture has involved the knee joint - one of the cases being compound and rupture immediate
amputation. The accident above mentioned is of a serious nature. This in some cases has been
followed by suppresion in the same joint. At a meeting of the Pathological Society
Dec 26th 1881 - such a specimen was shown.

The condyle had been split laterally and longitudinally - a slice of bone being broken of the lower end of the femur. Amputation was performed on account of the suppresion.

On Dec 2nd 1884 I admitted a man aged 28, who had sustained a severe injury to his left femur. There was a history of a fall but patient was too intoxicated to give a clear account of the accident. There was a good deal of bruising about the knee. A subject fracture of the femur - causing 1/4 inch shortening. The fracture ran from above downwards forwards and upwards obliquely, through the internal condyle, the shin end of the lower fragment being just below the skin. The head of the tibia was broadened but I could not be certain there was a fracture of the tibia. The usual treatment by extension and dressing splint was adopted but did
not succeed in reducing the deformity. The fracture united well but patient was left with a stiff knee.

The second case occurred in a man aged 35 who had been run over by a heavily loaded dray - one wheel passed transversely over his right knee. On admission an hour or two after the accident the leg & foot were quite cold - no pulsation in anterior or posterior tibialis - the muscles were in a state of tetanic contraction. There was a wound about an inch long along the lower part of the tibia - from which there was little oozing - there was a comminuted fracture of the lower end of the femur - much subcutaneous laceration of the quadriceps. The limb was amputated by J. Beech & the patient made a good recovery.

On examining the fracture afterwards I found an oblique fracture separating the internal condyle from the rest of the shaft - the condyle being fitted so that its inner aspect looked upwards - the external condyle was also broken.
was shattered into several pieces the patella and ilia were intact. The orbital artery and vein were completely torn across. They had been torn where they were stretched across the sharp edge of the internal condyle. The nerves were uninjured. The inner part of the quadriceps muscle was lacerated.

The third case was also in a man, aged 56, who was admitted Nov 25th, 1895. He slipped off the causeway and fell on his knee, doubling the leg under him. On admission - the leg's foot lay helplessly on the outer side - there was a good deal of swelling above the knee - though the accident had happened fifteen half an hour. On company the two condyles there was not more than 1/4 inch shortening. The patella was sound but on moving it laterally or up and down over the condyles a grating sound was got. On grasping the two condyles - one on either hand - they could be readily moved on each other - from behind forwards - again from the position of the limbs and the mobility.
there was evidently a fracture across the shaft just above the condyles. There was no bruising. It seemed to me most likely that the fracture consisted of two lines, one obliquely upwards and forwards from the middle condylar notch to the inner side of the femur -- the other upwards from the outer side somewhat as represented in the diagram. The injury causing it consisted of a twist or a fall. The limb was fixed to a historic splint -- extension was applied to the leg and a inner splint along the inner side of the leg straight. There was a good deal of pain and synovial effusion for several weeks, but no symptoms of any interference with the nutrition of the leg or foot. After four weeks time the long splint extension were taken off and a croft splint applied to the knee. Massage and passive movements were carried out twice a day. On
movement of the patella over the condyles, the grating sound would still be got. There was much thickening of the condyles, and lateral displacement of the shaft of the femur for about four inches. The fracture was now firmly joined and no shortening could be made out. In another three weeks, when the patient was allowed to walk about, the knee increased in a cast splint; in another fortnight, the splint was removed. Calm could bear weight on the knee, had no pain; he walked with a limp, had imperfect power of flexion.

On Jan 31st 1836, he was discharged, walking less stiffly. He could bend the knee about 60° for a little more. There was less grating motion; movement of the patella over the condyles, the thickening of the shaft was less evident.

The fracture would seem to correspond to a specimen figured by Shinnick's 320 figure 2, I think, rather Y than T-shaped. Hamilton takes a very grave view of these Transactions.
fractures: "The danger of violent inflammation in the joint is imminent: and adhesions of the knee is to be anticipated as the most favorable result since the joint surfaces are likely to be rendered immovable by fibrous deposits in their immediate vicinity as also by the adhesion of the muscles to one another to the bone higher up where the fracture of the shaft has occurred. More fortunate results than these may indeed be looked for, insomuch as they have occasionally been noticed, but they cannot fairly be expected." (Hamilton p. 425)

The fracture must have been caused by the peculiar combination of twist of the knee subject blow, the man encountered in galling. Hamilton (p. 422) refers to fracture of the external condyle as having occurred from simple twist of the leg.

I attribute to the fracture being I shaped so that the lower end of the upper fragment fitted in between the other two. In addition the force causing the
Fracture was not extraordinarily great so that there would be less tendency to displacement by muscular action. Hamilton's unfavorable prognosis is based on the fact that the majority of such fractures have been caused by very great violence - the resulting inflammatory reaction is correspondingly great.

The treatment adopted was that favoured by Hamilton & Thomsen - extension to the leg with the whole limb straight. It was not necessary to divide the tendo achillis. Cribb favours treatment with the double inclined plane for the T-shaped intercondylar fracture. But for longitudinal fractures into the joint he advises the straight position.

The pyrexial reaction after fracture varied to a considerable extent. Subjoined are one or two cases of the temperature dump the first week after fracture. The child exhibits medically serious other than those in children are similar. Both charts of cases of fracture of the neck show a well-marked
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<td>NAME S. R.</td>
</tr>
<tr>
<td>AGE 76</td>
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<tr>
<td>DIET</td>
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<tr>
<td>NOTES</td>
</tr>
</tbody>
</table>

**DISEASE**

**Hyperpyrexia**

**Month & Date** Nov 18

**Complications**

**NAME** S. R.

**AGE** 76

**DIET**

**NOTES**

**Temperature Fahrenheit Scale**

- **Hyperpyrexia**
- **Pyrexia**
- **Normal**
- **Subnormal**

**Time of Observation**

- **Hour**

**Graph**

- **Temperature Fahrenheit Scale**: 97° - 106°

- **Degrees Celsius** (C): 36° - 41°
NAME: 14
AGE: 62
DIET:
NOTES:

DISEASE

Hyperpyrexia

Complications

MONTH & DATE: June 87
DAY OF DISEASE:

Time of Observation:

Hour:

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DISEASE

Time of Observation

Hyperpyrexia

NAME W.S.

AGE 56

DIET

NOTES

1895

Hyperpyrexia

Temperature Fahrenheit Scale.

