**Observations in surgery / by Benjamin Travers, jun.**

# OBSERVATIONS

IN

# SURGERY.

BY

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TO

# BENJAMIN TRAVERS, ESQ., F.R.S.

SURGEON EXTRAORDINARY TO THE QUEEN, AND

SURGEON IN ORDINARY TO HIS ROYAL HIGHNESS PRINCE ALBERT,

&c., &c., &c.

My dear Father,

Apart from the consideration of relationship, it cannot excite surprise that I should desire to dedicate these first fruits of my professional experience to one who has laboured so long and so successfully for the advancement of our noble art.

To my uninterrupted intercourse with a mind animated by so philosophical a spirit of research

and observation, I must always consider myself largely indebted for any merit these pages may possess.

As to their defects, I can only say with the poet, —

Confiteor, si quid prodest delicta fateri. — Ovid.

With sentiments of profound respect for your professional worth,

I remain,

Affectionately your's,

THE AUTHOR.

44. Dover Street,
March 1. 1852.

# ADVERTISEMENT.

If we reflect upon the past history of surgery we cannot fail to remark that each generation has exhibited an amount of improvement proportioned to the readiness it has shown to listen to the teaching of its predecessors; and it is certain that he who chiefly busies himself with an enlarged application of what is already known, is the most trustworthy and ordinarily the most successful interpreter of later discoveries. If the stomach were indeed no other than a fermenting vat, or the nerves nothing but a series of electric wires, our work would be much simplified; but so long as we are dependent for our information upon the course and changes of abstruse vital phenomena, we should at least be grateful for the recorded experience of the past. Ambrose Paré (who thought himself divinely inspired on the occasion) tied the bleeding orifices of divided arteries one hundred years before the invention of Morand's tourniquet, and the Christian world was upwards of 1800 years old before it was certainly proved and made known by Dr. Jones, that the two internal coats of an artery,

when divided by the operation of a single silk ligature, heal and become adherent to obliteration, by virtue of the same process which effects the union of parts in all other cases of incised wound. Such considerations as these must be my apology for a reproduction in the following observations of much which may have been better told already, but which in my humble judgment will bear repetition.

Above all, it has been my endeavour to avoid the language of theory and vague hypothesis, which (to use the words of that ingenious writer Mr. Samuel Sharp) "have never done any considerable service to the practice of surgery; nay, for the most part have misled young surgeons from the study of the symptoms and cure of diseases to an idle turn of reasoning and a certain style in conversation, which has very much discredited the art amongst men of sense."*

* *Vide* the Preface to "A Treatise on the Operations of Surgery," by Samuel Sharp, Surgeon to Guy's Hospital. London, 1839.

Dover Street,
Feb. 28. 1852.

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# OBSERVATIONS IN SURGERY.

## OBSERVATIONS UPON FRACTURE OF THE SHAFT BONES.

### PART I.

#### FORMS OF FRACTURE.

The attention paid in the present day to the constitutional effects of local injury, and the more accurate estimate now formed of the powers of the system to influence or determine the actions of the part, render it advisable to review existing theories and ascertained facts more closely and at shorter intervals than heretofore. Their truth is thus rendered more prominent, and their application in practice becomes more correct and valuable. One consequence of an improved pathology has been, that fracture, whether simple or compound, is now treated with increased decision and success. Still a wide discrepancy of opinion exists as to details of management; and these pages are intended especially for the perusal of those whose oppor-

tunities of observation are not commensurate with the importance of the subject.

Whoever may inspect the series of broken bones to be found on the shelves of our Museums, will presently satisfy himself of the great variety of fractures, both as to direction and extent. The terms made use of to distinguish these are both descriptive and correct; viz. 1. the transverse; 2. the oblique; 3. the comminuted fracture. The late Mr. King, of Guy's Hospital, has described a form to which the term "impacted" is given. In this case, the upper portion of a broken tibia is partially received within the cancellous structure of the lower piece. The patient, a woman, ætat. 45, died in the course of the third week from the date of the accident, by which time it would appear that the business of repair was somewhat advanced. A sketch of the parts is given in the 11th number of the Encyclopædia of Surgery. The injury itself resulted from a fall from a chair, the patient alighting upon her feet. The drawing also exhibits a fissure on the side of the internal ankle, apart from the injury just described, and which communicates with the joint. The parts are preserved in the splendid Museum attached to Guy's Hospital.

The transverse fracture is of two kinds. The injury may be simple, and in such a case concerns the bone alone, the periosteum remaining unbroken. Such are certain instances of broken rib, clavicle,

and tibia in the young; but in later life, the bones being more solid, are not thus simply cracked, or broken through within the investing membrane. Here the periosteum also gives way, of which the consequent displacement is a proof. The transverse fracture is ordinarily marked in the shaft bones by slight effusion; it is not so painful as the other forms, the shortening is less, and the injury has sometimes altogether escaped detection. I have seen repeated instances of this in the clavicle, tibia, and radius, and in the vicinity of a large joint.

In the month of January, 1841, a labouring man was brought to St. Thomas's Hospital on account of an œdema and inflammation of the right leg, showing a disposition to spread towards the groin. This was said to have arisen from violence, of which no specific account could be obtained. Abscesses formed, and the cellular membrane above the ankle sloughed. A transverse fracture of the tibia immediately above the joint was not discovered until the broken ends fell asunder, from losing the support of the soft parts, as the swelling subsided. This man, being of a bad habit of body, became typhoid and died. He showed very little power at any time, but the overlooked and therefore neglected injury probably determined his death. He might have recovered from the constitutional effects of acute abscess or absorbent inflammation, without any other or more untoward complication.

In old people, the amount of violence which will fracture a bone is very inconsiderable, and the narration of the accident perhaps does not alarm the surgeon on that head. An elderly gentleman stumbles or falls upon an even surface; he is picked up and carried home; he does not complain of pain; he can put the limb to the ground, but he cannot walk: there is slow, œdematous swelling, involving perhaps the ankle-joint and its vicinity. "Many times, through hurry or inexperience, has this case been pronounced to be a sprain," and the remedies employed are consistent with such an opinion. After a time the party, becoming impatient of his condition, sends for further advice: the limb is now carefully examined, and the usual evidences of fracture of the fibula are found to be present. The limb being properly splinted, and absolute rest enjoined, the patient slowly recovers to the lasting discomposure of the surgeon first employed.

It is not difficult to account for some other sources of error in such a case. The mobility of the fractured ends, if it exist at all, is referred to the joint. The swelling is mistaken for capsular effusion, and if there be crepitus, it is attributed to a similar cause and place. Where the epiphysis of the tibia is broken off or separated from the shaft of the bone, the disfigurement is not great. Transverse fracture occurs sometimes independently of muscular relation, and is found in bones ob-

noxious to direct violence, or so situated as to denote their office to be that of configuration and support. The fibula is very liable to be broken across, so also the ribs and clavicle, as before noticed.*

Where the periosteum is much torn, and the bone large, there may be great displacement in particular instances of transverse fracture, and under such circumstances it is very difficult to maintain accurately the contact of the broken ends. To this cause may in part be attributed the production of a false joint, which I have known follow a transverse fracture of the larger shaft bones more than once.

In these transverse fractures, the provisional or external callus is not effused in the same abundance as under other circumstances. This is a consideration of some interest in reference to the fracture of the neck of the thigh bone. There the bony union depends upon the obliquity of the fracture, and the provisional

* Some anatomists observe, that the weight of the upper limb is transmitted to the trunk through the medium of the clavicle. This, if stated without qualification, is an error. In man the upper extremity is a mere appendix. The support which it requires is plainly to be sought in the region of the scapula, and the vast muscles which surround that bone.

When the clavicle is broken, the limb still hangs as before. Its direction is not materially altered. The pivot or axis of motion is lost, but in many cases the patient is still able to move, or even raise the arm to a limited extent.

callus*, more or less, is in proportion to such obliquity. *Cæteris paribus*, the greater the extent of the fracture within certain limits, the more abundant, relatively speaking, is the quantity of callus in healthy individuals. I have taken some pains to examine specimens of the fractured neck of the thigh bone. The instances of *non*-union almost always exhibit the transverse fracture complete, and situated close to the polished hemispherical head of the bone. If the trochanters be implicated, non-union is by no means the certain and invariable result of such an injury. The early application of splints and a steady perpendicular pressure, are very important indications in the management of transverse fracture.

## OF OBLIQUE FRACTURE.

Oblique fracture is best illustrated in the shaft bones. It varies in extent and in the character of the broken surfaces. The upper fragment is sometimes prolonged to a fine jagged point, which is likely to produce much mischief if the immediate appendages of the bone be extensively torn. Thus, in a case which occurred at Guy's Hospital many years ago, the patient died, on the third day of the attack, and seventh from the accident, of tetanus

* By this term I mean to describe the outer or parietal deposit, which is subject at a later period to the modelling action of the absorbents.

in its most severe form. After death, the upper fragment of the broken thigh bone was found transfixing the belly of the vastus internus muscle, the result of unusual displacement and very oblique fracture. This case, and one of a similar kind, where the patient was destroyed in a few hours, are related by Mr. Travers, at page 292., Vol. ii., of his "Enquiry concerning Constitutional Irritation." In the latter instance, the rectus femoris muscle was perforated by the upper fragment. In cases where an irreparable amount of injury is inflicted upon vessels, cellular substance, tendinous and muscular tissue, where there are loose clots with a great separation of the broken ends, the injury is ordinarily of the oblique kind; immediate death may not result from such accidents, but the patient does not long survive their infliction. Nature, being overborne by the violence and its consequences, either makes no efforts at repair, or fails in the attempt.

In the month of March, 1837, an old man, and a carrier by occupation, of a very rheumatic habit, fell whilst walking upon an uneven gravelly surface, so as to sustain a fracture of the right thigh bone in its lower third. There was some tension and displacement, the upper fragment "riding," and showing a tendency to protrude through the "vastus internus" muscle. There was no remarkable complaint of pain, nor any unusual sign of depression at the time of the accident. This has

been often noticed, when old people become the subjects of mortal injury. The limb was adjusted in a semiflexed position; but the bone continued to ride as above noticed. Beyond the certainty that no action had commenced at the seat of injury, things were pronounced to be favourable until the seventeenth day from the accident. The old man ate his food with appetite, and rested well at night. Now the respiration was suddenly affected, being slower and more laboured than is natural. The pulse, also, became slow and feeble. The patient retained consciousness, and died on the morning of the eighteenth day, twelve hours after the first accession of the symptoms here described.

On examination, the fracture proved to be very oblique, and the broken ends lay far apart in a muscular bag or pouch distended by a dark fluid blood. The surface of the lower fragment was quite bare, being stripped of its periosteum, and no inflammatory change whatever had taken place. The vastus internus muscle was lacerated partially. Much fluid was found in the ventricles of the brain, but no further change in any part, if we except such occasional interstitial thickening or chronic adhesion as are incidental to this period of life.

In certain cases, the solution of continuity begins in the transverse direction, which is afterwards inclined. This, also, is seen in the larger shaft

bones. The fracture, which has an oblique course, is more frequently complicated with wound than any other. It is questionable whether the true transverse fracture of the shaft of a bone ever presents the combination of an external wound formed by its protrusion. Nevertheless, from the application of an external force, as the kick of a horse, the transverse is occasionally a compound fracture.*

A very untoward circumstance, and which commonly accompanies oblique fracture, is a great separation of the periosteum, which is stripped from the bone, leaving it altogether bare or covered by a thin coating of effused blood. The ligamentous texture also suffers; and I have more than once found the interosseous space enlarged by a separation of the ligament from the tibia, through more than half the length of the bone.

It is not difficult to explain why the setting of a shaft bone, broken obliquely, should be a very troublesome operation: at the same time, if muscular resistance has been once thoroughly subdued, and a correct position obtained for the injured parts, the after treatment is often less elaborate than that required where the bone is broken trans-

* In January, 1843, there was a case of transverse fracture of the left thigh bone, with evidence of slight comminution, lying in the male accident ward, "George's" of St. Thomas's Hospital, produced precisely as suggested in the text. The wound was very circumscribed, but had extended to the coats of the Vena saphena major, and a very copious hæmorrhage ensued.

versely. The upper fragment, owing to extensive lesion, as we have already seen, lies often at the mercy of the large muscles in its vicinity; these, meeting no resistance, cause the bone to ride; and the lower fragment also falling, or being dragged away from its proper place, is not soon restored. Perpendicular pressure is not so available here as a means of restraint; and we invoke rather the principle of support, aided by posture. For these reasons, where the bones of the leg are concerned, the limb should be recumbent not suspended. This is effected in the same case by placing the leg on the outer side,—a sound practice without exception where the mischief occurs in the lower third of the tibia. It may happen that this bone is broken in two places; transversely in one, obliquely with or without comminution in the other. In such cases the apparatus employed must depend upon the posture required to accommodate a succession of fractures, and sometimes it is right to consult particularly the feelings of the patient, which will occasionally dictate a plan not altogether reconcilable to the strict rules of art. I have found it necessary more than once to substitute the swing box or tray (so as completely to suspend the parts) for the fixed recumbent position, and the change was followed by the happiest results. No attentive surgeon will ever accept any rule or method of practice as being without exception at all times.

## OF COMMINUTED FRACTURE.

Comminution is chiefly remarkable for its great diversity of aspect. The term is employed when the bone is broken into three or more pieces. A badly comminuted bone may be of itself a sufficient reason for the removal of a limb. It can hardly occur but under the infliction of a force which crushes all the textures proper to, and in the vicinity of, the bone. The life of this part is sometimes destroyed outright, or the textures so damaged that union by bone cannot be anticipated. Abscess is a result of comminution; by this means fragments are detached, or a portion of the shaft dies and exfoliates: both effects have been noticed in the same limb. Where parts are much bruised and loosened, the smaller pieces, if detached, should be removed at once. Under such circumstances the limb may be restored with a variable amount of shortening and deformity. There are parts of the skeleton especially liable to comminutions both from their structure and situation. I would instance the foot, the face, also flat surfaces, as the cranium, scapulæ, and wings of the ilia. The process of repair is here necessarily slower than after injury of a more simple nature. A larger production of bony matter is requisite, and the progress of ossific union is not always uniform. It may be far ad-

vanced in one situation, whilst at no distant point it has scarcely commenced.

In the extremities few badly comminuted bones escape the *ultima ratio* of surgery, viz. amputation.

## SPLIT BONES.

The celebrated Petit has denied, in his work* upon the subject, that a split bone ever occurs. I once dissected a limb when a dresser, in which the shell of the tibia, on its integumentary aspect was split nearly from end to end; and surgeons are familiar with the accident of detached or split processes, as Condyle or Trochanter. In the case to which I allude, the exact nature of the injury was not apparent before death, which was not immediate. The tibia was fissured into the ankle-joint, this cleft terminating superiorly in a transverse fracture of the bone about four fingers' breadth from its head. The accident occurred from the passage of a waggon-wheel across the limb, in an aged man. No attempt at adhesive action had been instituted throughout the track of the fissure. The patient remained well until within forty-eight hours of his

* Vide Traité des Maladies des Os, tom. ii. pp. 6. 8. "A l'égard de la fracture qu'on pretend se faire exactement selon la longueur des os, je la crois imaginaire, et je suis persuadé que ceux qui en ont traité, n'en ont parlé que d'après certains auteurs, qu'ils ont mal-entendus."

decease. He sunk somewhat suddenly, but had no fever or other severe constitutional disturbance indicative of irreparable injury. I have seen a fracture of the clavicle, which might have been called a fissure. In this case there was a cleft extending between the two curves of the bone, and occupying all its central or straight portion. This case was under Mr. Green's care in St. Thomas's Hospital. The patient did well.

In the Museum of St. Bartholomew's Hospital a fragment of an ulna is preserved, four inches long, and which was split off from the body of the bone by machinery. Here the fracture was longitudinal strictly. In the College of Surgeons there is an Hunterian specimen of fissured tibia, where the direction is precisely that of the long axis of the bone. The fracture extends into the knee-joint. In the spring of the year 1850 I sent a specimen of split humerus from the horse to the College Collection, attended by comminution of the scapula of a most extensive description. The accident occurred in the field, from a fall in jumping over a fence. The animal alighted upon an uneven surface, and crossed his fore-legs in coming to the ground. The head of the bone has undergone a perpendicular cleavage, such as might have been produced by the blow of an axe. In the same collection there are specimens showing how grape shot or musket balls, striking the shaft of a long bone, as the femur, effect a perpendicular fissure into the nearest joint.

I am of opinion that split bones should form a distinct class in the catalogue of fracture. These fissures may be simple, but they are more commonly combined with comminution of a bone; they have also been noticed where the bone is broken transversely. The splitting may terminate at one end upon the exterior of the bone, but it is, I conceive, essential to the accuracy of the term, that the other terminus of the fracture should be within the circumference of the bone or upon its synovial surface. Such an application of force as detaches a fragment after the production of fissure in the first instance, as happened to the specimen preserved at St. Bartholomew's Hospital, does not invalidate this general rule, being in its nature an exception.