97°

98°

99°

100°

101°

102°

103°

104°

105°

106°

C

41°

40°

39°

38°

37°

36°
febrile reaction due to the first three or four days. The case of fracture below the trochanter is more marked still but the patient had very troublesome bronchitis in the boy of 15, the man of 28 there was no special complication to explain the rise in temperature beyond the fact that both suffered severely from pain that prolonged itself in the case of the man into the third week. In the two cases of fracture into the knee joint this element again entered — in the patient aged 56 with an intercondylar fracture suffered much more severely than the other — the man of 28 years. In several cases where the fracture was seemingly as severe as any above there was practically no reaction at all. In some cases I have observed a marked alteration in the pulse for a week or fortnight even in cases where there was no special shock or no chest complication. In one a man aged 54, the pulse became intermittent and continued so for over a fortnight missing every 8th or 10th beat. In time this decreased and the pulse became quite regular again.
The condition is not peculiar to fractures. I have observed it repeatedly for the first few days after a severe surgical operation. It was well marked in a boy aged 5 who was admitted for radical cure of inguinal hernia. Many others have shown it.

As a general rule, treatment had been carried out by means of a hinged splint with extension to the limbs below the fracture. Counterextension being applied by raising the foot of the bed. In one case of fracture below the condyles, I tried the double inclined plane, but found it unsatisfactory - uncomfortable to the patient & inconvenient for the nurse's attentions while from the restlessness of the patient the limbs could not be properly kept at rest & was constantly slipping to the outer side. While there did not appear to be any compensatory advantage to counterbalance these.

I have not hesitated to administer an anæsthetic for the setting of a simple fracture.
in cases where I thought it necessary - especially in oblique fractures with overriding a much shortening.

In no case of oblique fracture that I have treated here, with shortening of the limb of over 3/4 inch have I been able to get union with complete restoration of the length of the limb. In several cases the patient has gone out with 1/2 inch shortening. In others the shortening has been even more. In transverse fractures of course one does not get a perfect result. The result in oblique fractures seems to be the rule in cases of oblique fracture treated by other surgeons, but is to be ascribed partly to the tonic contraction of muscles - partly to the shortening of the muscles caused by inflammatory exudation, and partly to the small relative section the femur presents to the muscles of the thigh - the corresponding difficulty of keeping the fragments in accurate opposition. In no case so far have I had an unmixed fracture.
Fractures of the Patella

This fracture constitutes between 1 and 2 per cent of all fractures according to Guettas figures there have been ten cases of fracture of the patella under treatment in Halifax in five years. Of these ten cases three were of boys. One of the four was the result of direct violence—a man aged 55 fell from a box railing on his right knee. As a result the fracture was at right angles. The patella fractured into five or six pieces. There was little separation between the fragments. The accident happened on June 18th 1896. After three weeks' treatment in hospital and plaster of Paris splint was applied and discharged. He has remained under observation since and at the present time still walks with a stiff knee but as far as can be made out with good union of the fracture. Of the other three cases one occurred in a man aged 62 who slipped on ice and fell forwards this right patella snapping as he fell. On admission there was a transverse fracture of the patella with separation of
The fragments to the extent two inches. In addition to the transverse fracture there was a vertical one running in a figure. There was considerable effusion of blood into the joint. This was aspirated at the fragments then drawn together by horse shoe shaped pieces of stripping exercising traction on upper lower borders. This was ineffective in bringing the fragments together. The limb had of course been put on a straight splint with the foot raised. On Dec 17, 1884, fourteen days after admission, Mr. caught cut down and wired the larger fragments. The wound healed by primary union. The ultimate result was also highly satisfactory - patient recovering full use of the limb.

Another case occurred in a man aged 35 who broke his patella May 5th, 1885. The fracture was transverse through the lower portion of the bone. There was a separation of about 3/4 of an inch.
Wring was not attempted - the limb was kept at rest on a straight splint until the synovial effusion had subsided & then put up in a plaster case. There is now (eleven months after the accident) union with about half an inch shortening.

There is still stiffness though not complete, patient being able to flex little more the thigh to an angle of nearly 90°. He is still however quite unfit for his vocation of plasterer.

The fourth case occurred in a woman aged 30 - a dressmaker - who slipped coming down the steps from church & felt both patellar snap in the act of leaping to recover herself. This happened on Feb 10th, 1886. On examination there was a transverse fracture of both patellae.

In each case there seemed a small triangular portion chipped off the inner side of either lower fragment. There was no bruising of the skin & no adhesion or swelling of the parts so that the fracture could be distinctly made out. The line of fracture in either case is figured below.
There was about 1 inch separation

On Feb 13th an incision was made over the
right patella. The granulations and clot
were removed. The fracture wired. The
small triangular portion on the inside
was found as diagnosed. The right patella
was treated on a back splint with a
bandage to hold the fragments together
as far as possible. The patient unfortunately
suffocated freely though there was
very little constitutional disturbance
with it. Suffocating did not cease
till several fragments of bone had been
removed amongst them. The fragment
detached at the fracture. The right
united with about 1/4 inch separation
After some months passive movement
was employed. Six months after the
accident patient left the hospital with
complete analgesia of the left patella knee in a straight position; there was slight movement at the right. Patient was able to walk with the aid of a stick though somewhat awkwardly. Six months later patient could walk freely though with a slight limp. There was very complete free movement at the Right Knee joint - flexion as complete as in uninjured limb. Separation to the extent of only 1/4 inch between the fragments - the left of course was permanently ankylosed. The result however was fairly satisfactory as patient was able to drive a searing machine quite easily.

By most writers transverse fracture of the patella is said to be due usually to muscular violence. Hamilton alleging that in the majority of cases where the patient have fallen on their knees the fracture has really been caused by muscular strain. He gives as reason the fact that when a man falls on his knee - the blow is as a
complete analysis of the left patella was in a straight position. There was slight movement at the right. Patient was able to walk with a slight stick or waddle. Six months later patient could walk freely through with a slight limp. There was very complete free movement at the right knee joint. Examinations complete 1/3 in and uninjured limb. Examination to the extent of only 1/4 inch between the fragments. The left knee was permanently and hyphosed. The result however was fairly satisfactory as patient was able to drive a sewing machine quite easily.

By most writers, transverse fractures of the patella is said to be due usually to muscular violence — Hamilton alleging that in the majority of cases where the patient have fallen on their knee the fracture has really been caused by muscular strain. He gives as reason the fact that when a man falls on his knee, the blow is as a
rule received on the external tubercle of the
tibia & not on the patella.

In two out of the four cases quoted above,
the fractures though caused apparently
by muscular violence separated the bone
into more than two fragments. In the old
man of 62, there was a vertical fracture
as well as a transverse - while in the
woman of 36 who fractured both patellae
at the same time there was a small piece
chipped off the lower fragment in either
case. Page in a note, of peculiar development
of a nodule of bone in the centre of the
fibrous aponeurosis of two old
fractured patellae in a man of 53 asserts
that fracture by muscular violence cannot
be other than transverse, producing two
fragments only. (Lancet 1888, Vol. 1, p. 575).

Hamilton supports a rather different view -
saying (p. 432), "A patella being given away,
transversely to muscular action, those
fibres of the quadriceps which are inserted
into the sides of the patella will con-
trainvitably act, may break the bone vertically
or cause them to separate laterally."
In the woman the fracture separation of a small fragment on the mesial side of the knee was diagnosed about half an hour after the accident - the diagnosis was verified by operation in one knee so there can be no doubt about its accuracy. This separation must have been caused by the contraction of the muscular mass inserted into the inner side of the patella - the vastus internus and part of the vastus femoris - it is difficult to see how a fragment so inaccessible to trauma from a fall on the knees could have been separated otherwise than by muscular action.

Simultaneous fracture of both patellae by muscular action is uncommon as all cases of double symmetrical fracture are. However, instead (p. 524) gives reference to five cases in which this has occurred.

The treatment of fractured patella presents in its details an infinitude of variety, but the various methods may be comprehended under three classes. One: where the limb is immobilised to various contrivances are used to exercises
traction on the skin. Next the fragments together.
A second class in which some form of substanceless traction on the fragments is employed.
A third in which an open wound is made and the fragments are directly united by wiring.

The various devices adopted under the first of these classifications to secure apposition of the fragments are numerous varying from the simple arrangement of Bandages used by Sir Astley Cooper to the complex apparatus such as Hamilton figures in his treatise. Even after aspiration one cannot be certain of setting the fragments in apposition because the traction sufficient to accomplish this either cuts into the limb or causes intolerable pressure. Instead such traction cannot overcome the tendency to lifting of the
Fragments whereby the fractured surfaces turn somewhat forwards. That this is so can be readily illustrated in a case that has been cut down on preliminary to wiring. If this pressure be made above and below one sees the fragments tilt when they are approximated. A layer of paris dressings which have been advocated by C. Heath as very efficient are on the other hand as strongly condemned by E. Hamilton as being quite inefficient as a means of approximating the fragments. If applied at all firmly liable to cause dangerous constriction of the limbs. Treatment by any of the continuance used in this first method is necessarily very prolonged extending into several months before any attempt at flexion can be permitted - the danger of course being yielding of the fibrous spongyous union of the fragments for though bone union has been recorded by Bony such cases are rare as to be practically a negligible quantity.

Examples of the second method of
Treatment have naturally become more common as surgeons have gained more confidence in their antiseptics. The principle is not by any means new, however. As I would class the direct application of Malgaigne's hooks to the fragments. They have been many cases treated satisfactorily by means of the hooks—thus enabling the surgeon to bring the fragments in close approximation. Nevertheless, spoken highly of them, with the antiseptic precautions adopted nowadays there can be little or no danger in their use. Lewis's or Otis's hooks are merely modifications of Malgaigne's and need no comment. Of other methods three have attracted notice—Barre's, Kocher's or Rolando's. By Kocher's method a silver wire is passed beneath the patella through the knee joint, then outside the skin, the two ends twisted together. There is the obvious objection that not merely is the knee joint penetrated but there is a continuous communication between the inside of the joint and the outer air till the
Fracture untreated and the wire is removed.

By Barker's method whereby a silken wire
entirely is passed beneath the patella
then tied firmly below the skin there
is no continuous possibility of infection
of the operation if it be performed
with efficient attention to cleanliness. The
operation however causes danger of infection
to the joint. At a meeting of the Clinical
Society of London May 24th 1887 Robson
introduced a method of treatment which
has since been employed in a number of
cases. After aspiration of the joint two
long steel bone set pins were
completely through the quadriceps tendon
just above the upper fragment the skin
being first drawn up to avoid traction on
the other through the upper end of the
ligamentum patellar just below the
lower fragment the two sets then
were then brought in contact by traction
on the pins except opposed by a silken
suture passed round the pins in a
figure eight. An aseptic dressing was
than applied. After three weeks the
fractures were removed & a plaster of Paris
dressing substituted for the splint.
Robson claims that he has more firm
union in his cases - but others who have
employed the same method have not
claimed more than fulsome union as
resulting.
Anderson has modified this method to
the extent of passing the wire through
the patellar aponeurosis of the
 quadriceps but the principle is precisely
the same as Mayo Robson.
(Lancet July 2nd 1892)

"In gynæological System of
Surgery ch. 862 there is a suturing wire
round the patella & the adjacent fibrous
tissue leaves it substanciously.

Of these various operations the preferable
is Robson's - it involves least danger
to the joint than either Kocher's or
Barker's - it is easier in application than
Barker's or Snyman's - is quite effectual
in bringing the opposed fragments together
& requires no elaborate apparatus such as
Malgaigne's Books which are not always accessible. In these methods, again, it is difficult to apply them in many cases, if no special advantage except in badly comminuted cases with some separation. In these, indeed, its advantage is evident. After any other treatment including that of incision and wiring.

The above methods, however, depend for their success on the absence of a condition which from pathological observation is fairly common in fracture of the patella from muscular action. This condition is well illustrated in two cases of reports (Lancet 1831. 7 1763) where the cut down turned on these the metaphyseal epicondylitis was torn through the gap between the fragment being closely applied to the upper surface of the lower fragment. In such cases they are apparently the main fracture from muscular violence, and subcutaneous injection could be obtained no matter how closely.
The fragments might be brought together for there would be a fibrous band interposed between them. Again it is impossible as far as present knowledge goes to discriminate between cases where this band is interposed, others where it is not. Perhaps by the development of osteography this knowledge may be obtained however untrue.

The operation of pulling down exposure the fracture union the fragments which meets with more general acceptance than it did a few years ago.

In 1831 Hamilton could say of it: "The primary treatment of simple fractures of the patella by coning the fragments must be regarded as still unsettled. It is true that the operation has not been advocated yet it is by no means wholly discarded even by those who would not recommend it as a method of successful application. Exceptional cases occur which invite torture performance especially in hospital practice."

(Hamilton 245)
since then evidence has been growing in
favour of this procedure. The few
advocates have now increased in
numbers. In include the most successful
angels in this county, in America, in
France where the operation was first
received and is very hostile now. But
is also a very advocate in Mr. Lucas
Championnière.

The method is the only one by which
osseous union can be practically
guaranteed. With precautions as to
antisepsis now observed, there is no
danger of suppuration. There is no
danger of any inflammation little less than
suppuration. The treatment requires
less confinement than any other.