There are two practical remarks to be made upon the history of these split bones. In the majority of cases the mischief is continued into a joint generally of large dimensions, as the elbow, knee, and ankle: secondly, split bones do not unite. This remark does not apply to fissures of the cranium. The circumstances are not the same, but when the shell of the larger shaft bones is extensively fissured as here described, bony union will not follow. This opinion depends upon observation in part, and in part upon reasoning. I have suspected some of the causes of this failure to be, 1st, that split bones occur for the most part in old people; 2nd, the cancellous structure is more injured, and to a greater extent, as evidenced by sanguineous effu-

sion into the broken cells, than happens in other forms of fracture; 3rd, there is an indisposition, arising from incapacity, either to institute or promote the adhesive inflammation; 4th, the periosteum is not unfrequently separated from the bone, to an extent incompatible with its office as the source or nidus of new bone. The following well authenticated case occurred in St. Thomas's Hospital in the year 1815:—

Michael Dixon, ætat. 13, was admitted, on the 14th September, under the care of Mr. Travers, into Isaac's Ward in St. Thomas's Hospital, for a fracture of the right thigh bone a little above the condyle, his leg having been entangled in the spokes of a carriage wheel. The broken parts were much displaced, and there was a small wound opposite the internal condyle. The limb was splinted in the semiflexed position and placed upon the heel. The leg had acquired a twist inwards, and the external condyle appeared to follow its movements —being also much displaced. October 5th: there is no union, the denuded condyle is now protruding through an ulcerated opening in the integuments. November 18th: bone was this day removed with forceps; it comprised the whole of the external condyle of the thigh bone. The limb was now ordered to be laid straight. Early in December the patient left the Hospital,—he could bend and extend the knee, walking tolerably with a crutch. The result of this case is corroborative of the

difficulty, or rather the impossibility, of procuring union of split bones. No attempt of the kind is made in an instance where health and the period of growth might be regarded as likely to second the natural effort. It must be admitted that this part of our inquiry calls for further illustration, and its interest is much enhanced by the comparative rarity of the accident.

When both bones of the leg are broken, it has been noticed that the place of the two fractures occasionally varies. The late Mr. Clift once pointed out to me an Hunterian specimen in the Museum of the College, where the tibia has given way in its lower third, and the fibula is broken above its middle. It would appear that the injury to the fibula is here consecutive or dependent upon the fracture of the tibia, rather than upon the proper and original cause of accident. The main support of the limb having given way, an appeal is made to this lesser splint, which also yields; but the place of its fracture is determined by its own tenuity and the action of very powerful muscles, now diverted to, and concentrated upon the weakest part of this remaining stay.

## OF COMPOUND FRACTURES.

When a fracture of one or more bones is complicated with external wound, it is termed compound. The forms of wound are various, those

most frequently noticed being the incised, the lacerated, and the contused, or a combination of the two latter.

A clean cut wound, with lesion of the bone, may be produced by a sabre or other sharp instrument. A sailor fell upon the deck of an Indiaman during a gale of wind, and struck his knee against the edge of a ship's cutlass, which inflicted a clean cut in the transverse direction, and divided the patella and common integuments, the joint remaining unopened. Under the application of a suitable bandage, the trunk being placed at a right angle with the extended limb, the parts healed kindly, and bony union was procured. The rapid passage of a narrow wheel, as of a gig or light cart, across the exposed limb, or the kick of a horse, will produce similar mischief. Sometimes the injury inflicted by machinery is of this kind: the edges ordinarily observe a juxtaposition, and unless the wound be incidental to the course of an artery, the hæmorrhage is slight and easily restrained. The fracture accompanying such wounds is commonly transverse, and unattended by displacement, circumstances eminently conducive to the healing action.

Adhesion should be invited and fostered by support uniform and unirritating, as that derived from strips of lint, and a roller lightly applied, the limb being rendered immoveable as soon after the receipt of the injury as may be convenient. The surgeon is especially warned against plaister in such

cases, the practice being dangerous on account of the coexisting fracture, which enhances greatly the risk of irritation in parts recently and so severely injured. For the same reason sutures are not advisable, but it may be necessary to adopt them, where the wound is extensive, in lax texture, or in the case of flaps. If on the third day the integument be puffy or diffused swelling occur, a cold wash or a tepid bread-poultice will be found useful in checking a tendency to suppuration. Rest and open bowels must also be efficiently provided for.

Contusion, or bruise of the soft parts in compound fracture, implies a very severe form and amount of force. This kind of wound is less manageable in its progress, and more grave in its consequences, than the foregoing. The broad wheels of drays and waggons, the falling of timber and masonry, produce a contused wound, often aggravated by comminution or much displacement of the broken ends. The breach may be considerable, the interspace filled with blood, which marks the site of the fracture. The edges of the wound are irregular or abrupt, and show no disposition to spontaneous action of a healthy kind.

When the wound is small the pain and swelling are more acute than when it is extensive. The uneven glassy granulation, with a surrounding tension or lividity of the soft parts, is noticeable when the injury is circumscribed; and these in

dicate the great probability of the formation of matter, deeply seated, and which, if not speedily released, is the fruitful source of sinus, or in extreme cases gangrene.

Abscess and sinus are the almost certain consequents of circumscribed and contused wound accompanying fracture. Some surgeons entertain a horror of meddling with such formations, when situated close to the fracture, being anxious to avoid a large and premature exposure of bone. Early incision, however, is the safer practice, and affords a very grateful relief to the patient, and healthy granulations are procured sooner in such cases than in others where this local relief has been either omitted or overlooked.

In compound fracture of the leg especially, contusion is to be viewed with apprehension. The textures lying in close contact with the bones, as tendon, fibrous membrane, &c., are apt to sustain an amount of injury not appreciated by one who is guided simply by the character of the external breach, but which injury is often indefinite, as evidenced after death or amputation of the limb, by the separation of the periosteum, the rupture of the tendinous thecæ, the broken and infiltrated condition of the cellular substance, far exceeding any apparent external limit.

There is no part of the management of compound fracture so calculated to try the discrimination of a surgeon as the early treatment of the contused

wound. It is always wise to abstain from irritating applications, but here it becomes a duty to do so. Light moist poultices*, the sedulous use of fomentations, absolute rest in a posture agreeable to the patient, such support as is equable and includes the joints immediately above and below the seat of fracture, are all objects to be secured without reserve or delay. Two accidents may happen, either of which is calculated to baffle the greatest skill. The first of these is the place of the wound, which sometimes cannot be dressed without such an extent of motion as must disturb the fracture, and interfere with its individual treatment. The second difficulty consists in an obstinate disposition to the formation of matter in the vicinity of the mischief, which leads to the sure destruction of healthy texture, by extensive burrowing, which, in its turn, provokes absorbent irritation of a very intractable kind in certain habits. The surgeon is compelled to interfere so often, especially where there has been delay or backwardness at first, as presently to endanger the integrity of the part, or life itself, owing to the impression so produced upon a system already obnoxious to too many causes of fatal exhaustion.

Much that has been said of contused wounds

* Cloths dipped in a very dilute goulard water, which is to be applied tepid, are substituted for poultices, in cases where the weight of the latter is complained of, or where the absorbents of the limb are actually inflamed.

applies also to laceration. A distinction is here to be made between superficial injury, and that which involves muscular parts. The surgical pathologist knows well the fatal nature of certain cases wherein the skin is extensively torn. The centres sympathise rapidly with the surfaces in every direction. In a case where the integument of the back of the thigh was lacerated from the buttock to the ham, and which terminated fatally, no effort was made to institute action of any kind for several days. The patient died; he was young and robust, and the amount of blood lost was insufficient to explain the early exhaustion of the system. A little girl, ætat. $2\frac{1}{2}$ years, was brought into Queen's Ward, St. Thomas's Hospital, on the morning of the 15th July, 1843, with a lacerated wound extending along the outer side of the right thigh and leg to the ankle; the fascia was exposed, and the muscular fibres detached from the head of the fibula. At first the symptoms of shock and local pain were not commensurate with the extent of the injury. At 8 P.M., twelve hours after admission, the child was convulsed, and remained for fourteen hours the subject of a universal spasm of the voluntary muscles. The pain and violent jactitation were incessant, and became greater as the powers gave way. There was no hæmorrhage of consequence. The accident happened from the passage of a cart-wheel over the limb, in a longitudinal direction. This form of wound, when circumscribed, is not

formidable. If there be important nerves or arteries in the neighbourhood, care should be taken to ascertain their integrity. Effusion may be looked for, especially where a joint is concerned, and which is then to be controlled by a liberal application of leeches. Broad slips of wetted lint, and a many-tail bandage, cut broad, is a simple and very efficient mode of dressing the recent wound. These fractures with laceration are produced by machinery, the horns and hoofs of infuriated animals, and the broken bone itself, when displaced and protruding, produces a very bad form of laceration.

When the margins of the wound are sloughy or indisposed to contract, stimulating dressings have been recommended. The best appliance in such an emergency is soap plaister, lightly applied in broad straps. This plan is not incompatible with fomentation, if the part be tumid or painful. Much pressure of a perpendicular kind is to be avoided in the first instance; and the secretions are to be narrowly watched. In certain cases, with very slight evidence of any local action whatever, there is pain so acute and continued as to deprive the sufferer of all refreshing sleep. Opium or morphia should be administered under such circumstances. Rest being procured at night, the appetite returns, the stomach regains its tone, which it then imparts to the system at large, and the pain, if not wholly subdued, becomes at least

tolerable. The combination of bruised and torn integument is indeed most formidable, belonging to the worst forms of fracture. Its management does not vary from that to be observed in bad contusions. If no blunder be committed in the outset, as by excessive purging, bleeding, or disturbance of the injured limb, cases of a very hopeless kind are sometimes restored, and the part may regain much of its original vigour.

I have been much struck by the extent to which exposed surfaces of bone, perfectly bare and for weeks together bathed in pus, have been shut in and finally covered completely by the surrounding edge of granulation, aided in part by similar productions from the bared bony surface itself. Two cases are especially present to my mind, in which this process was most marked and interesting. In one, the tibia was the site of this operation; in another, the surface of the parietal bone in a healthy middle-aged man. In the latter case, fleshy isolated points were distinctly to be seen springing from the crevices of the osseous texture, which had the acuminated aspect of healthy granulation, and bled when rubbed or otherwise irritated, leaving no doubt upon the mind of an observer as to their nature and origin.

It is well known that the healing of a large wound, especially of the integument, delays the process of bony union. I have seen the fractured leg remain wholly ununited in the ninth week,

where the skin was extensively injured. In the majority of such cases, union will be procured at last; but the system being severely taxed, requires of course a longer time to elaborate and perfect the means of repair. Where muscle or tendon is displaced and detached, it may be excised with safety at the time of the injury, which materially simplifies and abbreviates the healing process, and expedites bony union. I remember, on one occasion, cutting away nearly half of the bellies of the exposed and torn flexors of the fore-arm with perfect impunity in a bad compound fracture of both bones. The patient regained good use of the part.

### EXTRAVASATION.

Extravasation of blood accompanies all forms of fracture. It varies much both in its seat and its amount. First: It is interstitial. Here the blood diffused to a variable extent does not remain fluid, but coagulates in small masses, an appearance allied to ecchymosis. It is not marked by much tumefaction under such circumstances, and is soon absorbed. This effusion is very manageable in itself, but often occurs, also, where the fracture is formidable from its extent or comminution of the bone. There must always be some interstitial effusion around the broken ends;

but, in suspicious cases, diffused swelling, if progressive, is a sure sign of mischief to the bone, where crepitus and other symptoms are obscure. Secondly: Extravasation is continuous and excessive from and around the fractured ends. Here the blood is flowing rapidly from a trunk or large branch, and remains fluid or coagulates imperfectly. The investing fascia is enormously distended, and there is well defined fluctuation in one or more parts of the tumour. The tension which follows is very painful; and the figure of the limb is so changed, as often to render the nature of the fracture very indistinct. If a large artery be wounded, the patient may die of exhaustion. This has been known to happen in the thigh, but fortunately it is rare. An extravasation of fluid blood is very dangerous, for these reasons: — 1st. As has been already stated, it may be directly fatal. 2ndly. It greatly retards the progress of bony union. 3rdly. It not unfrequently misleads the surgeon, who is thereby hindered from ascertaining accurately the nature of the fracture. Being uncertain, he does not at once condemn the limb; for, after all, the bone may be only broken transversely without displacement. Should the broken ends be comminuted and displaced, still the tension precludes the possibility of directly ascertaining the fact; and thus it has happened, that a patient has sunk so late as the twentieth day, without a suspicion on the mind of

the surgeon that the bony mischief was extraordinary, or such as to demand his active interference. There can be no doubt, that if the effusion be sudden, enormous, and, above all, progressive, especially in the neighbourhood of a large joint, as the knee, it furnishes of itself a strong argument for immediate amputation. Dissection proves that, in a large majority of such cases, the injury to the bone is complicated and irreparable.

On the 8th of March, 1842, Henry Robinson, ætat. 52, an intemperate man, fell down a well. The enormous tumefaction of the integuments of the right knee and leg rendered it quite impossible to form any conjecture as to the real nature of the injury. He died on the sixth day, having shown symptoms of delirium tremens before his decease. On examination, the head of the tibia was found crushed, broken into small fragments, such as might result from the blow of a heavy hammer. The fibula, also, was broken close to its head. The popliteal vessels had altogether escaped.

When the limb is spared, leeches are useful in the reduction of swelling; afterwards pressure and support are to be procured by broad straps of plaister, and a many-tail roller beneath the splints. Much depends upon the dexterous and early application of an apparatus which shall command and support the parts continuously. Rest

is of paramount importance. Cold is not very efficacious, nor easily applied. I once saw a man die in St. Thomas's Hospital from an arterial hæmorrhage, following simple fracture of the thigh-bone. The fascia lata became enormously distended before death, and the limb above the knee of twice its ordinary circumference.

Mr. Bransby Cooper has published the case of "one Weaver," wherein he tied the femoral artery under circumstances in which it seemed probable that the vessel had given way suddenly during the setting of a simple fracture of the thigh-bone. The ligature parted kindly at the usual period. And it was further noticed that the process of union began sooner and was more expeditiously completed than generally occurs in similar cases. This curious fact is explained by that gentleman as follows:—"The altered direction so given to the main current of the blood through the profunda and its branches determines a less circuitous and relatively larger supply of the material needed for the repair of the parts than is the case where the femoral artery remains without obstruction.

# PART II.

## CHAP. I.

### REMARKS ON THE LOCAL TREATMENT OF FRACTURE.

EXTENSION is a term of very dangerous import as ordinarily applied in describing the treatment of broken bones. When used to define the force employed for the reduction of a dislocated limb, it is highly graphic and correct. Now the terms "posture" or "position" hold a similar relation to the case of fracture.

Mr. Pott was the first English writer who placed this matter in a clear light; and he has shown in his treatise, that what we require of the muscles, when a bone is to be replaced or set, is not to be obtained by dragging or extending the parts, but by posture alone. Force, then, is not to be employed in the first place; it may become necessary as an after expedient, but we depend upon an efficient and well-adjusted apparatus for that purpose, and not the coarse and uncertain violence of a man's hands.*

* The force here alluded to is known by the term "counter-extension." It is strictly antagonistic. It is often substituted for the direct operation of splints with advantage. It is gradually productive of muscular fatigue, whilst at the same time it corrects the position of the broken ends.

There are two indications to be met in the case of splints: first,—support throughout the length and breadth of the injured limb, firm and unirritating; secondly,—pressure, which is direct or indirect. By direct pressure I would be understood to mean that which is applied immediately to the broken ends, and in a perpendicular direction. Indirect pressure is employed as a means of support, to enforce more complete repose on the part of the muscles, or to restrain a particular fragment of bone having a tendency to protrude or fall away from its proper place. The term "riding" is used to express a similar condition, as in the case of the upper fragment of the humerus or femur, when broken above the middle of the bone, so as occasionally to expose a torn or contused muscle to its injurious operation.

It must be obvious to all, that complete support is only to be obtained by a perfect command of the neighbouring joints, both above and below the injured part. With this view, broad, flat, unyielding surfaces must be provided; and a great variety of material has from time to time been recommended and adopted in our public institutions. Wood, pasteboard, strips of lint or linen stiffened by starch or a thick paste, as that composed of flour and albumen, and confined by a roller wetted with solutions of gum, or starch, or varnish, have each their especial advocates; and there arise occasions upon which one plan may be adopted before another for

very sound reasons. For example, this method of gum or starch-splinting answers well in loose simple fracture near joints. It is better adapted for the lower than the upper limb. The gum-splint does not furnish a sufficient support either in kind or degree for the broken thigh even of the youngest child.

A professional friend of mine, Mr. Gale, of Glastonbury, reports most favourably upon the method of enclosing the limb in a box filled with Paris plaster, extension being made upon the injured part by means of pullies during the process of "setting." I am indebted to that gentleman for the following observation: —

"There are some objections to all the usual means employed in the treatment of fractured thigh. The starched bandages and glued lint come nearest to what we want; but these are calculated only for simple cases, and their disadvantages are —more or less pressure, — a necessity for the absence of all moisture; for if they become wet, of course they are spoiled, and if the patient should lose flesh they would require to be taken off. Now, the splints made of plaster of Paris have none of these inconveniences; there is no pressure, but, instead of it, passive resistance. No kind of accident by which they might become damp can injure them; and the security of the limb being preserved by the resistance of the condyles at the one end, and the pubes, &c., at the other, instead of pressure

to a considerable extent on the soft parts, the limb will keep the place it shall have been put into by means of the pullies, although the muscles may be reduced to half their natural dimensions. I think you will agree with me that the facility with which it can all be removed is not the least of its advantages.