While for recent fractures one might
hesitate to try another procedure first.
There is a class of cases in which
the operation is distinctly called for —
those where other treatment has not
been successful in restoring a
useful limb. In these cases one is
justified in seeing the edges mending —
dividing the tendon of the extensor if necessary, after Spencer's method.

That the union after a union is good is seen in a case recorded in the Lancet of March 19th, 1887 by Dr. J. B. Turner. The patient a man of 25 had had his left right patella reset by Mr. Mayo-Bolton in June 1886 for an ununited fracture with separation. About July or August of 1886 he again fell and fractured the same patella. This time close to the insertion of the ligamentum patellae—the old fracture held quite firmly.

With any of these methods of operative procedure—passive movement, massage, electricity—are called for to keep up the general condition of the muscles and restore the mobility of the joint.

Lately (April 18th), 1886, Barker has published a further note on this method in the British Medical Journal expressing his continued satisfaction with the cases treated by his subcutaneous method. Efficacious as it may be in certain cases one cannot guarantee accuracy of opposition from long
amphora on account of the pathological
fact previously mentioned. An advantage
it may claim over Robson's is that there is
a permanent loop round the vessels to
counteract any stretching of the union if
it be fibrous - while by Robson's method
there is nothing to counteract stretching
or separation of the fragments. On the whole,
for the ordinary surgeon it cannot be as
easily or quickly performed as Robson's
method, but requires for its performance
a special needle which might not be
at hand when most wanted. To perform
Robson's operation there is nothing to
prevent it being done even without an
anaesthetic five minutes after the
patient has been first seen, as no apparatus
really is required.
Fractures of the Bones of the Leg.

These fractures constitute by far the largest proportion of fractures under treatment here, outnumbering even fractures of the bones of the forearm. There begin all 287 fractures of one or both bones. This yields a percentage of 25.8 per cent. compared with 10 in Gault's tables.

Of my own cases I find notes of 82 in which one or both bones were broken. This excludes several cases of fracture with extensive laceration of the soft parts when immediate amputation had to be carried out.

Subjoined is the table of ages of these 82 cases—three of whom are still in the Infirmary.

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<thead>
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<th>Ages</th>
<th>1-10</th>
<th>10-20</th>
<th>20-30</th>
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Sixty one cases have been in males; twenty one in females, of the latter being double a compound fracture of the right leg; a compound fracture of the left. In addition to this case—nine others have been compound—one of them requiring amputation ultimately.
These fractures I would propose to consider according to their site. Taking three main groupings - i) fractures of the upper end of one or both bones ii) fractures of the lower end of either or both bones iii) fractures of the shaft.

Of group one there are only seen two instances both caused by direct violence.

S.R. aged 32: a mason fell from a scaffold to the ground - thought the struck the knee in falling. He was admitted shortly after the accident (Dec 19th 1836) when I found much swelling and bruising around the knee - a fracture apparently just below the tibia only and running almost transversely. I could not be certain whether the fracture ran into the joint by a vertical line or not. Swelling and inflammatory reaction were very marked. Two months after the accident there was good union or useful limb - but as for very little power of flexion at the knee joint, after that time he passed out of observation.

The second case was that of a woman aged 22 admitted Jan 4th 1836. She had been standing
on a band it gave way & she fell with the right leg doubled under her. On examination there was an oblique fracture of the tibia beginning just below the tibial tubercle and running inwards, downwards and backwards - the fibula was broken at the same level. There was some overriding and the sharp edge of the lower fragment of the tibia lay just below the shaft in front of the upper. Set the fracture leg fully flexing at the knee getting the fragments locked into position & then get the limb straight. The knee joint was not injured in this case & was not involved in the subsequent swelling.

On Jan 25th when limb was put up in plaster the callus was still very soft but the line of union of the tibia seemed good.

Of the 44 fractures in children 44 cases of the shaft eight occurred in children under 10 - the youngest in a baby 15 months old. In 4 cases both bones were broken at the same site - in three cases the tibia only - in the 44th case a boy of 10 who was admitted with the
History of having fallen off a wall on Feb 6th 1836. I could not be certain if any fracture of the fibula, but suspected it at a higher level than the tibia. The boy presented marked ecstatic deformity of both femora & both tibiae - the tibiae being flattened laterally & curved with the convexity forward, presenting a sharp anterior border. The right tibia was broken transversely at the maximum point of the curve - about the junction of middle and lower thirds. The parents would not take advantage of the chance presented of remodying the deformity of both legs some accordingly allowed the fracture to consolidate - keeping the curve as near that of the other leg as possible. In all of these eights cases the result has been a perfectly useful limb.

In one case that of a man at 64 years there had been a fracture of the shaft of the fibula without a fracture of the tibia. He was admitted Sep 30th 95. Gave the history that his right leg had been caught between a wall & a metal roller.
and crushed severely. There was a small punctured wound on the outer side, numerous abrasions & a fracture of the fibula about the junction of middle & upper thirds but the wound did not communicate with the fracture. Patient suffered severe pain for about a fortnight probably from some concurrent injury to the branches of the external popliteal nerve. In this case crepitus could be got fairly easily on manipulation. Since then I have had a case sent me as fracture of the fibula at this site which turned out to be otherwise. The man gave a history of his leg having been crushed in a stable a week or two before. He had gone about his work though he was lame till that morn when the pain became so severe as to prevent him from walking. On examination there was a fixed point of acute pain on the outer side of the left leg just below the head of the fibula - there was no swelling, no ecchymosis, no crepitus could be made out. On careful palpation
According to
the pain radiated from the man's description along the distribution of the external popliteal nerve - on pressure over the nerve as it lay behind the shelter of the hamstring tendon the same pain was experienced. It is
probable he had a neuritis set up by a bursa in the nerve where it wound round the shaft of the
femur.

In two cases the tibia alone has been
fractured about the middle of the shaft; in
none was there any displacement. In one of the
times a man of 32 - the tibia was broken
transversely a week before admission. When
the patient came under observation there was
practically no callus - a crepitan was readily
got - it caused the patient very little pain.
The fracture united in about six weeks' time.