"Of course you know that there is nothing new in the material employed. Baron Larry used it in Egypt, and the Turks before him, but only as a cast. This mode has many objections. The only thing that could prevent the universal adoption of this plan for fractured thigh is that it requires a little trouble and attention at first; but the surgeon is repaid by its giving no anxiety afterwards. I have had many cases of simple and two of compound fracture of the thigh. On the patient being asked how he feels after the fracture is put up in this way, the answer invariably is, 'I should not know that my thigh was broken from what I feel.'"
—*Extract from a Letter dated September 2d*, 1842.

It is fair to say, that, for ordinary purposes, nothing has yet been produced which deserves to supplant the wooden splint, sometimes jointed and flexible, at others flat and firm, but always as little ponderous as is consistent with the object in view. It is always at hand or quickly procured, cleanly, and easy of adaptation; moreover, it admits of the use of pads, which are often indispensable to accurate setting. The best pads are formed of coarse flannel, serge, or duck, disposed layerwise. Flannel

pads have been much extolled by Mr. Amesbury, whose opinion is entitled to great respect in all matters concerning the local management of fracture.

The lined leather splint is a very neat and useful appliance on many occasions; for example, in simple fractures of the fibula; also in certain cases of injury to both bones in the lower third of the leg. The great and peculiar advantage of the leather splint is seen in retarded or imperfect union, where it is blocked upon the part, the material having been previously soaked in boiling water, and thus rendered pliant and capable of casting the surface accurately.

The gutta percha answers very well for the bones of young children, and for diseased joints, or a broken rib; but the cylindrical bones of the adult ordinarily require the support of a less pliant material, when broken, as wood or leather.

### *Of the fastening of Splints. Rollers. Plaisters. Early setting. The Gum Splint.*

There is no more prolific source of disquiet to a broken limb than inattention to the tying on or fastening of splints, however faultless in shape or accurate as to measure. A leather strap or firm broad tapes armed with a buckle are to be preferred. Rollers are highly objectionable. Their application ensures a disturbance of the fracture, alters its position, and they require frequent readjustment.

At first they are liable to girt and stricture the limb already swollen; at a later period they are unfitted to procure permanently the required force. The best roller, applied with every precaution, will loosen and demand constant interference on the part of the surgeon. If an abundant secretion of pus be present they detract seriously from the simplicity of other arrangements, and only form a nidus for filth and extraneous irritation. What is now advanced in nowise invalidates the propriety of rolling the limb itself beneath the splints in certain cases; and it is to be regretted that in some fractures, of the lower limb especially, the many-tailed bandage is not oftener employed.

In simple fracture some have objected to the use of plaister, as being an irritant, where the injury is very recent and the swelling progressive. From observation I should say, on the contrary, that it is a grateful support to the part, and it certainly expedites the absorption of effused fluid, whilst it provides for a perspirable and healthy condition of the skin. The Emplast. Saponis of the Pharmacopœia is to be used in preference to any more resinous composition on the one hand, or less tenacious material on the other.

Lastly, let it be remembered that our measures ought always to be taken as though they could not be recalled; that frequent handling or alteration of posture sets up an irritation which produces exfoliation and non-union. Our arrangements once

completed, the limb must be permitted to remain in absolute repose, and any proceeding which implies a contrary effect strikes at the root of the only principle upon which fracture can be safely treated, viz.—rest.

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It will be seen that the writer is not a blind convert to the modern and very prevalent opinion, that the old-fashioned wooden splint should be wholly laid aside for the more rapid and less cumbersome plan of pasteboard, starch, and gum. Unquestionably there are cases to which the latter practice is very applicable, but it is far from economical, and therefore not invariably adapted to the surgical wards of an hospital. One good has resulted from the ingenuity of our modern artists —we do not so often see the patient tied to his apparatus as formerly. The necessity of making the *appareil* a part of the injured limb is now better understood, and more generally acted upon. Where recourse is had to agglutinatives, the gum-splint should be recommended; it is retentive, unyielding, easy of application, and the material is not costly. It is applied as follows. The limb being placed in the required posture, its surface should be smeared with a thick solution of gum arabic. A layer of lint of adequate dimensions is then applied smoothly over the gum so as to represent the splint; and either side of the limb, be it

leg or arm, is to be treated in the same manner. A roller is now applied over the adhering lint with great accuracy, so that the surface does not remain exposed at a single point, the uniformity of the pressure being quite as important as its constancy. This stage of the process being completed, the whole is again thickly smeared or brushed over with the fluid gum, and the material allowed to dry, which it does readily at ordinary temperatures. Where the adjustment is accurate, the patient is presently relieved from pain, and the cure progresses without further interference beyond ordinary attention to posture.

Authors differ a good deal about what is called "the period of setting." In practice this diversity of opinion is even more remarkable; and yet no one now denies the necessity of rest and posture to the broken ends of a bone, or that provision should be made for these indications as soon as possible. Now it is certain that a splint of a proper substance and correct dimensions supplies the surest means of securing rest, position, and support. To say that because a patient is very irritable, or the parts much swollen or wounded and contused, or because pressure is inadmissible, that for such reasons splints may not be used in the first instance, seems to be a wrong verdict. Of course they are not always to be applied strictly or with a purpose of pressure before the primary tumefaction has subsided; but be it remembered that by them alone can a proper

amount of *support* be obtained; and in this sense I have always counselled their immediate application. When a well-adjusted splint is tied about a broken leg or fore-arm at once, pain, swelling, cramp, and motion of the broken ends, are soon reduced or wholly subdued, and the subsequent course of the case partakes of the advantage derived from so auspicious a beginning. It is also notoriously true that where limbs are left tied up in pillows, and soddened with cold lotions for days together after the injury (by no means an unusual practice in former times), the process of cure is always more painful and slow, and union is not always obtained, at least with that certainty which belongs to the other plan.

Where gum or agglutinatives are used, the surgeon must, of course, wait until the primary swelling has subsided. This interval will be much shortened and rendered far more tolerable to the patient by the temporary use of wooden splints, which give an amount of support which no pillow can supply, and accelerate materially the approach of that important preliminary of bony re-union, viz., the absorption of extravasated and waste material.

## CHAP. II.

### REMARKS UPON THE CONSTITUTIONAL TREATMENT OF FRACTURE, SIMPLE AND COMPOUND.

In the healthy adult broken bones do not operate to hurt or disturb the system at large, if only such essential conditions as rest, nutritious food, and a tolerably wholesome atmosphere are complied with; to these may be added cleanliness, and the use of an apparatus which is not cumbersome, and does not of itself create irritation. There are, however, always two periods during which it may be stated, as a general rule, that the system evinces its sympathy with what is going on in the part; and sometimes the constitution begins to participate early and to an extreme degree in the untoward consequences of severe fracture.

The first period comprises the ten or fourteen days which immediately succeed the accident, when we may look for restlessness, constipation, and febrile excitement; the season, in short, of direct sympathy between the principal viscera and the injured part. The surgeon is not over-anxious to interfere at this time, and beyond the exhibition of a mild laxative, or a little henbane or opium at night as the case may be, the less medicine given the better. This observation is, I believe, generally

allowed to be correct; but where the system is unsound, or the accident occurs to an habitual drunkard, this call for direct sympathy falling upon organs which cannot sustain or provide for a wholesome reaction, may be of dangerous or even fatal consequence. In the diseased, the aged, and the intemperate, one needs to be more than commonly watchful and apprehensive during this first period of notice or challenge to the integrity of the circulating system and innervation of the body at large. But we will assume that the powers of life have shown no defect or disposition to succumb; that, on the contrary, there is patent evidence of vigour in the system, an abundant promise of aid towards the complete restoration of the part injured. The second period here spoken of is denoted by the space of time in which these promises are realised, the actual fulfilment of such indications of power. It corresponds to the utmost duration of the healing action. It commences with the earliest stage of adhesive deposit, and terminates only with the completion of the definitive callus.

The first period is one of appeal or solicitation on the side of the part; the second is that of responsive co-operation on the side of the constitution. As excitement, fever, or delirium is symptomatic of the first, so in severe accidents loss of flesh and appetite, night sweating, sickness, rigor, or a gradual decrease of vascular force, denotes a

condition wherein the vital power is over-taxed, and nature is failing under an excessive demand, an emergency only to be met by the dexterous and liberal administration of support. The special indications of default and weakness are not constant; they do not always show themselves at the same time, nor in the same direction, but they may be expected to develope themselves sooner or later; and in delicate habits, or where the injury has been unusually complex and severe, their early recognition is of the last importance to the successful management of the case. The symptoms, perhaps, may follow such a course as the following: — The patient is listless, complains of remittent pain in the part, has no appetite for wholesome food, prone to hepatic obstruction and irregularity of bowels, is drowsy, but is never refreshed by sleep, which is disturbed by visions and talking. The tongue is coated, and the pulse accelerated, reduced in volume, but resisting pressure beyond a certain point, wiry or jerking. The surface varies, too, as to its sensible heat; sometimes it is damp and chilly, at others dry, but never very hot, as would be the case under febrile action of an ordinary kind. Great delicacy and much attention are now required on the part of the surgeon; for if at this time active stimuli be resorted to, headache, confined secretions, increased restlessness even to delirium, may be induced. If, on the other hand, brisk purges or a decided antiphlogistic plan be

adopted, diarrhœa and a fatal coma may follow from effusion into the cavities of the brain; and on examination the injured limb will exhibit traces of suspended action, which has failed from a want of the sustaining influence of rest, and imperfect power of assimilation on the part of the stomach and bowels. One marked accompaniment of this critical period in weakly habits is a tendency to diarrhœa, and I have known a middle-aged adult so circumstanced die outright in forty hours after the exhibition of two colocynth pills, given by an inexperienced attendant in the absence of his principal. Indeed those who have not had frequent opportunities of visiting the subjects of severe injury at all hours, can but imperfectly appreciate the nicety required at the bed-side in these cases; for the symptoms here recorded are prone to be somewhat masked, so that what belongs to hepatic or intestinal congestion may be mistaken by beginners for want of tone, and in consequence be met by a very erroneous mode of treatment. The time of their approach, like that of their duration, varies. They become more evident after the middle period of life, and where, as I have observed, there is reason to suspect the presence of impaired or diseased organs.

The surgeon must not permit himself to be misled by a complaint of very acute pain in the early stage of union; neither are a hot skin or a full and rapid pulse always to be feared as the forerunners

of serious mischief. In the young and robust such symptoms merely denote a sufficiency of the natural powers, and the expedition which is being made in the process of repair. Apart from what has been already stated, there are good reasons for recommending caution in the frequent use of purgatives. They produce disquiet, if not actual displacement of adjusted surfaces, and they are apt to render the bowels and bladder unduly irritable, or the intestinal canal becomes torpid after several violent dejections, and thus there is created a fresh necessity for their aid, highly detrimental to the progress of the local cure. To a cause of this kind I have more than once been disposed to attribute the very slow rate at which muscular power is regained long after the bone was firmly united. The practice of blood-letting in fracture is now extinct in the metropolitan hospitals, and it is at present difficult to form a conception of the cases in which it could ever have proved either useful or necessary.

When, at a late period, the system languishes, the method of support may sometimes be diffusible, such as rapidly reaches the capillaries; or it may be more concentrated, and instituted rather with a view to a prospective demand. Regard must always be had to the habits of life; if they have been intemperate, the nature of the excess should be ascertained. This is a common injunction, but often not sufficiently attended to. That wine and

brandy do operate to restore power and lessen irritation when all forms of medicine fail, is matter of daily observation. The safest mode of support is that which depends on diet; but where medicine is really wanted, and the state of the secretions does not contra-indicate its use, opium is of all remedies the most effective. It has been called tonic. It allays the hyper-irritability of a flagging system by procuring sleep, and so inviting further a disposition to take food; and it is effectual in restraining the excess of a draining secretion going on in the part where the injury is complicated with wound or abscess. It is of great service in restraining a disposition to hectic, and it is not contra-indicated in a surgical sense where such action is actually present. The old preparations of the drug in an adequate dose are quite as effective as the salts of morphia; however, the muriate of morphia is often prescribed with advantage, on account of the facility with which it may be combined with the muriatic acid in certain cases of excessive diaphoresis, or where the brain is prejudicially affected by the medicine in its simpler forms.

When the appetite is capricious, the belly hard with a coated tongue, and the dejections gaseous and lumpy, mercurials must be employed. Here one decisive dose of calomel may be justifiable; but as a general rule the blue pill, or hyd. cum cretâ, with a few grains of rhubarb or scammony,

generally answers the purpose as effectually, and at a smaller cost to the powers of the patient.

In conclusion, the constitutional, like the local, treatment of fracture to be safe must be deliberate. It is not wise to interfere with natural actions belonging to the healing process, unless they become manifestly disordered. If the patient is restless and constipated, purge him; if irritable and sleepless, exhibit opium; but always abide by the symptoms: they cannot be treated by anticipation; and it is certain that all such meddling on the part of the surgeon has ever proved most disastrous to the patient.

In illustration of what I have termed the second period, or the time of respondence on the side of the system, and the accidents which may then occur, I append the following authentic version of a case which naturally excited a great and very painful interest at the time throughout Bristol and its neighbourhood.

A gentleman, ætat. 33, of a remarkably cool and temperate habit of body, sustained a fracture of both bones of the leg above the ankle joint. On Friday, the 4th November, 1842, exactly one month after the accident, a friend was sitting with him till half-past nine at night. He was in high spirits, sang a song, and expressed great delight at the prospect of being on his sofa in a day or two. At a quarter before eleven he

cried out to his brother that he was in severe pain, desired that the pillow upon which the limb rested might be shifted, and that an opiate might be given to him immediately. His brother was busied in preparing the draught, when he called out, "Bless me, the pain is dreadful; I feel it all across, and from top to bottom." He then gave a start, and breathed very heavily, and was convulsed. Presently afterwards he swallowed some brandy, and said, "I feel as if I was dying." The convulsion recurred, when some more brandy was offered; but he could no longer swallow, and died almost instantly. The body was carefully examined by Messrs. Esther, Lowe, and Prichard, of Bristol; but no cause of death could be detected. On examining the broken surfaces, it was seen that the process of union had been very slow and imperfect for the time which had elapsed since the date of the injury.*

Surgery is, in its best sense, prophylactic; it is either operative or medical. The first is confined, and may be acquired without much intellectual capacity. The second is the study of a life. In its simplest definition it is the science of estimating constitutional power, and procuring its rapid concentration in arrest of actual or impending disease. A most grave occasion for the exercise of this fore-

* *Vide* a report of the inquest on the body of Andrew Nelson Ruddock, Esq., Surgeon, of Bristol, in the local journals of the day.

sight presents itself in certain compound injuries, which are so serious, as at once to challenge the performance of an operation in order that life at least may be saved by the sacrifice of the injured part. Sometimes the mischief is so large, that we are not permitted for one moment to halt between two opinions. But it may happen that the textures involved are of a very unequal capacity as respects the healing action, or they may be injured in an unequal degree. The powers of life may have been much sunk by nervous shock or loss of blood, the amount of injury being relatively small, or, again, the part may be much disfigured, but the patient vigorous. In one instance we need only a simple repair; in another, a clearing off of dead substance must be succeeded by one of extensive reproduction. Sometimes organic disease may be present, which forbids all hope of saving the limb; but the prudence of operation is now very questionable, for the risk to life is scarcely less imminent in either event. Where the general health is good, the age of the patient forms an important consideration. During growth, Nature is more easily induced to reconstruct a bone, or repair a torn muscle, than at a later period.

Hæmorrhage and laceration with displacement are signs of the worst forms of local injury. It will be right to treat this point less concisely; and I shall not apologise for entering into details of little interest to the mere reader, but of the last importance to the surgeon and his patient. When

summoned to repress a violent bleeding, we know that the loss of blood already sustained is, as a question of safety, secondary to that of its continuance. Thus, in epistaxis or hæmoptoe, it is not unfrequently necessary to bleed from the arm, and with good success. The surgeon will do well to bear this in mind in deciding upon the plan to be adopted in the case under consideration. There are two kinds of bleeding incidental to fracture, which are alone sufficient to decide the question of operation in the affirmative. In the first, the skin remains unbroken (as has been noticed in speaking of extravasation), but the tension is enormous, the pulse feeble or jerking, the skin cold, the patient restless. In this case, whether furnished by one or more vessels, the blood accumulates, not merely upon the surfaces, but also in the interstices of the muscles. Thus the cellular investment is broken down, which, being disorganised, sloughs invariably. This form of bleeding is more usual in the upper part of a limb. Great muscular resistance and extreme violence are the conditions of its occurrence, and it will infallibly destroy life, unless the part be removed. The second is also the more insidious from its slow progress; but its effects are neither less certain or fatal. It is seen after compound fracture of the leg in the vicinity of the ankle-joint, where great difficulty is met with in securing the many arterial branches which are deeply seated amongst tendons, or beneath aponeuroses, furnished, also, with loose

cellular sheaths, which permit an excessive retraction of the bleeding vessels.

It may happen that the ankle-joint is exposed, or one of the malleoli broken and detached. The congestion and pain in the direction of the knee are signs of deeply seated mischief at a distance from the external wound. In such cases there sets in a welling hæmorrhage, which speedily saturates all applications made at the moment. Compresses are worse than useless; for they increase the pain and tumefaction of the part. At first, but little alarm is entertained at the sight of the slowly oozing stream, apparently proceeding rather from a surface than a single trunk, and pressure is persisted in. By-and-by it is found that the face is cold, and the expression one of anxiety. The pulse is rapid but small, and sensibly jerking under very slight pressure. Sometimes the patient vomits; and I have seen such suffer from rigor; but these symptoms belong rather to nervous shock sustained at the time of the injury. They cannot fail, however, to operate in aggravation of the effects of hæmorrhage, which, being without prospect of remission or restraint, will certainly prove fatal, unless the limb be amputated forthwith.