The other thirty two cases have been
examples of fracture of the shaft of both
bones - by direct or indirect violence. The
site varied from 2" below the tibial to the
junction of the lower ½ & the
Fractures below this I consider in the next group. As a rule the fracture was oblique, the fibula being broken at the same level sometimes - at other times at a higher level. In most of the cases there is no special peculiarity requiring further notice, one or two have been of interest pathologically from their extent. In two cases a portion of the shaft has literally been shattered. On Dec 31st 85 a man of 35 was admitted, with the history that an explosion from a gas main had blown out a window which struck this right leg. There was extensive bruising of the leg, a comminuted fracture of the shaft of the tibia - the bone for about 3 inches above the middle being shattered into several pieces. There was no external wound. Fortunately there was very great swelling at time of admission, the whole of the deformity could not be reduced. But this was accomplished a fortnight later under an anaesthetic. In Jan 15th 86 a man aged 38 was admitted about an hour before a heavily loaded
drag had passed over his left leg. Foot was very cold on admission & pulsation could be made out in the antero-lateral artery. About 2 ½ inches of the shaft of the ulna in its middle third were shattered into many fragments lying just below the skin. There was laceration of the extensor muscles. Under an anaesthetic I tried to reduce the fragments into position but only partially succeeded. Some of the smaller fragments slipping out of position at once. Patient made a good recovery however. The limb is now consolidating a little twisted but of good shape on the whole. The Callus of course is still soft & yields on manipulation.

The case of a patient admitted Oct 26th 1825 is another instance of severe fracture caused by direct crush. In this case the fracture was oblique & was accompanied by considerable damage to the soft parts but recovery was satisfactory. Patient can now follow his occupation of a Carter without difficulty.

The cases under group II numbers 27 in all.
and aseparable of further subdivision into three groups: fracture of the lower end of the shaft - many obliquely - nine cases into the ankle joint - fracture of the fibula with or without injury to the ankle joint - but accompanied by evasion of the foot - fracture of the fibula accompanied by evasion of the foot. Five of the nine cases in subdivision have been the result of direct injury. The occurred in a boy of eleven the result of a heavy stone falling on his leg - there was a greenstick fracture of both bones just above the ankle - a considerable force was required to straighten the limb.

In a second case seen Sept 15th & 21 the fracture was very obliquely examined for by misfortune united. It was firmly consolidated however Jan 1882.

In a third case in a man of 68 the fracture was caused by a cart wheel. The fracture was obliquely - there was overriding which I could not by any device wholly overcome. Patient drifted out of observation, but two months after the accident he bad still a
oblique fracture of the tibia just above the joint - is still - 5 weeks after the accident unmitigated.

I have notes of eight cases, examples of group

(Nov 18th 56)

- The youngest child of 7 who fell
  come out of school with the leg doubled under her knees, - she struck the outer malleolus against the steps. There did not seem to be a fracture of the tibia but the fibula was broken obliquely by a lirmump from above downwards back wards through the malleolus. There was well
  marked crepitation. The fracture permitted of
  abnormal inversion of the foot. In another
  three cases there was a definite history of a
  fall with the foot twisted inwards - the
  four others could not say definitely how
  the foot was twisted in falling - In one case
  that of a man aged 37, admitted June 28th 56.
  The fracture ran through the malleolus -
  he fell from a scaffold, struck the
  external malleolus. On manipulation the
  lower end of the fibula could be moved
  about producing crepitation there was a
  marked line of crepitation upward oblique
Cliffs ankle and an uninjured fracture.
A fourth case seen Dec. 1826 was a
sort of V shaped fracture of the lower end of
the tibia but above the level of the joint.
Healing was satisfactory as also in the fifth case
one of transverse fracture just above the
ankle. He was caused by the passage of a cartwheel.

Four of these ten cases gave the history one
expects in a simple fracture: the history of a fall
with the leg twisted. In one case the foot of
the ankle was twisted outwards; in another the
man fell across a Palka with the foot
 twisted inwards. In the two cases were un-
certain about the position of the foot. In each
case there was a pronounced fracture with
deformity in two of the cases closely analogous to that
seen in botte's fracture. The deformity was
more easily reduced and more easily kept in
position when reduced.

The tenth case is still in the wards - is
the case already recorded of fractured femur
and ribs. The man could give no account
of the injury to his leg - possibly as he was
motorcycling - he broke it in falling. It is un-
across the malleolus. There was great bruising extravasation of blood which, unless relieved by massage, left the ankle stiff. In some cases the fracture was at a higher level; the fibula was caused in some by a direct blow in falling against the sharp edge of the curbstone. In none was there any alteration in inversion of the foot. All of these cases except the child of seven, occurred in men ages ranging from 28 to 43.

Various estimates have been formed of the relative frequency of this fracture as compared withotts. Demythener asserted that it was the more common of the two. Amongst modern writers Crock argues with this view (in Fractures and Dislocations, 1880), while Boyd in the case system of Singer, includes it under his own view. The fracture is well described by Tawse (ch. 5) — the fibula may break about the joint where it rests against the tibia, that is the tip of its malleolus is drawn upwards by the forced movement of the foot; the shaft of the bone is correspondingly
spond or tilted outward. The usual seat of the fracture in this case is near a  
half-inch above the tip of the  
malleolus. The fracture must not be  
confounded with the common one,  
which subsequently described, in which  
the foot is twisted outwards, the internal  
latero-lateral ligament torn, the internal  
malleolus broken, the fibula broken at a  
joint somewhat higher up, about 2½  
inches above its tip.

Where the fracture is not the result of a  
blast, the mechanism, it may be observed is  
similar to that of the common sprain of the  
ankle—in which the foot is as a rule  
 twisted inwards.

In Hamilton's analysis of 68 cases of  
fracture of the fibula—15 resulted from  
direct blow. (P. 65.)

In the cases I have cited, localised pain  
was not regarded as sufficient indication of  
fracture unless accompanied by ecchymosis.  
In one case that of a boy of 13 who came  
under treatment on June 13th 85, there was  
localised pain over the shaft of the
Fibula about 2 inches above the heel. No
swelling could be detected but the foot
was too tender to permit of much
manipulation. Made a provisional
diagnosis of fracture of fibula as the
condition dated from a fall on the
outside of the leg two days previously.
Pressure caused pain only over one spot.
However on second day after admission the
temperature rose to 103° F. There was
some fulness - I cut down expectant to
find osteomyelitis. However there was
merely a small cavity in the cellular
tissue containing a few drops of pus; there
was no evidence of acute osteomyelitis of the
fibula and evidence of a fracture. The
temperature fell next day - the boy was well
in a few days.

The third group is constituted by fractures
of the fibula accompanied by eversion
of the foot - from some injury either to the
internal lateral ligament, or to the
internal condyle. In six cases the
internal condyle was fractured - there
was marked eversion of the foot; in two.
there was dislocation of the internal lateral ligament - with very little eversion in one instance - in the last case - the displacement was more backwards than outwards & could not be remedied even under an anaesthetic till the tendo achillis was divided.