A badly broken or comminuted bone is not so formidable as severe laceration, whether of muscle or common integument. In the former case there may be some displacement; but the parts are capable of readjustment. Where several soft

textures have been severely bruised and torn, in addition to a fracture of the bone, an amount of mischief may be produced which cannot be repaired at all, or, at best, the parts recover imperfectly, and at so great a cost to the vital powers, that the patient falls an easy prey to some other kind of disease, either latent in the system at the time, or to which it had been actively predisposed.

Of this kind are many compound dislocations of the wrist and ankle, or elbow joints. The tendinous thecæ are exposed and torn; the tendons dislodged or separated from the muscular fibre; one or more articular surfaces are laid open; the amount of hæmorrhage is variable; but the sum of these accidents constitutes a grave reason for immediate operation. In certain cases, where there has been a disinclination suddenly to deprive the sufferer of his limb and livelihood, attempts have been made to restore the part thus seriously injured. The results of these experiments are not, in the writer's experience, favourable to their frequent repetition. These are sleepless nights, impaired appetite, fever, disordered secretions, unhealthy wasting discharge from the part, unremitting pain, frequent local inflammations with suppuration, subsiding only to recur, until a fatal exhaustion supervenes.

In a few fortunate instances, life may be spared, and cicatrisation be obtained at a distant time. A cure is then said to have been effected; but

a little inquiry will soon dissipate any such delusion. The member is deformed, and no longer useful; nay, its cellular substance remains in so diseased a state, that the patient is never free from inflammatory or neuralgic pain, and, should he survive, amputation is sooner or later performed as a last resource.

The operation, however, is now a boon of very doubtful value; the bodily powers being irretrievably impressed, if not absolutely worn out. Such are the consequences of a practice which has been called merciful; but however humane in intention, it is not grounded in sound pathology, and is directly opposed to the evidence of repeated observation.

When the injury is of a complicated nature, that is, where more than one limb is hurt, as in cases where a compound fracture is sustained of one leg, there being, also, simple fracture of the opposite thigh or upper arm; also in cases where, in addition to a broken limb, the patient has sustained several contusions, or injury of the head or spine; we cannot, from the earliest moment, be too jealous of a treatment which further endangers or tends to diminish power. Nevertheless, it occasionally happens, that a portion of such accumulated mischief is too formidable for the resources of Nature, and that an appeal must be made to Art. In such an emergency, let the surgeon be mindful to watch his opportunity for the performance of

an operation. If the patient be much exhausted, let him be placed upon his bed. No pains should be spared to induce sleep, which, if disturbed, is still grateful, and sometimes essential to the further maintenance of the heart's action.

After the receipt of irremediable and complicated injury, if the prohibitory state of collapse be prolonged, two, six, twelve hours, or more, may be suffered to elapse before proceeding to operation, not merely with impunity, but with a comparative certainty that success will attend such delay, where a less deliberate proceeding would infallibly be fatal to life.

Where it is necessary to mutilate a patient to such an extent as is implied by the simultaneous removal of both legs, or a fore-arm in addition to amputation of one of the lower extremities, the chances are much against ultimate restoration. The resources of art leave the surgeon no alternative; but if the party does not die immediately, the exhausted system proves unequal to the task of repair. Febrile reaction, with sloughing of the stumps, tetanus, or a pure progressive collapse of the vital powers, determines a fatal result in the large majority of such cases, and that at no distant time.

After all, these are cases which experience always approaches with much apprehension; it is so difficult to know, certainly, the extent of the impression already made upon the nervous and

vascular centres, or to what degree they will answer the further call upon their powers which the surgeon may be compelled to exact. Again, the chances of miscarriage, both at and after operation, are fearfully enhanced by the foregoing shock.

In no particular is the truth of this observation so often proved as in loss of blood. The quality of this fluid seems to diminish with its quantity. The business of aeration is incompletely performed after profuse and enduring hæmorrhage; but if the bulk of the remaining fluid be yet further and suddenly reduced, this accident, coupled with its diminished vital capacity, is utterly irrecoverable, and the patient dies upon the spot. The experience of civil and military practice is abundant and convincing upon this point; and as a further illustration, I will close these remarks with a short account of two cases, which occurred at St. Thomas's Hospital, in March, 1839.

## CASES.

Two men were riding upon the shafts of a waggon, when the horse became unmanageable, and they were precipitated beneath the wheels. James Saunders, ætat. 48, hale and florid, sustained a simple fracture of the right thigh, also compound fracture of the left thigh and leg, attended in the latter case with comminution and extensive laceration. George Tilt, ætat. 35, of a meagre aspect, escaped with a

bad compound fracture of both bones of the left leg. There were no means of ascertaining the quantity of blood lost in either case; it was thought not to have been very large. The accident happened in the Kent Road. In the first instance they were carried nearly two miles to the Deptford Dispensary, and thence brought back to St. Thomas's Hospital. The first man soon rallied, and the left limb was removed in the upper third of the thigh, shortly after his admission, with his full consent. The femoral artery was secured before making the ordinary incision, but during the operation a gush of arterial blood took place on dividing the profunda. He lost nearly a pint of blood with great rapidity; when he became suddenly very faint, and died upon the table almost without a struggle. He was examined: the viscera were healthy in all respects. The second man, Tilt, who had been much reduced by poor living, lay in a state of extreme exhaustion all night, having been admitted at half-past four o'clock on the previous afternoon. Extremities cold—expression fixed and glassy; indeed he appeared to be on the verge of dissolution. He was supported through the night chiefly by small quantities of brandy at intervals, and on the following morning he took some aromatic spirit of ammonia with camphor. In the afternoon he also had rallied sufficiently to bear the operation below knee. The limb was removed by Mr. South, and the amount of blood lost was inconsiderable.

The man remained in a precarious condition for some days afterwards, but the report speaks favourably of him as to expression, rest, and appetite. He recovered perfectly, and left the house in the beginning of May.

The first of these cases clearly illustrates the effects of accumulated injury. 1. Fracture of both limbs; the left broken in two places, and compound in both. 2. The necessary loss of blood. 3. The journey backwards and forwards, exceeding five miles in all. 4. Ligature of the femoral artery. 5 Amputation, which might have proved successful but for the accident of renewed hæmorrhage from a large arterial trunk during its performance.

There can be no doubt that the first operation was a measure warranted by the results of experience; but should there be any hesitation upon the reader's mind as to that point, we refer him triumphantly to the event of the second case. Here, in the face of every discouragement, a like bold procedure was crowned with success, and its principle amply vindicated.

*Postscript.*—Many of these observations may appear trite or over-bold; but they were drawn from the life; and in all I have had the course of particular instances in view. I have only set down those things which are not fully explained in larger treatises or are still contested points amongst many excellent surgeons. When I have counselled opera-

tions in some urgent cases, I would be understood to discourage all undue haste. The wisdom and advantage of consultation with older and better men ought never to be overlooked whenever the case admits of such an arrangement.

*Note.*—Habitual drunkards, when they happen to be the subjects of severe injury, are liable to a nervous seizure of a very painful and uncontrollable nature, characterised by paroxysms of extreme violence, which subside at intervals into a general agitation, of the head and extremities, which has hence been called "Delirium tremens."

The patient is not conscious or rational during the attack, but it has remissions, and sometimes a protracted interval may elapse between the seizures. The skin of these patients is of a tawny colour; they are of a sallow aspect; their expression is maniacal; the pulse quick and tremulous, becoming full under excitement, but always compressible, and venesection is invariably hurtful. The bowels are confined but easily give way, and diarrhœa may proceed to a dangerous extent from a single dose of calomel. Restraint is necessary whenever violence prevails, and recourse must likewise be had to the particular kind of stimulus in which the patient had previously indulged. Opium is the remedy which never fails to compose the patient, but to this end it must in certain instances be administered with great liberality. I have seen a quantity equal to half a

drachm of crude opium administered in the course of twelve hours before the requisite effect was produced. In this case the pills were washed down by copious draughts of gin; yet the patient rallied after many hours of uninterrupted sleep, from which he awoke to his former consciousness. Whenever we are compelled to so sudden and copious an exhibition of opium, it is important afterwards to watch narrowly the operations of the liver and mucous surface of the alimentary canal. Diarrhœa not unfrequently ensues, which appears to depend either upon a hyper-irritable state of the surface of the bowels, or an absence of healthy bile. Sometimes the chalk mixture with aromatics is an effective remedy. Occasionally minute doses of blue pill with the Dover's powder are employed, with or without the absorbent and aromatic draught above mentioned. The local repair is always retarded by these attacks, so severe indeed as occasionally to compromise the injured limb. But amputation is here a doubtful expedient, and by no means uniformly successful.

# MISCELLANEOUS OBSERVATIONS

UPON THE

# REMOTE CONSEQUENCES OF FRACTURE.

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OF GETTING UP. TETANUS. HÆMORRHAGE. NON-UNION. PERIOD OF LIFE AT WHICH FRACTURE OCCURS, AS IT CONCERNS THE QUESTION OF REPAIR AND RECOVERY, ETC.

The surgeon should be very watchful when his patient first begins to re-acquire power over a broken limb. At first the party should be dressed and allowed to sit up daily, observing, for the most part, a semi-recumbent posture. Passive exercise of the part only is to be permitted at this time; after the lapse of some days, if all be well, the muscles may be trusted somewhat further. The party is to be furnished with crutches and a long list sling in the case of the lower limb, or, if it be an arm, the prehensile powers of the hands and fingers may be called upon slowly to resume their office. The leg should only approach the ground very gradually —toe first, afterwards sole of the foot to the heel in order. Let the patient be content to know and

feel that he has recovered the support of his limb, before he tries to initiate any attempt to walk. In short, the greatest caution and strictest surveillance are necessary at this time, for very obvious reasons; and, above all, if the patient be advanced in years, or there is any suspicion of visceral disorder, great attention must be paid to the state of the digestive organs. Take care that the party is not over-fed. Procure for him change of air and daily carriage-exercise when it is practicable, and give some gentle laxative often enough to secure a sufficient diurnal relief. The slightest reflection will serve to show that such precautions must be absolutely necessary, and that their omission may prove dangerous.

The great majority of fractures are seen in the persons of those employed in heavy manual labour, or amongst such as have been long and early accustomed to frequent locomotion and healthful exercises, causing them to nourish rapidly and eat largely. The abrupt deprivation, or rather suspension of such habits of life, must be felt severely. Dyspepsia in one, lowness of spirits in another, a tendency to obesity with irregular and depraved secretions in a third, are only natural incidents, and form the fitting sequel of a protracted confinement to bed. When, from any want of care or foresight on the part of the surgeon, a broken limb is, for a second time, perhaps, condemned to splints and absolute repose, the physical trial is rendered

doubly severe and distressing. In order to avert the possibility of such mischance, let great caution be observed by the surgeon about the time of "getting up;" nor must he permit any change of posture, removal of splints, or other departure from his original mode of treatment, until he is satisfied in his own mind that the broken ends of the bone are firmly united, and that consolidation is complete or so advanced, that he puts nothing to risk by releasing his patient.

Hæmorrhage, gangrene, tetanus, are all recognised as indirectly following fracture of the bones of the extremities, and as having proved fatal sometimes to the limb, sometimes to life itself. Gangrene attacks the integument of the part in an active form below the seat of injury. It is preceded by swelling, vesication, and very acute pain. In simple fracture the action is often purely constitutional; but the condition of the part itself will occasionally explain the cause of the attack. Many years ago, a limb was removed in St. Thomas's Hospital for a spreading action of this kind following a simple fracture of the tibia above the middle of the bone; in that instance, one of the broken ends lay in contact with the trunk of the posterior tibial nerve, which was partially lacerated. The patient survived the operation of amputation above the knee, and did well. Where the soft parts would be liable to die from excessive bruising or other violence, the case is sometimes complicated

by wound, in itself the cause of an inflammation which assumes the gangrenous character.

The ordinary cause of tetanus after fracture is a lacerated, transfixed, or irritated muscle. Lock-jaw has been known to attack a patient upon the separation of an eschar, where the integument has been destroyed to a definite extent, the fracture of the bone having been originally of a simple kind. As to hemorrhage, Sir B. Brodie was in the habit of describing in his lectures the case of a gentleman who sustained a compound fracture immediately below the knee-joint, in riding through a copse whilst hunting, by striking the part violently against a tree. The upper fragment of the tibia was displaced backwards, and coming into contact with the trunk of the posterior tibial artery, induced ulceration of its coats, and, as a consequence, repeated bleeding to so serious an extent as to endanger life. The patient was saved by amputation several weeks after the receipt of the injury. Fortunately, these results are so rare, as to constitute, not the rule, but the exception. It is right to notice them as matters of fact, but they do not concern the surgeon so nearly as the non-union of fractures. This accident is far more frequent, and scarcely less disastrous.

It would be out of place to go largely into the causes of non-union in a concise treatise like the present. For the most part they are not obscure; and too often they belong rather to the extra-

vagance of art, than inaptitude on the part of nature. Unquestionably, the failure of ossification is sometimes purely constitutional; but we cannot disguise the fact, that it results also from a wrong or inefficient management of the injury. Such, at least, is a common opinion amongst those whose position guarantees their right to form one. For one case in which the defect is fairly attributable to failure of the natural powers, two, at least, occur, in which the result is due to original neglect, or an unseasonable interference at a later time. Where the constitution is in fault, the local state is most marked. The ends of the bone are just rounded off with a fibro-ligamentous substance; the surrounding parts are in nowise affected after the primary swelling has subsided; there is, from the first, an absence of the slightest pain, enlargement, or thickening in the vicinity: in short, no attempt is made to raise the hoard or scaffold which always precedes the definitive repair of the old bone; and, in such cases, experience hails with delight the earliest symptom of vascular excitement in the part, as earnest of a healthier process. How opposed to this instance is the case of œdematous and thickened integument, abscess, exfoliation or caries of the broken ends, remittent nocturnal pain, accelerated pulse, loss of appetite, and a general febrile debility!

In a memorable example of this state of system, where the broken thigh of a young and healthy

farmer remained disunited at the end of three months, it was admitted that the splints had been removed for purposes of examination in the third week after their application, and shortly afterwards altogether discarded.

Sometimes a bone, as the femur, is so much damaged by a detachment of the periosteum, and general injury of the soft parts, that the subsequent state is one of progressive destruction. Here, again, the tumour and thickening become the seat of abscess. No reparative effort can commence. A large exfoliation from the shaft takes place after a protracted interval. The patient dies hectic, and utterly worn out; or the crisis may have been averted by a timely removal of the limb. The Author has often witnessed these events, both in compound and simple injury of the thigh-bone.

The moderns have cited a variety of local circumstances under which a bone will not unite, but the most common cause is mal-apposition or a disturbance of the broken ends. No stronger argument for "early setting" need be used than the risk to the successful issue of the case as respects union if this proceeding be delayed. The most unfortunate results have been seen to follow the substitution of one apparatus for another after the lapse of a certain time, say fourteen days. The meddling with splints, with the view to examination or readaptation, cannot be too much condemned. All this is consistent with the fact that

bones do and will reunite in spite of motion. The blood also will coagulate at last if stirred with a stick or teaspoon; but that process commences sooner and terminates more quickly where the fluid is permitted to remain at rest. The permanent intervention of other parts betwixt the broken ends of a bone is of rare occurrence. An extensive separation of the periosteum is far more frequent as a cause of non-union. Where the defect is attributable to old age or want of power, the symptoms are sometimes sufficiently remarkable. The constitution for months together remains indifferent to the local emergency. By and by another texture is involved, and affairs are now changed. The skin, owing to the recumbent posture, becomes inflamed. Now the centres sympathise at once; fever shows itself as a type of the exhausted habit; the integument sloughs; after which occurrence the patient never rallies. Death is preceded by a modified hectic, colliquative diaphoresis, loss of appetite, incoherent talking, or delirium in a more active form, and inability to swallow food.

At this juncture acute diarrhœa not unfrequently closes the scene in a few hours. In reference to the various methods which have been employed to excite the ossific deposit, little dependence can be placed either upon setons or excision. Moreover, these operations are objectionable from the very acute pain and constitu-

tional suffering which they produce. Amputation very often terminates the course of such experiments. Change of air, nutritious diet, a careful observance of any idiosyncrasy on the part of the patient, whether primitive or acquired, are all essential as a general rule. For the part itself, absolute rest and an amount of pressure, sufficient to procure attenuation of the limb, in short, such as induces uneasiness, but which, owing to its gradual application, is not dangerous; this plan will ordinarily induce the required action after an interval of variable duration. It has succeeded very frequently when less gentle and more summary measures have entirely failed. The work of Mr. Amesbury may be consulted upon this and other contested points with advantage, as replete with sound information.

It is necessary to use great caution in exposing a patient to such an amount of pressure as is requisite to excite the ossific action in the vessels of the part. In April, 1835, a sober, middle-aged man, suffering from a simple fracture of the right thigh-bone of two months' standing, was suddenly subjected to very firm pressure. The process of union had commenced very imperfectly, or remained altogether suspended. The force applied was perpendicular to the seat of fracture by means of flat, firmly padded splints. The limb was placed semiflex in Amesbury's thigh apparatus. From having made no complaint, the patient now be-

came very sick and restless. Erysipelas showed itself along the entire limb. On the tenth day from the attack a large sacral slough was discovered. After this accident the man never rallied. He suffered from profuse night sweating, low delirium, and diarrhœa before death. The body was not examined, but the case is recorded by way of caution. Possibly this man was labouring under some prior and predisposing disease. All that can now be affirmed is, that no such manifestation preceded the application of the splints as described above.