Three of the cases were admitted the day after the accident when the swelling was very great & looked the exact amount of eversion. In two of the cases the result has not been satisfactory - there is still eversion of the foot - a marked ridge running across the tibia - marked induration at the site of fracture - considerable pain & stiffness on walking. This condition persists (April 1896) in one man whose fracture was set in Feb 1895; less marked in the other case - which is only two months old. The eversion was fully recognised & an attempt made to remedy it by manipulation & two carefully adjusted splints - but apparently after 24 hours the swelling & effusion interfered with mechanical obstacle in the way of reduction.
5 of the other four cases in which the condyle was fractured one is still under observation, as just about a fortnight old; another occurred in a woman of 53 who was alone before the accident. She sustained a Potts fracture of the left leg in Oct 24th with much evasion. After three weeks she was discharged with the limb in plaster. Since then she has been under observation with a stirrup. The fracture seems in good position but there is very little evasion of the foot and projection marking the fracture through the internal malleolus. But there has been some periostitis around the lower end of the fibula. Under massage, douching and passive movement the condition improved and the patient expressed herself as being so well able to walk as before the accident.

Of the other two cases one occurred in a woman of 53 who was very drunk on admission Sept 21st, 1876. She could give no account whatsoever of the accident. There was a fracture of the fibula a comminuted fracture of the internal
Wallclocks and eversion and dislocation back-words of the foot. This fracture was not on this was no swelling. The deformity was readily reduced and maintained in position though with some difficulty. Ultimate patient recovered with a perfectly useful limb - no deformity.

The other case was a sergeant of militia who was admitted Jan 16th 1895 suffering from a Cotts fracture with slipping off of the internal malleolus & marked eversion of the foot. The fracture united without deformity. Three months afterwards the man was able to go about walking so well that no one could have suspected an old fracture.

The case of double fracture may be mentioned: there was a Cotts fracture of the left leg with eversion of the foot & fracture through the internal condyle in a woman admitted Dec 12th 1895 discharged Feb 10th able to use the left leg a little - the union in the right was a compound fracture about the junction of upper-middle thirds. In three two months since she has recovered full use of the left leg with perfect freedom of movement of the ankle.

In the two cases where the internal ligament was
Lacerated: recovery was complete. In the case where the tendo-achillis was divided, the ankle was weak & rather stiff for some months time. She passed out of observation before regaining full power.

Out of 16 cases, Hamilton records 12 presented some deformity.

There were as mentioned nine cases of compound fracture, one in a girl of 10, the others in males. In four of these cases, there was a small punctured wound from which there was free venous oozing for a number of days. Of these four, three were oblique & comminuted — one in a man of 57, could not be reset in position, was run on Dec. 10th, six months after the accident by the Medical Officer in charge. It supported, however, ultimately required amputation. Patient recovered. In another case the fracture was just above the ankle, there is stiffness, still to this day, seven months after the accident. In the other two cases of the four recovery was complete.

On Aug. 21st, 1885, admitted a girl of 20 who had fallen off a wall & sustained a compound fracture of the right leg — oblique of the tibia
from above downwards forwards onwards through the lower third. The sharp end of the upper fragment had perforated the skin & reaching a flap of skin, after wipping off the lower end of the upper fragment, readily affected reduction. Recovery was delayed by sloughing of the undermined bridge of skin over the internal malleolus. However in two multilimus fractures was discharged with a firmly united fracture.

In another, a man aged 28, there was a compound comminuted fracture about the middle of the leg with much bruising around the wound - a cramp gave way, & som edoing that was being projected fell externally & the foot was very cold & no pulsation could be made out but in line circulation returned and the fracture set though only after considerable febrile reaction & pain. There was no suppuration in spite of the extensive bruising.

The other three cases were examples of very severe compound fracture in which the question of amputation had to be considered, but was deferred & the limb given a chance with success in each case.
The first was in a man aged 24 admitted June 16th, 1893. A stone slab had fallen on his right leg causing a compound comminuted fracture, there being on the anterior and inner surfaces of the leg a wound four inches long through which the ends of the bones protruded. One fracture ran obliquely about the middle of the leg, while two inches lower a second fracture crossed the fibula transversely. The fibula was broken in one place at the same level but did not communicate with the wound. Under an anaesthetic I cleansed the parts and reset the bones after removing with bone forceps a projecting ridge which prevented reduction. The wound seemed to heal by primary union but at the end of a week slowly broke down without any rise in temperature or sinus formed from which after several weeks I removed a small piece of bone. Thereafter the sinuses closed and the leg united firmly.

The patient now ten months after the accident can use it readily.

The second case occurred in an elderly man.
23 who was thrown out of trap after run over June 17th 1895. He sustained an oblique fracture of the left tibia and fibula about the junction of middle and lower thirds. About two inches of the shaft of the tibia had been pushed through the skin and was lying over it. The neurotomic had been stripped off the protruding end. The fibula also communicated with the wound at the seat of fracture. The muscles were severely lacerated. Even under an anaesthetic I could not accurately reduce the overriding & put the ends of the fractured tibia in opposition. I cut about half an inch off each end & then wired the tibia. These were a good deal of dirt ground into the muscles & the venous oozing from the lacerated tissues was profuse. Better free suppuration ensued unfortunately with necrosis of the ends of both bones. At the end of two or three months I removed some small sequestra. The sinuses then readily healed up & the bone consolidated at the site of fracture. Patient was discharged on Dec 9th wearing a crutch splint. There was goodunion &
very little deformity. The ankle joint was stiff. The muscles wasted, but they were regaining power under massage and faradism. Since then patient has continued to improve although restoration of function is not yet quite perfect. There being still stiffness in the toes and ankle. I have very reason to believe that in time it will become normal.

The third case occurred in a man of 31 years of age who was admitted on January 20th 1846. While driving a cart down a rather steep incline the horseman away a daggers across the ground for a considerable distance. On admission I found that he was severely shaken and had sustained a compound comminuted fracture of the left leg just above the junction of the middle two fourths lower fourth. There were in addition numerous bruises over the body and left side of the head. The fracture separated a triangular piece of bone with its apex pointing forwards and its base constituted by the posterior surface of the tibia for two thirds of its length. Thus the bone,
Of fracture in the lower fragment ran from above downwards backwards matter outwards - in the upper upwards backwards outwards - the femur was stripped off most of the bone. Thorough fracture there was great laceration of the muscles & a wound about four inches long in the skin running transversely with much bruising. The fibula was broken at the same level but did not communicate with the wound.