Sir B. Brodie has remarked upon poor living and an exhausted habit as predisposing to the occurrence of non-union. A most marked instance in which this process was arrested by the state of the system, was that of a middle-aged man under my own observation, who drank gin to excess, and who had the misfortune to break his humerus near its centre. I watched him for some time, and indulged him freely in his favourite propensity, but without success.

When a shaft bone is comminuted, broken into three or more fragments, a detached piece may assume such a position as to keep the main portions asunder, and so retard or wholly prevent union. A very good specimen of this variety is to be seen in the museum of St. Thomas's Hospital, where also may be found a very fine preparation of a humerus, fractured obliquely through its sur-

gical neck, with the inner wall of the shaft driven into the cancelli of the head of the bone (an impacted fracture). In this case re-union was obtained under circumstances worthy of mention here. The subject of the accident, George Redgrave, was admitted under Mr. Macmurdo in December, 1843, and he died in the hospital in March, 1844, in a state of advanced phthisis.

My personal experience on the subject of pregnancy as a cause of non-union, is very slight; but that such a condition should operate to retard or rather temporarily suspend the process of bony reparation, is only consistent with the fundamental laws of the animal economy.

The following case, which was published by Mr. Oswald, Surgeon of Douglas, in the Isle of Man, in the "Provincial M. and S. Journal," is very illustrative of what occurs under such circumstances, and I am indebted to that publication for the annexed particulars.

In August, 1839, Mrs. R., a West-Indian, ætat. 28 years, large in the family way, sustained a fracture of both bones, from a kick in the middle of the right leg: there was comminution and protrusion. After removing loose fragments, the limb was laid upon a splint, and water dressings applied. Natural labour commenced on the 28th September: and she was delivered of her first child in eight hours. Suckling was forbidden. At this time the wound had healed firmly, but the fractured ends

were moveable, and the part flexible. October 4th, she began to complain of pain and uneasiness in the part. In December, the callus was firm. In January, she began to walk, and the cure was pronounced complete.

The following instance of gangrenous imflammation, following a simple fracture, occurred in the practice of the hospital, under Mr. Green, in the Autumn of 1835. It has been alluded to by Mr. South, in his translation of "Chelius's Surgery," and to that gentleman I am indebted for some particulars of the case. It will be seen, that the local action depended, in great measure, upon constitutional causes. I believe that mortification, after a simple fracture, may, on the whole, be pronounced "rare."

Charles Ayling, a porter, ætat. 47, has an habitual old man's cough, and has indulged freely in gin and beer. On the 6th of October, 1835, his right leg was jammed between a wheel and doorstep, and a simple comminuted fracture of both bones was the result. The skin was slightly grazed, and there was a great effusion of blood in the vicinity of the mischief. Pulsation in the tibials, below and behind the ankle-joint, could not be felt on admission. On the evening of the following day, he was incoherent and restless; pain and swelling being progressive. Forty drops of laudanum were given at this time, and he got some rest during the night. On the 8th he was collected;

the pulse compressible, and beating 110 in the minute. The limb was œdematous, swollen, and mottled; and its sensibility much lowered below the seat of fracture. 9th. The local appearances are spreading upon the knee and thigh, pulse is 108, small and jerking. Tongue is coated; but the bowels have acted naturally. He was now ordered to take six ounces of gin daily; also port wine, sago, and beef-tea. 12th. Acute pain, and no rest. Vesications have appeared upon the limb. Pulse wiry, 100. He is still disposed to take food. ℞ Ammon. carb. gr. v., mist. camphor. ℥j., tinct. hyoscyami ♏ xv., tinct. opii ♏ v. 6tis horis. On the 14th, the leg was in a state of sphacelus, complete and extensive, for which incisions were made. 17th. Emaciation is now very marked: pink patches are seen upon the cheeks. The skin is hot and harsh, and tongue dry. Pulse 116, small and irritable. October 21st, 2 p. m., the limb was removed, and he died at half-past nine in the evening of the same day. The body was not examined, but the integument of the limb was loaded with adhesive matter throughout, and pus escaped in considerable quantities on section of the muscles.

As to the period of life at which fracture may occur, it is notorious that there is no rule of universal application in that matter. I myself have seen an infant with a mass of callus covering the middle of the clavicle three weeks after birth.

These bones are ossified in healthy children before the full term of gestation. In the case alluded to, there were grounds for suspecting that some violence had been done to the part during delivery. The little child eventually did perfectly well. Old people, too, sometimes manifest unusual resources and powers of repair, after fracture of the cylindrical bones, especially women. In the "Medical Gazette" for January, 1843, there is an account of a perfect union of the shaft of the thigh-bone in a woman ætat. 89: but this is an exception; and the following narrative describes the ordinary event of broken bones, at such an advanced period of life, with sufficient accuracy to justify its insertion here.

Lady W., past eighty years of age (on Sunday, October 12. 1845), fell on a landing, where she was presently found lying upon her back. Her scalp was bruised, and her right collar-bone broken about its centre, the broken ends being also displaced. She was much shaken by the blow, and only recovered her warmth of surface very slowly. She was subject to attacks of spasmodic rigidity of the limbs, with confusion of intellect. On this occasion she was quite collected. She was in the habit of taking from fifteen to twenty-five drops of Battley's liq. opii night and morning regularly, and ordinarily a colocynth pill at night besides. After the accident she dosed a great deal, but declined food. She was thought

to be doing pretty well up to the evening of the third day. After that time her circulation began to fail, and she did not rally again. She survived her fall about a week.

Such cases need no comment. The last feeble flicker of existence is sustained by the habitual use of narcotic stimulants, and any additional demand for support or supply cannot be entertained. "Il n'y a pas de quoi;" and thus it is that under such circumstances local injury proves fatal, and the lamp is abruptly extinguished.

# INJURIES OF THE HEAD.

## REMARKS UPON THE TREATMENT OF INJURIES OF THE SCALP AND CRANIAL SURFACES.

The scalp is exposed to the same forms of injury to which the common integument is liable in other situations; that is to say, cuts, contusions, and laceration. If allowance be made for the particular organisation of the tissue, its locality, and the class of injury, usually attended with great violence, to which it is commonly liable, I see no reason to distrust the efficacy of very simple modes of treatment, even where the mischief is most complicated. Undoubtedly serious errors were formerly committed in the local management of scalp wounds, provoking excessive inflammation; and the system has often been blamed for the production of symptoms which in no wise belonged to it. The practice of inserting sutures on all occasions, and loading the injured surface with plaister, the thick compress and tight bandage, have often escaped their share of well merited censure: to these might be added inattention to the state of the stomach and bowels, errors in diet, and want of cleanliness;

causes which operate to promote disturbance, and thereby retard the healing action.

It would be an affectation to insist upon an entire disuse of plaister, and one or more interrupted sutures are absolutely necessary to secure the required coaptation of large angular or flap wounds; but if there be much contusion, or the surface is soiled, and its edges ragged, strips of moistened lint, or a fold of linen dipped in cold water, and retained by two or three turns of a roller, are the readiest and safest means at our command. As a general rule, I entertain a great dislike to the use of poultices. They are objectionable on the score of weight; they are apt to create a very unpleasant odour about the person of the patient; and their continued application tends to sodden the parts: thus they become an additional cause of irritation, and rather increase than diminish the chances of a diffused suppuration. Where a cavity or sinus exists, the necessity for extensive incisions is often averted by covering the parts with an emollient dressing, and the subsequent application of a roller capable of keeping the sides and surfaces of such abscesses in contact, and their cavities empty. This plan is consistent with the practice of counter openings, as they are termed, of sufficient size, and in such a situation, as to provide for the ready escape of matter as soon as it is secreted. Upon these terms I have succeeded in some very bad cases of un-

dermined integument, where dilatation of the part had previously failed to induce cicatrisation. When the bone has been injured by cutting instruments, as a bill-hook, spade, sabre, or the like, we may anticipate the growth of granulations from the interlamellar tissue. Their progress should be carefully watched, first, with a view to their own preservation; and, secondly, in order to guard against membranous inflammation within the cranium, which has been known to commence at this time, and which must be overcome at all hazards. Under such circumstances the patient should be freely purged, he should remain in bed, and, if the pain in the head become severe, he should be largely leeched, or bled from the arm. At a later period blisters, calomel, and the trephine itself, will not avail to check the fatal progress of some of these cases. After death, pus is found between the dura mater and the bone, or smeared diffusedly upon the opaque and thickened arachnoid. The tissue of the brain is softened, and its vessels uniformly gorged with blood.

There is often a puffiness or swelling in the vicinity of recent scalp wounds, distinct from that which accompanies erysipelas. It follows large effusions of blood, certain forms of contusion, and it is brought on by much manipulation of the parts, which, however, may be unavoidable for the purpose of securing bleeding vessels. This tumefaction belongs to the cellular

membrane, but if an œdema supervenes, and shows a disposition to spread, it presently assumes the character of a fascial or erysipelatous inflammation. There is a wiry pulse, a loaded tongue, and acute headache or drowsiness. The indications are obvious at this time: brisk cathartics, a moderate diet, cooling febrifuge drinks, &c. The part must be kept smooth-shaven, and enveloped in linen cloths dipped in iced water, goulard, or a spirit wash. Leeches are not likely to be useful at this juncture, but the earliest indication of matter beneath a tendinous or aponeurotic tissue should be met by free incision.

To subdue excessive irritation and economise power are the chief things to be borne in mind on these occasions. The secretions should be narrowly watched, and the stomach invited to a willing performance of its office.

These actions are of constitutional rather than local origin, and something more than an ordinary antiphlogistic regimen will be required before the general health can be restored.

If the part is much injured, and the power of reproduction feeble, wine, bark, ammonia, nay, opium itself, may be quite as requisite in scalp injury, as in wounds situated elsewhere.

The membranous covering (dura mater) may be exposed with impunity; and such cases often do well if no worse complication exists at the time of the accident. The effect of an opening in the dura

mater communicating with an external wound is ordinarily a protrusion of the substance of the brain (hernia cerebri) in the form of a spherical dark-coloured swelling, having a pulse synchronous with that of the circulation. It is apt to bleed when meddled with, but is not painful, unless long exposed or unduly compressed. It is abrupt in its appearance, and sometimes acquires bulk rapidly. The proposition for cutting off or cauterising these tumours is full of danger, and appears to proceed from an imperfect appreciation of the tendencies of diseased action in the brain. An astringent wash or mild antiseptic lotion under a bandage lightly applied, together with open bowels, quietude, and strict temperance, comprise all that the surgeon can with safety suggest in the first instance.

It often happens that the brain has exhibited symptoms of a functional derangement before the time at which the excrescence appears. This circumstance renders the prospect of a perfect cure remote and uncertain, but it is not inconsistent with a material alleviation of the patient's condition in the most formidable cases.

The point upon which it is proper to insist in practice is, that if moderate pressure cannot be borne, no other primary interference is likely to be of service. After the tumour has existed for some time, it shows a disposition to die. If the process of separation be aided at all, it should be by liga-

ture rather than by excision, which is always followed by a violent hæmorrhage. Besides, if nature be thus anticipated in her operations, the disease recommences; whereas if the dead mass is permitted to drop off spontaneously, the parts will sometimes granulate and cicatrise kindly afterwards.

Where the opening in the dura mater is small, and the general health unimpaired, the wound occasionally heals, even after the repeated separation of dead portions of the substance of the brain. On the whole, this is a subject concerning which few are either much informed or interested. It does not fall to the lot of civil practitioners to see the hernia cerebri often, if at all. The best *resumé* of facts connected with this serious consequence of head injury is contained in a paper published in the eighth volume of the Med. Chir. Transactions, by Mr. Stanley of Bartholomew's Hospital. It is probable that many cases have been called hernia cerebri, which had nothing in common with the well marked features of that rare accident. The luxuriant granulations or excrescences growing upon the exposed but unbroken membrane, are in no degree allied to the disease in question.

In certain incised wounds, where, for example, in a quarrel, a man has been struck with a chisel, or where the scalp has been injured by glass, or a knife, the hæmorrhage is sometimes so profuse as

to alarm the inexperienced. I have seen people brought to the hospital after such an injury, where it was reasonable to suppose that a very large quantity of arterial blood had been lost, perhaps rapidly. In such cases it is always expedient to secure the wounded vessels by ligature. The hæmorrhage may not be active at the moment, but it will certainly recur and prove most troublesome, if not dangerous, unless decisively dealt with as here directed. I never saw a silk ligature do any harm to the wounded scalp, but I have often known abortive attempts to restrain bad arterial bleeding by sponge or lint compresses attended by disastrous consequences, as a painful tumefaction, exposed and discoloured pericranium, nay, disease of the bone itself, with a corresponding derangement of the health of the patient. These things, from their apparent simplicity, seem hardly to require notice; but in moments of haste there is no time to propound questions as to plans of treatment, which should already have acquired the force of axioms. If decision be the soul of surgery, correctness of detail certainly comprises the whole body of the art, and recent scalp injury furnishes abundant scope for the exercise of both these qualifications.

# OF INJURY TO THE SUBSTANCE OF THE BRAIN.

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## INTRODUCTORY REMARKS. DEFINITION OF TERMS, AND PROPOSED CLASSIFICATION OF THE FORMS OF INJURY.

The general management of the accidents to which the brain and its investments are exposed, is now so well understood, that it would appear to a superficial observer as if no more remained to be said on the subject. They have claimed the attentive inquiry of some of the ablest surgeons of past and present times, and in the main have been well elucidated and clearly explained. Nevertheless, there yet remains something to be done; if we are rich in materials there is a want of systematic analysis in reference to the treatment of these injuries, without which it is impossible to generalise with safety or success.

The profession in this country have long been distinguished by a cautious observation of facts, and the difficulty of finding out the truth has led them to place a correct value upon its ultimate attainment. Hence they are as a body safer prac-

titioners than many of their Continental neighbours, and I regard the management of head injury as forming no exception to this rule. Perhaps, too, we appreciate more justly the purpose and operation of medicines: certain agents, as mercury, are administered with greater boldness and effect. And I am inclined to think that a mischievous habit of anticipating the approach of possible symptoms or forms of diseased action, whether by mechanical interference or otherwise, is not at present to be numbered amongst the short comings of British surgery.

In certain treatises of a former time we read, it is true, of setting on the crown of a trephine as a matter of course in obscure cases, or scalping the patient, as one of those mild preliminaries proper to the subsequent search for an assumed crack or fracture in the skull; but these things have passed away, and, perhaps, their mere rehearsal is uncalled for. Still the mind of a beginner is apt to be amazed and lost amidst the labyrinth of terms under which the various forms of head mischief are described, and there is an absence of simplicity even in their definition. Concussion, commotion, depression, compression, laceration, extravasation, are several words which, to a student, might seem to imply so many distinct species of disorder. Now, for any useful purpose of definition, they all resolve themselves into two classes or headings, viz.:—1. Commotion. 2. Compression. Surely, with a practical view, symp-

toms should be arranged according to their relation to the brain itself. Scalp injury belongs rather to the department of flesh wounds and their consequences.

No one who has had an opportunity of seeing much of these accidents can have failed to notice the great variety of symptoms which the same kind and amount of violence will produce in different individuals; indeed, any one who expects to realise the ordinarily received symptoms of a concussion on all occasions will soon find himself as much perplexed as the tyro whose faith in the Hunterian definition of a venereal sore led him to reject by far the more usual forms of syphilitic ulcer, as not partaking of the essential character of the disease.

How many instances occur wherein it is not possible to know or determine, with any degree of accuracy, whether the primary condition is one of recoverable collapse or approaching death; whether the vomiting, the cold surface, the inactive pupil, the restlessness, increasing often to violent convulsion, speak only of temporarily arrested function, or denote a hopeless and helpless disorganisation. Suppose, again, the first danger partially overcome; temperature restored; the circulation tranquillised, bowels and bladder acting healthily; still nothing rouses the patient to effectual consciousness; his best response is a groan or half-articulate sound, and he again lapses into a torpid

slumber, without a sign of returning sense. Days —nay, weeks may elapse before the crisis of a protracted reaction arrives. Still it is possible that the lost balance may be restored, time alone being required, or, in other words, continued rest. Slowly do the listless members resume their power, the eye its language, the mind its office, and the stomach its tone. Finally the patient may recover, waking as from deep sleep, but memory takes no heed of the past, and the progress of convalescence is nowhere better marked than in the slow revival of this faculty. Of all the accidents which occur to the brain, those followed by a slow reaction are the most interesting.

The state of torn brain is generally thought to be marked by convulsion, and I believe truly so, in fact it is an extreme instance of unsubdued irritation. Where there is no external wound or artificial outlet, laceration, whether of surface or substance, the result of injury, is uniformly fatal. The brain seldom initiates an act of adhesion under any circumstances; and it does not reproduce itself. The local reaction, when death is not immediate, always induces a softened condition, and the semi-fluid debris are often smeared and infiltrated with a purulent secretion derived from the capillaries. Nature would appear altogether to decline the attempt at reconstruction, as being an effort to which she is wholly unequal. As to the instance of balls and substances which lodge, of which

Hennen and others have given cases, or where portions of the brain have continued to escape for some time through an outer wound, these are not fair examples, for there the spoiled material finds an outlet, and absorption is not required in anticipation of a process of contraction and cohesion, which has already commenced in the contiguous parts, and upon which permanent cicatrisation depends.

Where there is an external wound giving a ready passage to spoiled and waste material, no appeal is needed to that roundabout process to which recourse must be had when such means of escape do not exist; and in the latter case the brain does not of itself exhibit any power to institute this essential preliminary of repair under such circumstances, viz., absorption.

Compression, whether by blood or bone, is well known to be fatal if unrelieved. Where the brain is compressed as well as torn, the characteristic marks of automatic-convulsive movements are often wanting; in other words, the organ being first completely paralysed by permanent compression, furnishes no evidence of any minor irritation. Laceration, which is one mode of irritation, is uniformly characterised by convulsion and unsustained efforts to promote and combine the manifestations of the will, — there is an imperfect volition; but when the paralysis is permanent, there is always pressure, and stertor is the sign of its direct and

universal operation. In injured brain we observe two distinct effects of pressure, according to its site; it is either superficial or central. A deep-seated lesion, into which blood is poured on the instant, the result of recent injury, is directly fatal, and we may suppose that in such cases the heart's innervation is summarily subdued to extinction; but when a surface only is compressed, without breach of its tissue, the circulation becomes slow, laborious, and comparatively powerless, because the heart no longer receives or distributes its contents as heretofore. The blood moves more slowly, and there is a simultaneous deterioration of its quality. The capillary current presently finds itself impeded to downright obstruction; the tissues are gorged or circulate black blood; the flagging heart, since it can no longer impart energy, derives in its turn but slight assistance from the over-loaded lungs. Death, under such circumstances, is a process of slow suffocation. The happy reverse of this picture is every now and then presented to us by the dexterity of the surgeon; and anybody who has once witnessed the effect of raising a depressed and compressing bone, or the giving exit to a mass of coagulum lying upon a surface of brain otherwise uninjured, cannot afterwards disclaim all faith in the practical resources of surgery.

It is important to bear in mind that there are many depressed fractures which exhibit no sign of

compression. The symptoms of pressure amount, in fact, to an extreme degree of that mode of disturbance which, in a more mitigated form, we term an irritation. In another place I shall speak more fully of the signs of irritation; and I might quote many cases which prove the danger of omitting to remove all possible causes of offence to the brain and its membranes after injury, wherever it is possible to do so. It will be shown, that where a fracture is depressed, it is right to raise the displaced fragment, although the signs of compression be not present; for an unsubdued irritation so caused will sooner or later terminate in an act of inflammation of one or more of the membranes of the brain, accompanied by effusion into the cavities of that organ, and a permanent change in its consistence, the result of prolonged congestion in its capillary vessels.

On the whole, I would venture to suggest that the following arrangement of head-injury is, perhaps, more simple and descriptive of its several forms than any hitherto propounded for general purposes of practice and observation. All these accidents may be regarded as belonging to one of two principal divisions, which may be termed—1. Commotion. 2. Compression. Irritation and inflammation of the organ can scarcely establish a claim to a separate divisional classification. These are rather remote consequences or incidents, and grow out of the peculiar circumstances of an indi-

vidual case. As to their frequency, inflammation is more rare than convulsion, paralysis, or other purely neuralgic conditions, and especially so in recoverable instances.

Commotion is either fatal, or transient and remediable by art. It embraces all cases within the two extremes of shock or blow which kills immediately, leaving no visible disintegration or trace of its effect after death, and those examples of protracted reaction, the event of which is uncertain through a period of many days. To commotion I refer alike simple stunning to be followed by present recovery; also those mixed conditions of alternating stupor and excitement, which terminate fatally after an uncertain interval, and depend upon lesion of the substance of the brain. The last are often characterised by so many signs of recoverable shock, as to excite great doubts about their actual nature until the patient begins to die. Torn substance and fractured basis, in all its forms, are of this class.

Compression, whether by blood or bone, is recognised as occurring in one of two forms:—

1. It is irremediable either from its extent or its intensity; or from the combined operation of these two causes.
2. It may be relieved by taking away the depressed and compressing body.

Compression remediable by art is of two kinds. It is either partial or complete.

When the effect is partial it is marked by signs of irritation; of this order are the spiculated growths, angular projections, and some of the fractures of the internal table.

The other variety embraces all those cases of collapse, stertor, and insensibility, which mark the action as being at once persistent and complete.

If the whole be reduced to a tabular form, it may be displayed thus:—

*Commotion.*

1. Fatal, without lesion or reaction of any kind (rare).
2. Simple, with a brief and healthy reaction (ordinary concussion).
3. Obscure, with a slow reaction, and recovery more or less complete.
4. Lesion of the substance of the brain with or without fracture of the cranium, uniformly fatal in the latter, and ordinarily so in the former case.

*Compression.*

1. Directly fatal, whether from the nature or extent of the mischief.
2. Not directly fatal but remediable by art, and occurring in one of two forms.

*a.* Pure, by surfaces of blood or bone.

*b.* Partial, by depressed edges or spiculæ, the symptoms being incomplete and marked by signs of irritation.

## OF SYMPTOMS AND PRINCIPLES TO BE OBSERVED IN TREATING HEAD-INJURY.

It is an old observation, that the heart's action is, to a certain extent, independent of the brain; and we know that this is borne out by experiment. If a living animal be pithed by dividing the spinal cord next its junction with the tuber annulare the contraction and dilatation of the heart will for a time continue as before. It evinces a like capability of action when removed from the animal's body, and the phenomenon may be sustained, both as to period and velocity, on raising the surrounding temperature, by immersion in warm water. Still the whole affair is transitory, and the fact is not of much importance if stated as a ground upon which to base any practical suggestion; for the source of the nervous influence being cut off, so soon as the vital endowment of the part is exhausted, death ensues. We cannot maintain the supply of vital force so derived beyond a very brief space, or renew it when once expended; and therefore, whether we experiment upon animals, or reckon upon the resources of the system under injury, we must not count upon any encouragement which such an isolated phenomenon holds out. From the moment when the brain finally ceases, in consequence of interrupted connection, to exert its influence over the rest of the body, the animal so circumstanced begins to die. The con-

dition of the brain may be that of disease, and under such circumstances the system exhibits signs of its altered function, so long as its connection with the spinal marrow is preserved; but when the circulation in these organs is suspended, or their continuity is permanently interrupted, the process of dissolution commences, and is completed, sooner or later, according to the character and extent of the lesion. For example, in certain cases of local injury, or where chronic disease of an important organ has gradually impaired the proper nutritive powers of the system, life has been known to succumb suddenly, and the spark has been extinguished almost in a moment of time. Without any premonitory sign the patient complains of præcordial oppression, a sense of faintness supervenes, then restlessness; he gasps and tells you he is going to die, and in fact he does die, perhaps, upon the spot.

So long as the brain retains its integrity, a loss of consciousness and muscular power is not of fatal import; the person so circumstanced is not dead, but sleeps; but when that organ has undergone changes incompatible with the preservation of its office, we are informed of the fact through the medium of the circulation. Hence, in head-injury, experience always regards, with a just apprehension, a flagging or uncertain pulse, or one which continues steadily doubled in its rate of frequency, independent of any other symptoms,

strictly cerebral, which may happen to prevail at the time.

I will now briefly address myself to some particulars affecting the local and general management of head-injury. If we compare the remarks of such clever observers as Dease and Pott with the practice of the present time, we shall be puzzled to explain what has become of a numerous class of cases, which in their day called for the continual "setting on of the trephine." They must still occur, and be even more frequent now than formerly; the fact is, that they are differently interpreted. Mr. Pott, with all deference be it said, for he was a scholar as well as a surgeon, mistook the road upon a false theory of "prevention." Mr. Dease fairly admits "that the people all died in spite of the trepan, physic, bleeding, and low diet, and that those who escaped the operation, or any treatment at all, often made the best recovery."

To be candid we must admit, that the principles of inflammation, the doctrines of constitutional power, and functional derangement, were very imperfectly understood, and not appreciated then as now; and that, besides more exactness of observation and detail, we possess in the action of mercury a means of arresting inflammation, and restoring a disturbed balance of circulation, of which they knew nothing. To the surgical pathologists of our own day, and in an especial manner to those em-

ployed in watching the course of inflammatory changes in the transparent tissues of the eye, we are indebted for what may well be termed a discovery, first brought from the London Eye Infirmary, in Charterhouse Square, to the great hospitals, and since employed to prevent, modify, or remove adhesive deposit, as the case may be, and control the various terminations of inflammation. Where, half a century ago, the lancet was indiscriminately used, or the knife, the saw, and the cold grinding cathartic constituted the treatment of a doubtful concussion, we now attach more confidence to the operation of small doses of calomel, at regular intervals, aided, as required, by the trickling bleeding procured from a score of leech bites.

Head-injury is often remarkable for the great obscurity of its early symptoms, to say nothing of their variety. After the same kind and amount of violence one man is rendered stupid, and his pupils, whether dilated or not, are inactive; he is drowsy, sick, and moans when spoken to; his pulse is feeble and slow, and his surface chilled. Another is reduced to a condition of positive insensibility, casts his stomach at the time of the accident, but not afterwards; is very cold, has a large motionless pupil, a slow labouring pulse, not unfrequently snores loudly; one arm or side of the face may be paralysed, along with the bladder and lower extremity; the urine may or may not be permanently

retained. The continuance of such a condition is one among the symptoms of a recoverable state, or its opposite. Perhaps there is an appearance of blood about the nares, or it has trickled in small quantity from the meatus auditorius. A third, after a severe blow or fall, is excessively violent and incoherent, requiring restraint to keep him in bed; the pulse bounds; the surface is not cold; and there is an expression of wildness about the eyes. Now, although any one of these conditions may exist, irrespective of any lesion whatsoever, they being all possible forms of recoverable commotion, it may be the forerunner of acute membranous inflammation, or of that hopeless train of symptoms which indicate lesion of the substance of the brain. There are many cases modified in their course and character by habits of intemperance or by a previous physical exhaustion, depraved secretions, or unfavourable mental conditions, which are from such causes additionally obscure under the effects of injury, so that it is as necessary to inform oneself of the previous habits and position of the patient, when summoned to such accidents, as it is where the disease is idiopathic, or the symptoms of a more slow and insidious nature.

I always direct the head to be shaved; even where the mischief is slight, it is a useful precaution. One sometimes discovers a wound or bruise by so doing which might otherwise have escaped detection for days, and it is a positive relief to the

entire region, as well as necessary to the efficient use of topical means. A spirit lotion, or a diluted Goulard wash, with the Liq. Ammon. Acetat., are amongst the best refrigerants commonly in use; but cold vinegar and water answers as well as any other application.

With regard to bleeding, abstraction of blood from the arm is of course at times indispensable, but often the slow oozing obtained by good leeches is not only more effective, but by far the safer practice. This more gradual operation of the depleting agent tells with great effect upon cases where the reaction is disposed to be tardy or incomplete. Patients slowly open their eyes and recover consciousness, after trickling leech-bleedings, who had been previously bled copiously from the arm without any evident good effect; and if the heart is too rapidly impressed by venesection *plenô rivô*, along with faintness, there supervenes increased congestion and fresh loading of the sinuses. The respiration under such circumstances becomes more and more impeded, or a fresh fit of violence comes on — excitement without power. Put by your lancet in such a case, for the patient will infallibly die if you persevere. Watch especially the venous circulation; where the pulse will bear the pressure of the finger, order an application of six leeches to one or both temples (I have laid them on one by one), bathe the wounds so made with hot water, and now look narrowly to

the breathing, the countenance, and the pulse. When these measures are successful, the soft murmur of child-like repose slowly takes the place of the former retarded or irregular respiration; the face is no longer suffused, nor the features working and distressed; the lips are slightly compressed which lately hung in a semiparalysed state, flapping, and loose; the pulse is now regular, 80° or 90° in the minute; the patient is reviving, and will reawaken to consciousness by-and-by, when the capillaries are sufficiently relieved, through the influence of a regular pulmonic circulation; the blood is now once more decarbonised, and when the heart in its turn begins to respond to its accustomed stimulus, the reaction may be deemed complete, and the patient is restored by gradually unloading, instead of suddenly emptying, the oppressed vascular tissues. As for counter-irritants, they are useful in most recoverable commotions of the brain, and their diffused action is at times very salutary. Where there exists an early tendency to excitement, they will sometimes control it in a remarkable manner when active depletion fails, or is plainly inadmissible. They are especially operative in those morbid conditions where there seems to be a want of power to rouse and sustain the action of the capillaries. In recent head-injury it is best not to irritate by maintaining a raw surface, or keeping the blister open, as it is called. The relief to be obtained by counter-irritants in

such a case is not to be confounded with the proceeding indicated in chronic disease. The soreness and irritation of an issue are very undesirable here, and the exhaustion so produced may be of serious consequence to a person otherwise disposed to early convalescence. The regions best adapted for these applications are the crown of the head and the nape of the neck. The required irritation may be kept up for a period of six or twleve hours, according to circumstances. Blisters should never be used where there is reason to suspect that the brain is lacerated, or irremediably injured; and on such occasions no other objection need be advanced than this, that they are utterly useless.

## OF PURGATIVES, AND THE USE OF MERCURY.

There is nothing more repugnant to a thinking mind than the very coarse and unreasonable practice of giving large and repeated doses of purgative medicine immediately after the occurrence of any severe accident; nor in head-injury is such a proceeding always free from danger to the life of the patient. However plain the indication for laxatives may be, the practitioner should bear in mind, that whether it be a broken leg or a broken head, he has ordinarily to do with complicated effects. If the previous diet has been poor, and the meals irregular both in

quality and quantity, there will probably be unhealthy or defective secretions and loaded bowels, but for the same reason there will also have existed so much the less ability to resist the impression of severe shock or sudden violence. Such a consideration is strengthened by the fact, that in many cases the system is already debilitated by habits of intemperance, or slow organic changes may have commenced in the lining membrane of the stomach, or in the substance of the liver or kidneys, implying a necessity for extreme caution in the use of medicine of any kind. I am very sure that I have more than once seen convalescence retarded by a repetition of large doses of calomel, or the frequent use of Epsom salts, where the system could not bear such treatment. The rich and dainty, too, under similar circumstances, often require to be handled with equal caution, for that luxury and excess are more fatal in their enervating influence than a meagre and scanty diet, is proverbial. It is a common observation that we give ordinarily too much medicine; and I do believe that in surgical cases much of the physic might well be spared, or at least its intention be more certainly carried out by means of a restricted and careful diet; nevertheless purgatives are by no means to be overlooked in the treatment of head-injury. Whenever stupor, nausea, with vertigo or bowel-pain, are complained of, a very

early recourse must be had to laxatives at least. Castor oil or the compound senna draught should be given as soon as the patient is in circumstances to swallow and retain the medicine; but I have never been able to appreciate the necessity for an immediate exhibition of large doses of calomel in simple concussion. Slow bowels or obstinate constipation very commonly follow injuries of the head, and the biliary secretion is especially liable to defect or suppression; but such a state is not the production of a few hours, and some days elapse ordinarily before calomel need to be resorted to. When its use is indicated, it is better to give it in a full dose; but it is an old remark, that all mercurials have a tendency to lower the patient when too liberally administered, and this is not desirable if we wish to institute a process of repair, or restore the powers of the system with certainty and expedition.

One reason why the older surgeons saw so many cases terminate in secondary and fatal inflammation of the membranes of the brain was, their inability to discern the stage and period of reaction, and determine the moment at which one or two full doses of calomel would often have prevented the necessity for more, and would have summarily stopped, or rather anticipated, those changes, which terminate in incurable effusion. In all the simple or less complicated cases, such unirritating medicine should be administered

as will suffice to empty the loaded colon, and gently stimulate the alimentary canal. Healthy appetite, next to rest, is the surest and most unfailing sign of a return to health; it should be cherished and assisted, not destroyed, by the operation of physic. Injections per anum are not often required in the early treatment of head-injury; but if the stomach is irritable, or there is reason to suspect a loaded state of bowels, they may be administered with advantage. Some common salt stirred into a pint of thin gruel, or a warm senna infusion, holding some sulphate of magnesia in solution, or an ounce of turpentine mixed with a quart of warm water and the yolk of eggs, are among the best forms, and are generally productive of immediate relief to the distended abdomen.

I have endeavoured to draw a line of demarcation between those instances of disorder in which mercury is not essential to the recovery of the faculties, and others wherein the summary operation of calomel, pending the approach of convalescence, is of marked utility, if not an urgent necessity. I would further venture upon the suggestion, that this remedy so exhibited should be given boldly, and not hindered in its proper effects by extraneous combination. This observation applies to the purely evanescent operation of the medicine. I shall now briefly allude to its value as a specific in cases of a more com-

plicated or obscure character. It often happens after the lapse of a few days from the time of the mischief that the patient remains in a very stupid condition, that he is with difficulty roused from his lethargy, and when taxed with inquiries the expression or complaint is one of pain and uneasiness referred to the head generally. There is a great intolerance of light, the skin is dry and hot, if the patient can be induced to protrude the tongue it is coated with a white sticky secretion. The bowels perhaps have been copi ously relieved by purgatives or injections. There is ordinarily no evidence of any loss of command in the sphincters. Sometimes the lethargy is uninterrupted, as in the case of slow and retarded reaction; sometimes there is a state of moaning and extreme restlessness. If the patient does not refuse food, it is at least a matter of indifference to him. The pulse is, I believe, always accelerated in the case I am describing, and generally contracted, that is, quick and sharp. If there is contusion or wound, it should now be closely looked to, for the manual interference of the sur geon is sometimes required before any medicine can be of service; but the symptoms, as regards the brain and its investments, are those of irritation and approaching inflammation. They are in contrast with the paralytic stupor of compression on the one hand, and the irregular automatic movements of laceration on the other.