Under an anaesthetic I cleansed the wound removed the bones. I thought advisable to remove the loose wedge of bone as its attachments were too few to allow of a proper blood supply. The two irregular edges of the anterior surface of the tibia were then clipped away to fit more satisfactorily a wired. The evert from lacerated muscle was very profuse - laceration offering the posterior muscles stretching down the calf to the lower third. Free drainage was provided - the limb put on a back splint with a
foam concrete. The wound did well, there being very little sloughing that confined to a small area of denuded skin anteriorly. Patient was going about three months after the accident with the leg encased in a plaster of Paris splint. The limb is in good position - the fibula is firmly united - there is formation of callus between the broken ends of the tibia - but the loss on the posterior surface is so extensive that the fracture will require treatment: take some months before one may take off the plaster cast.

Some points with reference to the treatment of the above set of fractures may be mentioned. The most commonly used and satisfactory appliance was the black splint with a foam block and side splints. The indication of great importance was of course to set the fracture without any obliquity or overriding. In some cases flexion of the knee with slight extension accomplished this object, but in others especially oblique or comminuted fractures, this was insufficient.
I have found great help in handling the knees at the seat of fracture. With care this can be done in a simple fracture without any danger of making it compound, but it is often sufficient to release fragments which have got locked in an abnormal position to enable one to restore them to their usual relations. In some cases, of course, an anaesthetic was required to allow of free manipulation. Even then, with the complete muscular relaxation as obtained, it was found impossible in certain cases with much obliquity to completely rectify the deformity which occurred even in simple fractures as well as in compound fractures as that cited on p. 224, where the bone fractured had to be used to remedy the deformity. The limb has then been strapped on to a lace splint with a farthingale - care being taken to hold the fracture in position all the while. For the customary fractures of both bones I employ no other than the splint added to fit the limb accurately, preventing falling back of the heel of lower fragment. In some cases constant attention is required.
in the first week or ten days to prevent this. Where the fracture has been caused by considerable violence the swelling of the calf is great. The bandages raising the heel and lower part of the leg when the fracture is set may be quite insufficient in 24 hours time when the swelling is greater. When readjusted will of course become excessive when the swelling of the tissues begins to subside. Another matter of consequence is rather too much neglected in fracture of the leg. In many cases the patellar do not look straight upwards when the patient lies on his back. They have a greater or less inclination outwards. In one case that of compound fracture of the leg I cited on p. 1. The deviation of the patella to the axis of the foot which of course correspond from the perpendiculares on the uninjured side amounted to nearly 30°. In this case to fix the foot in a further at right angles with the horizontal line it then try to slide the patellar round till it too looked directly upwards would have been to court disaster. poster or later the
desire to get rid of the strained portion of the thigh would have caused a rotation of the thigh over the fragment of the tibia while the lower remained attached to the rigid footpiece. In a minor degree of this obliquity, which has been present in the majority of the fractures I have seen, I have found it sufficient to put the foot at a lower angle and in the space where it does not fit the splint accurately. But for cases where it is more marked, I have had prepared a splint with a more or less movable footpiece, the footpiece being hinged and capable of rotation so as to fix it at any angle to the vertical plane while of course at right angles to the long axis of the splint. The splint is then completed by the addition of two side splints reaching above the knee and padded to correct any lateral obliquity if that exist. I have made no use of any of the splints which allow of flexion at the knee. By using such a splint, one loses the power of applying lateral splints to fix the knee and consequently loses a certain amount of control over rotation of
the upper fragment. The flexed position of the knee has of course an advantage in that if itself it opposes the external rotation of the thigh & leg - but with a restless patient the knee is less fixed. All the cases of Pott's fracture mentioned above have been treated in the straight position as described - attention being paid to paddling properly around the ankle so as to prevent eversion of the foot. With this fracture as with Colles fracture however the essential is to set the fracture supralateral joint. If that be done straight side splints & a back splint will be quite sufficient to maintain it in proper position. If the fracture be improperly set - dragging splint will not make it any better & will be more liable to cause sloughs from the localized padding of the absence of the uniform pressure thus is in the other cases. In one or two cases of oblique fracture through the upper third with persistent overriding I have tried extension to the foot with little beneficial result - the patient being unable to stand it as a rule.
One device I have found of very great value in certain cases of fracture accompanied with much bruising where the fracture is seen before much swelling has occurred. I have applied it to a number of simple fractures.

After fixing the limb on the back splint, well padded, I have surrounded the limb from the foot up to the knee with a thin layer of tow well teased out. On the top of this is applied a bandage drawn firmly so as to compress the tow into a firm mass. Side splints are then applied as an additional security. All authorities warn one against the application of a bandage immediately over a fracture on account of the danger of gangrene. The evil result of constrains from the myriads of bacteria of the bandage.

In the method I have mentioned, the dressing of tow or tow wound in highly elastic does not act as a band constrains the circulation but allows the circulation to go on while by the uniform pressure it prevents excessive inflammatory swelling. In the cases I have used it, when the dressing was taken off at the end of 10 days
it has been as easy to recognise the fracture as on admission, there has been no swelling of the foot and no discomfort whatsoever from its being tight. I have had to cut open a firm, aphthid crust, even on an old fracture, but never to disturb this dressing. I employed it in one case of very badly comminuted fracture of the tibia from the passage of a cart wheel, where there was so much bruising I was afraid the skin would slough. The case is cited on p. 115. The swelling was practically negligible, quantity of circulation returned freely to the foot, although on admission no pulsation could be felt in the anterior or posterior Tibialis. This was kept on for twelve days. In another case (cited on p. 220) of both fracture with comminution of the internal malleolus, the dressing was applied firm round the ankle and kept on for ten days. The limb remained very comfortable and there was no swelling of the feet, when taken off. The contour of the ankle joint was as distinct as on admission. In a number of other cases of similar nature
the result has been as satisfactory. It is of course of no service in any case where there is already much swelling. It may be mentioned it is the dressing I apply to every case of recent or chronic sprain or other joint. In the case of the ankle the patient can generally walk on the third day & recover without the support that usually follows after the old treatment. Best - a plaster case.

Of course any fracture requires daily inspection - not of course to extend of removal of splints or bandages unnecessarily. In cases which came under observation with much loosening & overriding I have found it serviceable to reset the fracture after ten or twelve days, under the influence of an anaesthetic. Then sooner or later at periods varying from a few days to a month or more according to the gravity of the case a plaster case has been applied & the patient allowed to get up remaining under treatment for massage & jointing that will deemed necessary.

I'm an able & suggestive article in the
British Medical Journal of April 20th, 1888.

Mr. Appleton has criticised adversely the common treatment of oblique fractures of the bones of the fracture, deeming that the results got are very imperfect and call for further non-surgical treatment. He points out the impossibility in many oblique fractures of securing accurate approximation & alleges this to be due to the swelling & shortening of soft parts by inflammation. That this plays an important part in simple fractures is of course perfectly obvious to anyone who has tried to set an oblique compound fracture with overshoes found himself unable to do so without employing the bone forceps. His contention is right that one inflammatory material has been avoided, the shortening is due to this most nearly to a true spasm of muscles but it is difficult to see how this remedy will rectify this cutting down & pegging all bones for the correction of a simple fracture into a compound will notwithstanding the shortening not will be necessary to resort to bone forceps.
In Colles fracture again where there is marked deforming and inflammatory effusion when the fracture is seen - there can be no possible benefit derived from cutting down - if itself that can have no benefit on the eversion - nor can it ever be done to rectify the deformity any better than reduction under an anaesthetic - for cannot turn till the fracture is properly reduced - is properly reduced it will stay so without wiring. Of course, the case assumes a different aspect if the wound is to suggest a gradual resection of the joint - but the probability would be deemed rather too heroic treatment.

Lane has been supported by an article by Redding in the Lancet of June 1st, 1888: He gives statistics of cases of Colles fracture - fracture of the forearm where there is pain more or less severe not relating to work several years after the fracture - the noteworthy point about the cases of Colles fracture is that they all stayed in hospital too short a time for the treatment necessary for so important an accident. The fracture had been treated but the element of main...
nigms of the ankle joint had been altogether
ignored—"with disastrous result as
follows improper treatment of a common
strain. But there points out a real
defect in the treatment of certain fractures
here, but the proportion is not nearly so large
as he would suggest, more the depression
and working force seen with cases
which have treated in hospitals sufficiently
long to allow of the resolution" and
inflammation of the condition of angling.
Underlying the hope there seems to be
another fallacy that many fractures are
allowed except treatment to yield a kind
of satisfactory as before the accident—a
manifestly untenable hypothesis.
It may be remarked of those very
oblique fractures that if they are not
sufficiently early they can often be got into
near accurate apposition and not
likely to get displaced, as the amount of
inflammatory exudate is small unless the
fracture has resulted from some great
violence.
In direct opposition to the above views
is the so-called ambulatory treatment of fractures of the lower extremity. This has received considerable attention, paid to it lately, chiefly by American surgeons. It has been discussed in the Buffalo Medical & Surgical Journal for 1884, in the Archives of Surgery for 1884, and at the German Surgical Congress for 1884. The treatment has been applied to fractures of the femur as well as of the leg, consists in essence of the early application of a rigid splint extending well above the fracture, enabling the patient to walk about on his fractured leg. In the case of the femur—the fracture is surrounded by a thin plaster cast, the whole limb is then fixed in an apparatus somewhat resembling a Thomas knee splint. The foot is fixed to the bottom bar to allow of slight counterextension in addition to the weight of the leg. The apparatus is applied within a week of the sustaining the fracture. In the case of a fracture of the leg transverse or oblique, the limb is excised at once—

To follow the method given in the Archives of Surgery—"in a plaster...
...the foot - between the foot and the limb so as not to press on the foot but rather to allow of slight coaptation by the weight of the foot on the lower fragment. The theory is that the weight is transmitted through the plaster case to the head of the femur at the femur - that the patient really walks on these. That the above method would prove satisfactory in transverse fractures of the shaft ofibia or femur with displacement - there can be no doubt. But it is also questionable utility in oblique fractures of the femur with overriding. Here is first the danger of applying a rigid case around bruised tissues which would naturally swell. There is in the next place the difficulty of guarantee in the case of fracture of the femur at least that there will be no disturbance at the seat of fracture with the frequent change of position on the part of the patient. It has of course an obvious advantage in those cases where the danger to life is increased.
by the maintenance of the recumbent position—though evening those one would prefer to wait till the swelling had reached its maximum had begun to subside.

Lauder's method as carried out at Buda-Pesth has been described by Kummer in the Lancet for Oct. 27th, 1884. The treatment by this method involves continuous stay in hospital. After the first fortnight passive movement is commenced & massage to the callus, the patient being of course kept at rest, being the early stage the fracture is fixed in a plaster of Paris splint. Lauder claims that his method shortens the time required for consolidation. In a series of cases he found that by the old treatment 38 to 53 days were required, by his only 16 to 57 days, required in corresponding fractures for complete consolidation. The successful carrying out of this method it is essential that the fractures be got early before inflammatory reaction has come on. I have carried the method out to a modified extent in one or two
cases but have not so far sufficient evidence as to the alleged short temp of the time for consolidation.
In one case have had the opportunity of observing a fracture of the astragalus associated with a compound dislocation of the ankle joint. The man was a miner or had been struck on the inner aspect of the right leg by a heavy mass of coal. He was admitted into Kington College Hospital. There was a compound dislocation of the ankle joint - the sole of the foot bent inwardly upwardly and outwardly the articular surfaces of both tibia and tibula projecting on the outer side through a clean cut wound. A stump longitudinally for 3 inches. The tip of the internal malleolus was torn off. Otherwise the bones were unjured, there was very little bruising. The accident had been caused by a severe force applied to the inside of the leg - the two bones through the skin on the outside. The case was rendered all the more noteworthy to me by the somewhat extraordinary treatment adopted by the practitioners in charge. It was impossible to reduce the dislocated bones, even under an anaesthetic, he accordingly amputated.
through the middle third of the leg. If
\text{solution} be employed cold tap water
was used, the wound supposes...became
very foul he poulticed it with linseed meal.
And the patient made a good recovery.

Examine the limb after amputation and
found the tip of the metatarsal in its
normal site. There were small holes near
some lumps were evidently chopped
off the ends of the tibia. The astragaluwas
split antero-posteriorly but was not disturbed
in any way from its attachments to the tibia.
The most exhaustive commentary of cases
is contained in Sir Astley Cooper's 'Fractures
and Dislocations' (1842). This series of cases
given there contra tetoem from his own other
surgeons' experience contain several
somewhat resembling the above as in
cases 164 & 167. In these there was greater
wounding of the bones of the leg; however a
fracture as well as a dislocation. The
treatment at present is much as Sir Astley
Cooper recommends — resection of the
ends of the tibia epiphysis in an unreducible
dislocation. In the series of cases he cites
The results even in pre-antibiotic days were wonderfully successful—usually with mobility at the ankle being not uncommon.

If fractures of the other tarsal bones have occurred instances of cases of fracture of the metatarsals are of no particular interest.