To say where the congestion of irritation ends and inflammation commences is especially difficult in the case of the brain. The two states are allied, so much so that we might almost regard them as stages of the same disorder. Be this as it may, these are the cases, as a class, in which mercury will effect the greatest good; indeed, it is the only remedy which will dissolve the mystery of doubtful emergencies. If a patient under the prolonged effect of a severe blow or fall followed by insensibility, without breach of the integument or cranium as far as can be known, does not mend permanently and decidedly under the action of mercury pushed to a gentle ptyalism, all other means having failed, the case is ordinarily fatal and the patient dies. Sometimes a rapid act of inflammation has passed the limit of relief before this only effectual remedy is employed, and its termination is evidenced by characteristic appearances after death, or the brain may have suffered from one of those lesions, whether central or superficial, which proves destructive, not by reason of its extent but because the business of repair cannot commence. Irreparable injury however minute, operates directly to exhaust the innervation which controls the circulation and function of organs subservient to life. The restorative action of mercury does not involve, as a necessity, so much rapidity of action as would entail great or sudden exhaustion, and it is to be accompanied by such local measures

as tend to subdue inflammation. At first it is not desirable to exhibit opium, but if there be an irritable mucous surface, or the subject is aged, or if there be signs of organic change in other parts, it is then right to use it in combination with calomel, and with or without an antimonial, according to circumstances. Calomel in one or two-grain doses, at intervals of three, four, or six hours, is the best mode of giving mercury by the mouth. If deglutition is difficult, or the patient is indisposed to unclose the jaws, the mouth may be opened forcibly and the remedy in powder smeared upon the tongue with butter or other unctuous matter. This proceeding upon frequent repetition sometimes induces sore or excoriated fauces, and the irritation may become so painful as to be actually prejudicial. Under such circumstances, the mercurial ointment should be rubbed upon the skin so as to ensure its speedy absorption. The effect of calomel, when once it has entered the system, is very marked in some cases of recoverable commotion. The copious and more regular relief of the bowels, the clear indications of returning sense and power conveyed by gesture and articulation, the disposition to take food, the compressible pulse and tranquil respiration, all point to the steady and progressive relief of the brain and its investments. There is still some complaint of pain, and in bad cases, for a time, a paralytic condition of one or other of the nerves of sense

as smell or hearing is observable; there is perhaps ptosis of one eyelid, an arm is benumbed, or one side of the body feels colder than its opposite; but these effects are transient and may be permanently relieved if not entirely removed by careful after treatment.

This after treatment is a very comprehensive term. It includes attention to repose and diet, uniformity of temperature, and an entire abstinence from stimulants of all kinds, together with all provocatives to mental excitement. In certain cases of slow reaction some surgeons carry the principle of non-interference to a hazardous length. They affirm, that if the patient cannot sleep off the injury, medicine does little or no good. A proposition of this kind must be received with caution, but I am willing to admit that surgical or medical interference may be ill-timed, and to that extent very prejudicial in its results.

### OF IRRITATION. INFLAMMATION. QUESTION OF OPERATION, ETC.

Irritation is a state rather recognised than defined by the physician. Like life, it is marked sufficiently by its phenomena, but it is difficult to determine its exact cause; and, therefore, it cannot be explained so clearly as some other diseased actions of the brain. At first it would appear to depend upon a loss of equilibrium in

the circulation, and may be regarded as a purely functional disorder. If it continue, it is characterised sooner or later by signs of congestion, which may be regarded as its second stage, and most serious event. If under such circumstances the case be not susceptible of early and decisive relief, inflammation and irremediable mischief ensue ordinarily at no distant time.

Irritation of the brain follows local violence as a remote effect of injuries; but it is also induced by aggravated dyspepsia, immoderate drinking and other excesses, anxiety, depression of spirits, exposure to cold, and all accidents having a tendency to exhaust or deteriorate nervous power. It is sometimes shown in great uncertainty of temper, slowness of speech, and failing powers of thought and memory. I knew a gentleman, who smoked to excess, tumble down upon the door-step of an omnibus; he was carried home, and lay all night cold and well-nigh pulseless, stertorous, and insensible. Deglutition was performed with great difficulty. He was restored by a liberal use of brandy and hot applications to the surface of the body. When he recovered, it was evident that his memory was gone, and it remained seriously impaired so long as I had an opportunity of seeing the case. So speech, taste, vision, or hearing are all liable to be affected when the circulation has undergone changes which determine an irregularity in its distribution upon the surface and substance

of the brain. In this state there is, I believe, always pain in the head, a morbid appetite or disinclination to take food, and as a consequence, great irregularity in the actions of the intestinal canal. The simplest example of a purely functional irritation is epilepsy in a mild form, such as I have watched to its final extinction in a case recently under my care. The subject of this disorder was a growing boy who was a large eater, and subject to the attack soon after a principal meal, as breakfast. This lad was cured by paying great attention to my directions for the regulation of his diet, and an entire change of scene and occupation. He was taken from the confinement and impure atmosphere of a London counting-house to a farm at a distance from town. His recovery was very rapid, and he had previously suffered much from blisters, calomel, and other unavailing methods of treatment.

The action which terminates in the formation of a circumscribed abscess in the substance of the brain is an inflammation, and the retained matter so produced sets up an irritation of that organ. The angular depression or projecting spiculum of a cracked internal table of the skull produces irritation, which if it continue, provokes inflammation as evidenced by pain and febrile excitement during life, and by the appearances of thickening and effusion after death. It is of importance that the distinction no less than the connection between these two states of irritation and inflammation

should be accurately recognised. If the subject of cerebral irritation be exposed to extreme measures of depletion a fatal exhaustion may supervene, but they are wholly inadequate to relieve such a condition permanently. Surgeons of the present day have a deeper interest in this matter than their predecessors, from the knowledge of the operation of such an agent as mercury, which may well inspire them with confidence in the treatment of many cases not formerly remediable, and suggesting no alternative to the performance of an operation fraught with risk and extreme uncertainty.

It is sometimes difficult to determine the point at which irritation assumes the modified character of compression, but the symptoms which call for interference on the part of the surgeon seldom admit of doubt. We are not on these occasions to wait for laboured or sonorous breathing, a fixed pupil and the course of direct pressure. Where there is a paralytic state of one or more members of the body with slow and imperfect perception, impaired sense and memory, difficulty of speech and deglutition, atrophy or evidence of a permanently disturbed circulation, an operation is as plainly called for as though the local signs of compression were palpable to the sight and touch. Tenderness or pain on pressure, circumscribed and persistent, point to the site of such operation, whether it consists in simple division of the pericranium or trepanning the skull. In these cases

of the remote effects of injury, the presence of matter, bony spicula, diseased or necrosed bone with meningeal separation, nay, sometimes even a slight thickening of membrane, may give origin to symptoms which will usually be found to correspond in intensity to the amount of local change.

In recent cases of fractured skull, I believe the rule of not operating where there are no symptoms to be a good one. A departure from this practice is certainly justifiable in the case of wound with fractured and depressed bone. Be the symptoms what they may, displaced and exposed fragments should be elevated, and if loose, removed. If allowed to remain they provoke inflammation, which usually commences after the lapse of a few days and terminates in a destructive change with effusion on the surface of the dura mater. If removed at once, the patient being rid of such a grave cause of disturbance before the parts are spoiled by disease or rendered unfit to sustain a process of healthy repair, the system at large responds to the full extent of its powers, as yet unimpaired by medicine and not debilitated by prolonged illness. The reverse of this is the result of waiting until further signs of mischief arise. If inflammation of the brain or its membranes be not stopped at the outset its fatal termination is seldom prevented. An irritation on the contrary need never be despaired of, whilst there is life

there is hope. In either case the other organs of the body sympathise widely, and with variable effects, upon the constitution. The nervous power may be excited, depressed, or altered in its action without immediate risk to the individual; but the circulation, to maintain life, must be at once restored to its original freedom.

Chronic apoplectic lesion, though a purely local change, depreciates the quality of the nervous influence but does not directly interrupt its course and operation; it is the crisis of a slow morbid action, of which the other organs of the body have all had warning, and for which they are in some degree prepared. This is not the case where the system has been taken by surprise by sudden lesion of a healthy structure. Laceration of the substance of the brain produced by injury is always fatal. In the first case, the powers of life having themselves undergone a previous diminution, are no longer capable of being very suddenly impressed by the occurrence of a minute lesion which, though critical, is but another stage or step in the progress of existing disease. Apoplectic cell, therefore, unless it be large and rapidly formed, does not alarm the centres like a sudden tearing of the sound tissue. There is no excessive counter-action excited for purposes of limitation or repair; but the case is otherwise after recent injury. There the resistance and reaction commence at once, but ineffectually, for the heart and arteries do not long

respond to the necessities of an organ which, under the circumstances, they are wholly unable to restore.

As regards treatment, the connections of the brain being universal it may be approached circuitously as well as by the direct road, and sometimes with great advantage where there exists a tendency to relapse. Symptoms can never be too closely watched nor power too carefully estimated in dealing with a part so prone to rapid and dangerous reaction.

# CASES.

To the foregoing Observations I now append some original Cases occurring in the practice of the hospital and elsewhere. Some I treated myself, in some I shared a divided responsibility; where the narrative has been obtained from others the fact is so stated.

## EXAMPLES OF COMMOTION.

### Case I.

On March 17, 1836, Thomas Darlington, a sailor boy, ætat. 14, was felled by the fall of a heavy bale of goods whilst employed upon a ship's deck, with which his head came violently in contact, a wound being inflicted at the same time in the left frontal region and across the root of the nose.

He was insensible when brought to the hospital, bleeding freely from the nose and ears. His skin was cold, pupils dilated and inactive, pulse scarcely perceptible.

Within three hours of his admission (1 p. m.) he rejected about a pint of blood of a dark colour when the vomiting ceased. He now became more sensible, answering questions and complaining of pain in the head. There was slight jactitation at intervals. Towards evening the skin became hot, the pulse rose considerably, 26 in the quarter and bearing moderate pressure. ℞ Olei ricini ℥ss. statim; vesp. abradatur capill. lot. spirit. ℞ Hyd. subm. gr. ij. stat. 18th. Passed rather a disturbed night; medicine has operated three or four times; has a good appetite to-day; pulse continues to rise; skin hot. ℞ Pil. colocyn. comp.

gr. v. 19th. Right eyelid swollen and puffy; conjunctiva much injected; complains of pain in the head; patient is disposed to doze to-day, having passed another restless night; bowels not open since yesterday morning; pulse 80, and soft. 20th. Pil. col. c. cal. gr. x. statim; pupils remain dilated; pain constant, referred to the temples; heat of scalp diminished. 21st. No material change; pulse 100, well filled; scalp above the brows œdematous; a suture was cut from the wound, within which was a plentiful formation of pus; is never quite free from pain, but slept well last night; bowels opened to-day; appetite unabated.

April 16, 1836. This lad was on the eve of presentation when he experienced a fresh attack of severe hemicranial pain on the right side; active purging and a blister relieved all his symptoms.

This is an average specimen of pure commotion, ordinarily termed concussion. This boy on admission was supposed to be the subject of a fractured "basis cranii."

## Case II.

The substance of the following case was communicated to Mr. Travers many years ago by Mr. Green, formerly his colleague at the hospital. A man received a compound fracture of the leg in a fall from the top of a coach. He was subsequently replaced upon the roof of the coach, and

brought forty miles to the hospital. At the time of his arrival he appeared intoxicated but recovered in a few hours. On the third day the leg began to swell and assume a gangrenous appearance without much inflammatory action. He fell into an apoplectic stertor on the fourth day and died that night, or early in the following morning. The brain exhibited no morbid appearance whatever. During life and before dissolution commenced, an eminent physician of the hospital, Dr. Wells, called the case one of pure sanguineous apoplexy, and supposed that blood was effused either upon the surface or in the substance of the organ.

### Case III.

On the afternoon of the 14th of July, 1834, Henry Hawes was brought to the hospital with a small contused wound on his occiput, drunk and insensible. He had been knocked down just before admission in a brawl. His extremities were cold; his pulse beating 78 in the minute and very feeble. At night he had regained his natural warmth and vomited copiously, holding the basin for himself. He spoke when addressed but was not coherent. When the sickness subsided he became so violent as to require restraint. To this succeeded a state of sonorous breathing, with a corresponding labour of pulse. One of his pupils was contracted, the other widely dilated; both

were inactive. He was twice blooded largely, first from the arm afterwards from the temporal artery. His symptoms were never permanently ameliorated, and he died on the fourth day. The right side of the occipital bone was fissured into the foramen magnum, and its junction with the temporal on the left side was loosened, so that their margins lay apart. The tunica arachnoides was smeared with blood throughout in a semi-fluid condition. The orbitar face of the left anterior lobe was extensively torn. I quote this case as illustrative of the complication of drunkenness. He probably vomited in consequence of the liquor he had taken before his accident, and not as a result of the brainular disturbance. The case is far from being uncommon in hospital practice. The opposed states of dilated and contracted pupil are often seen in lacerated substance of the brain.

### Case IV.

July, 1837. A woman was felled by a runaway cab. She survived the injury about half an hour. The cranium was completely separated through its base into two equal portions (anterior and posterior) by a fracture running through the posterior clinoid processes and both petrous portions upward to the vertex. The substance of the brain was not injured so far as could be ascertained by inspection after death.

## Case V.

In August, 1846, John Dawson tumbled down the stone stairs adjoining London Bridge. It was thought that he had been drinking. One pupil was contracted, the other dilated. He was stertorous but not in an extreme degree: the pulse beat feebly but without intermission, the surface was warm, he vomited once after admission. His condition was one of apoplexy or intense drunkenness. The paralysis and flapping of the lips were very noticeable in this case. He was not materially affected by bleeding from the arm to a full pint. He died in twelve hours. After death an enormous cavity was found in the left hemisphere of the brain, full of dark fluid blood. Blood also in a fluid state was found in the lateral ventricle of the opposite or right side.

## Case VI.

A few days after this occurrence a little girl was brought to me, and the bystanders stated that she had been knocked down by a run-away cab. She was insensible, her pulse intermitting every ten beats and very feeble. There was contusion of left eyebrow, with just a stain of blood about the nares and right ear. She vomited once after admission. I had ordered her head to be shaved, and was taking other active measures, for I thought seriously of the case, when she opened her eyes

and awoke to consciousness almost suddenly. Her circulation and temperature increased apace. She now began to scream and be very violent. She was quite coherent when spoken to, but did not know her own sister who was standing by her bed-side, nor any particular of the accident. I persisted in my measures and by and by she fell asleep again. Eventually she got perfectly well. What is called concussion is a very puzzling state; the most experienced are frequently at a loss to determine whether an injury is mortal or not. I thought badly of this little girl at first; and in Dawson's case the general impression when he was brought in seemed to be that he was only excessively drunk.

## Case VII.

On the 3rd of September, 1847, a man was brought to the hospital, who had fallen down a shaft forty feet deep, in course of construction on the line of railway near Woolwich. He had sustained a fracture of both clavicles and both thigh-bones—one of the latter comminuted with much effusion. He died comatose twelve hours after his admission; but he spoke repeatedly and was certainly conscious when he first arrived. His death was attributed to shock until we opened his head, where we found an effusion of clotted blood upon

the surface of the brain, without any visible lesion of its substance.

The head symptoms were masked or suspended in this instance *at first* by the diffused effects and overwhelming nature of the other injuries; as soon as the slightest appeal was made to the nervous agent, its proper disorder took effect. He became insensible and died.

## Case VIII.

Matthew Sharman, a lad æt. 13, was brought to the hospital one Monday morning some years ago (the date is omitted in my note of the case), who had fallen upon his occiput, being thrown by a restive horse. He vomited and was very restless; pulse barely perceptible, 15 in the quarter min. He persisted in lying upon his face. On the third day, the bowels having been freely moved by a dose of calomel, he recovered his senses so as to speak briefly when addressed in a low tone; but for a long time he was the subject of great slowness and confusion of intellect. This is one of a large class of cases of retarded and imperfect reaction, which, however, do not require the calomel at intervals for their cure. The restlessness and a very inactive patulous pupil led me to think at first that the boy had sustained a mortal injury.

## Case IX.

On Saturday, May 5th, 1849, a lady of rank was returning from her drive in an open four-wheeled carriage along a park road, when suddenly the horse started, and, losing her self-possession, she cast the reins from her and jumped out, falling with considerable violence upon her head and face, which was much grazed; the left temple and eyebrow were swollen from severe contusion. Her ladyship was carried home in a state of unconsciousness, and her medical attendant recognised all the symptoms of concussion. She was very cold, had a feeble pulse and vomited freely. Soon after being placed in bed, she was slightly convulsed once or twice. This symptom was only partial; but it was presently afterwards discovered that the left side of the body, including the face and both extremities, was paralysed, and the stools and urine escaped involuntarily. She still made no sign but warmth returned, and the pupils are said to have acted sluggishly on exposure to a strong light. As soon as the pulse would at all justify the proceeding, twenty-five leeches were applied to the temples, and a blister to either side of the head, in front of the ears. Two ten-grain doses of calomel were given at an interval of a few hours, also a turpentine enema, and as a consequence the bowels were plentifully evacuated three times. The action of the gullet was not

impeded, but the jaw was so fixed, in consequence of severe muscular contusion, that force was used to facilitate the introduction of a spoonful of beef tea, liquid jelly, and the like. The only noticeable effect of the leech-bleeding was the reduction of the pulse, so that it was not again attempted at that time. The pulse was 120 in the minute, small but distinct. The breathing was loud and raucous, and so much accelerated that the lungs could neither be filled nor emptied of their contents as during health, their congestion being rapidly progressive.

I first saw her ladyship on the morning of the third day, Tuesday, 11 A.M. Her condition was unchanged. The pupils were motionless; the pulse 35 in the quarter, very small but distinct. She occasionally raised the right arm, and recovered the use of the left leg so as slowly to flex and extend it at uncertain intervals as she lay supine in her bed. The kidneys acted freely, but the bowels had not been relieved for twenty-four hours. The head was now shorn close, and iced water applied to the scalp. Three grains of calomel were given every two hours in a little butter, and nourishment in a concentrated form at short intervals, as jelly, beef tea, chicken broth, wine and water. The night of Tuesday passed without further change. In the course of Wednesday a powerful enema of senna and fœtid gum in gruel operated sufficiently in procuring further evacu-

ation of the bowels, and once or twice during that day, on being addressed loudly by name, she partially opened her eyes and moaned feebly, again raising the right arm. On one occasion she carried the silver boat to her lips with her own hand, then she relapsed gradually into motionless and somnolent insensibility as before. The breathing and circulation were all this time distinct as to interval but very rapid, and on the whole more depressed.

No further change took place until seven o'clock on the morning of Thursday, the fifth day, when the pulse at the wrist failed, and the temperature of the body was sensibly lowered. Respiration still sonorous, but more hurried than ever. Stimulants of the most active kind failed in producing the smallest effect; at 10 A.M. the heart's action finally ceased.

*Examination of the Head fourteen Hours after Death.*

Evidence of severe bruise over the left eyebrow. The temporal muscle was lacerated on the same side, and blood was extravasated in its substance. The membranous coverings of the brain, together with the surface and substance of that organ, were all gorged with blood; the latter being much softened, so that the tissue was almost diffluent in some parts. There was fluid in the right ventricle, and in the substance of the left hemisphere; near the place of the external bruise, there was

found a central rent or lesion stained with blood, but in strong contrast with the defined cell or cyst of apoplectics containing clot. It was manifestly due to a positive disintegration which took place at the time of the accident, and was no doubt the primary cause of death, being in its nature irreparable.

When I first saw this lady, I was at once impressed with the extremely untoward aspect of the case. The only points in her favour were, that her warmth of surface remained and that her pulse was regular, albeit far too rapid to endure long. The fixed glassy eye, the meaningless automatic movements, the hurried respiration, the hemiplegic affection of the left side of the body, the convulsion in the early stage of the case, also the loss of power in the sphincters, all betokened breach of texture. The value of this sad but memorable instance is great as illustrative of the fact, that tearing of the brain-substance, like central lesion of the marrow, to however small an extent, is an irreparable and fatal injury with or without further complication. The softening incidental to congestion after a violent blow, by which the substance is reduced to the quality of a fluid fat or soft suet, is, I believe, due entirely to impeded circulation, and not to any molecular disintegration produced by the injury. Where lesion exists, it always assumes a shape palpable to ocular demonstration. Of course, if in such cases the

heart gets no rest after several days, the patient must die. It is the hurried, and at times sonorous breathing which is in such direct contrast with the soft slow murmur of ordinary concussion, with a corresponding state of pulse; in one case rapid, wiry, or jerking, in the other slow even to occasional intermission, although sustained upon the whole, and improving in breadth and power after leech-bleeding or the use of mercury in so marked and progressive a manner, as to constitute the happiest augury of returning sense at no distant time. The utter futility of all remedial effort, however warrantable or judicious, furnishes on these occasions a further clue to the fatal nature of the injury sustained. In the foregoing case, a strong solution of the gum assafœtida in the senna infusion was evidently more resented by the patient than any other application or medicine employed. It was of course administered as an injection.

## Case X.

The following case is not authenticated by the name of the surgeon or any date; but I have every reason to believe that it occurred many years ago, and that the patient was treated at one of the Boro' Hospitals. I give it in the words of the writer: —

"*Jan. 25th.* — ——, æt. about 17, on the 23rd

was heard to fall, and found lying upon deck with his head under a cask. Was taken up insensible, and has continued so since. Was bled eight hours after the accident, and appeared to sink under the operation. Pupil dilated. Fæces and urine pass involuntarily. Pulse 168. Breathing 11 in the minute. V.S. ad ℥xij. 26*th*. — Died without the least struggle.

"*Inspection.* No appearance of injury in the brain or spinal marrow. Thoracic and abdominal viscera more turgid with blood than natural, but not diseased. Introsusception of ilium in two places to a trifling extent."

The foregoing is apparently a dresser's note at the time; but the particulars are sufficiently circumstantial and important to warrant their publication. Such cases are probably very rare, but they are illustrative of the dangers of slow reaction where there is no positive disintegration; where indeed the organ is so paralysed that it regains its force very slowly, or as in this instance, not at all.

## Case XI.

Feb. 18, 1844. A young man, being intoxicated, was knocked down by the buffer of a steam engine on the Southampton line. His scalp was curiously and deeply cut in all directions, but the bone was uninjured. He was insensible when picked up,

and disposed to throw himself about, so much so as to need restraint. His skin was cold, his pulse small and variable, his pupils dilated. He vomited copiously after the accident. On the third day he had rallied so as to speak intelligibly when spoken to, but he could not maintain a conversation. He continued to eat and drink greedily almost up to the time of his decease. On the fourth day his extremities on the right side, both upper and lower became paralytic, and his skin again lost its warmth. At the same time an erysipelatous swelling appeared over the temples and face. He now passed all his evacuations involuntarily, and began to sink rapidly. He died early on the morning of the eighth day. The head was carefully examined after death, and no lesion of any kind was discovered. The sinuses were much loaded, and the tissues generally in a state of congestion.

## Case XII.

In the beginning of August, 1847, a boy was admitted for compound fracture of the upper arm above the condyles. The parts were very loose and otherwise injured, the bone being split into the joint. Some little time elapsed before he exhibited any symptom of unusual disorder, but all on a sudden he began to talk and be very violent and incoherent. His pulse rose to much apparent

fulness under the finger; but it beat irregularly, and his whole frame was strongly convulsed. Subsequently he became quite unconscious and began to snore aloud. He never rallied, and died about thirty hours after his admission. Before death he was very cold, and breathed very slowly and without noise. The volume of the pulse was not sustained and was barely perceptible for some time before respiration finally ceased. After death, a minute clot of blood was found betwixt the convolutions of the brain connected with a contiguous and superficial lesion of its substance.

When the "head symptoms" first showed themselves, I made a careful examination of the part, and discovered a very inconsiderable wound, little more than a contused scratch, behind the right ear, but no indication of fracture. He had no symptoms of such mischief when first brought in, nor did any one know or suspect that his head had been hurt. All this is, however, consistent with the existence of laceration, which was presently marked by its usual concomitants of convulsion and irregular circulation; symptoms sometimes observed in recoverable commotion, as I have elsewhere described. Had this boy been very sick and retained his temperature, or had the starts not supervened so rapidly, the restlessness and irregularity of the pulse would not of themselves have operated to preclude all hope and chance of recovery. Indeed, the symptoms of laceration were

very pure and well-defined, which is my principal reason for narrating this case.

## Case XIII.

On the night of the 15th July, 1844, a man was brought to the Accident Ward who had been knocked down and trampled upon by an infuriated horse. On the left side of the vertex was a small wound which I dilated, but we could not make out any injury to the bone. He was twice largely blooded. The pulse rose immediately after bleeding, and the temperature of his body was maintained for some time. He survived the accident about twelve hours, lying in a heavy apoplectic snore with occasional twitches of the muscles of the extremities, the pupils being throughout permanently fixed and dilated. The urine was expelled involuntarily at the time of the accident. The symptoms of pressure were so complete and unmixed in this case, that I felt much disposed to trephine this man at one time, but the proposition was fortunately not carried out; for after death the anterior and middle lobes were found to be extensively torn on the right side of the head, and an enormous quantity of clotted and fluid blood was found upon both surfaces of the dura mater. This was one of those cases in which the pressure is so direct and extensive as completely to subdue

any and every symptom of circumscribed laceration.

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## EXAMPLES OF SLOW REACTION.

### Case I.

Master S——, ætat. 15, in the month of June, 1834, fell to the ground whilst climbing a tree in the garden. The distance might exceed twelve feet, and the posterior and inner part of the *right* parietal bone came violently in contact with some loose gravel at the foot of the tree. When picked up he was found to be insensible, with a slow soft pulse beating about sixty-four in the minute. The accident happened in the morning shortly after breakfast, and he vomited twice during the day. There were two small lacerated openings in the scalp which were laid into one, but no line of fracture could be found,—a copious oozing of blood from the *right* ear continued for many hours after the receipt of the injury. The surface being cold and the pulse not regaining power, the treatment was confined to an easy purge and the constant application of a cold wash to the scalp. Towards night jactitation and incessant incoherent talking supervened. This state increased so much that means were taken to prevent his falling from bed. The experiment was now tried of drawing a little blood from the arm, the quantity thus

obtained did not certainly exceed two tablespoonfuls, yet the pulse dropped instantly, becoming at the same time so irregular as to excite considerable apprehension. The bleeding having been stopped, the pulse regained its average 64°, being quite powerless, the pupils were patulous and inactive. Surface cold, so that hot-water bottles were applied constantly to the feet,—but the stools and urine were perfectly retained. Towards morning some disturbed sleep was obtained, the result of exhaustion. 2nd day. Leading symptoms underwent no change. Vomiting did not recur, and a full purging was produced by the exhibition of two drops of the croton oil. 3rd day. Feet were very cold, hot bottles were applied constantly and warm tea poured down the throat. Towards night the restlessness had subsided, bowels acted healthily with the aid of medicine. This day there were one or two efforts at coherent expression, lapsing rapidly into a state bordering on idiotcy. 4th day. The pulse was 70° and more firm, and the patient having plainly survived all the immediate results of the injury, six leeches were applied to each temple, and the following pill ordered to be taken sextis horis: R Hyd. subm. gr. ij., Ant. tart. gr. $\frac{1}{8}$. The above was found to be quite as much as the pulse would bear at this time, indeed the mercury was stopped after a few doses. On the following day there being increased heat of scalp another application of twelve leeches was made,

and consciousness now began to dawn. His first interrogatories were for his mother and for food, he expressed his surprise at finding himself in bed, —but the nature and date of his injury remained unknown to him. At the expiration of ten days from the period of the accident, a small blister was placed upon the nape of the neck for a dull brow-pain. The bowels also were gently moved by castor oil; about this time all the scalp wounds had healed permanently. There now appeared a slight drawing upwards of the corner of the mouth and outer commissure of the eye-lids upon the left side. After an interval of three months this was still very perceptible particularly when the features were excited to particular expression, as in smiling. The pulse maintained an undue slowness, in all other respects this lad was convalescent in three weeks from the time of the accident, but deafness of the *right ear was very slowly* and partially recovered.

## Case II.

June 8, 1836. William Gray, a seaman ætat. 20, fell from the gaff end of a schooner upon the deck, his head coming into contact with a cask whereby a wound was inflicted above the left eyebrow. He was picked up in a state of complete insensibility, in which condition he was conveyed to the hospital on the evening of Wednesday,

June 8. On admission he appeared to be in a heavy sleep with slight stertor; skin cold, pulse feeble; this however soon filled and became rather hard, so that at midnight ℥xvj. of blood were drawn from the arm to the manifest relief of the circulation; no further alteration of symptoms occurred at this time.—June 10. Has continued to sleep heavily; pressure over the left temporal region evidently produces pain, though no answer can be obtained. He has taken two five-grain doses of calomel since his admission; a common enema has also been thrown up without any effect upon the bowels; there is warmth of surface to-day; the pulse is small and accelerated, tongue white and coated: ℞ Ol. Croton ♏j. statim sum. 13th. The croton oil has acted freely since the last report. Twenty leeches have been applied to the scalp, and a blister to the nape of the neck, the head having been previously shaved. 17th. Two more applications of leeches have been made since the last visit, and one minim of croton oil taken every night. To-day, for the first time, he is collected and sensible but has no knowledge of his accident; pulse 84, small, wound upon the brow nearly healed, pupils somewhat inactive, vision of the left eye is impaired. 18th. Has recovered perfectly; pulse is 80°, and decidedly small; there remains a disposition to frequent sleep.

N. B. In this case reaction was established upon *the ninth day.*

## Case III.

In June, 1833, a woman about thirty years of age was admitted under Mr. Tyrrell into St. Thomas's Hospital for obscure injury of the head. She fell from the first pair window of a public-house in the neighbourhood, being intoxicated at the time. She never spoke, or gave any sign of intelligence when picked up, and remained in a state allied to coma for several days; the pulse at the same time was rather accelerated but very compressible; there was occasional moaning; the skin was cold on admission but gradually acquired warmth. Topical bleeding and enemeta produced no sensible effect whatever. On the fourth day the patient muttered unintelligibly when an effort was made to rouse her, and she immediately sank again into deep sleep. The stools and urine were at this time passing involuntarily. A slight oozing of blood occurred from one nostril soon after the accident; this subsequently ceased. On the fifth day the experiment of mercury was tried, calomel being given at short intervals. On the tenth day from the accident salivation was established, and the consequent change of symptoms was most marked and satisfactory. She now answered questions, making no local complaints; the pulse was still small, and the pupils sluggish, but her amendment was progressive up to the beginning of the fourth week from the date of the

injury. At this time there occurred a fresh accession of stupor, and an abscess was discovered over the upper and posterior angle of the left parietal bone. It was opened, and a teaspoonful of healthy pus escaped. This small collection produced a state of muttering delirium, with a very rapid and feeble pulse of 112° in the minute. The abscess healed kindly, and the effect of the mercury having subsided, the patient was discharged well early in July.

N. B. Whether this abscess followed a contusion of the part, I never could ascertain; it may have been wholly symptomatic of the serious disorder from which the brain had so recently recovered. Deafness, impaired sense of taste and smell, and ptosis of one eyelid, have all been occasionally recognised as following these injuries.

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## EXAMPLES OF IRRITATION AND DEPRESSION OF BONE.

### Case I.

February 14, 1842. Mr. C. —— Jr. was epileptic when young, and suffered severely from cerebral irritation in India, where he was attacked by fever in adult life. A few nights prior to the above date he had been indulging freely after a theatrical entertainment, and retired to his room

in a state of excitement. In the morning he was found lying on the edge of his couch stertorous and insensible, with marks of a slight contusion over the left brow. His fæces and urine had passed from him, and their discharge had been to all appearance involuntary. A convulsive and restless but otherwise unbroken slumber, with fixed pupils and a quick powerless pulse, succeeded to the first state of stertor, which was met by blood-letting from the arm and did not return. This state lasted until the third day, when he gradually regained his senses. His articulation was now very slow and measured; his pulse 80 and small. His manner was indicative of great exhaustion. He complained of dimness of sight; objects seemed nearer rather than farther removed, as in the case of amaurotic patients. He lay for the most part asleep, or feigning repose. The lower extremities had been very cold at first, but now regained their warmth. There was for some time a good deal of action in the small arteries of the scalp, and the veins were very full in that region. This gentleman slowly recovered. He was largely leeched and blooded; an ample blister was applied to the nape of the neck, also pounded ice to the fresh-shaven scalp. He took a jalap bolus, and subsequently three grains of calomel every four hours, until his gums were made sore. On the second night after his attack he became very violent for some hours. Morphia failed to

relieve this condition, but he slept towards morning, apparently from exhaustion.

I have since seen cases like the foregoing, but not one where the symptoms so closely resembled those of injury to the head, which is my apology for noticing it, believing as I do that the bruise alluded to was probably produced by falling from the bed, and was not an infliction of sufficient severity to explain what followed. Had the case been less actively treated, slow congestion and membranous inflammation would have supervened, and the event of such actions we know to be fatal without exception.

## Case II.

A gentleman in the middle of life, distinguished both for mental ability and great decision of character, very active and business-like in his habits, began to wander and lose his self-control on Friday, 5th July, 1844. He had frequently complained of brow-pains and *mal-aise* since the date of a tremendous fall down a precipitous path by the seaside, some months previously. His hair was removed and he was freely leeched and purged, and on the following Monday forenoon he was pronounced better in all respects. In the evening of the same day he had a rigor, was very sick and complained of acute pain in the forehead. At night he got out of bed; when led back he dozed and

sighed heavily, then rose or attempted to rise again. He was now insensible, speech and deglutition became imperfect. On Tuesday he refused all sustenance; on Wednesday he became stertorous and the bladder ceased to relieve itself; on Thursday he was actively convulsed, and was much troubled with an accumulation of mucus in the fauces and air passages. Before death the body and extremities on the right side were paralysed. The bowels, being loosened by an enema, were afterwards relieved involuntarily, and their contents were not unhealthy. He sunk finally on Friday the 12th of July, about noon. The pulse was very variable and irregular in its action throughout; at one time small or intermitting, at another bounding to fulness: but it always gave way after the abstraction of a very little blood drawn by leeches from the temples. He showed no sign at any time, nor did remedies at all affect the progress of the symptoms. After death the dura mater was found to be preternaturally adherent to the bone in all directions. The surface of the arachnoid was smeared with pus, and fluid existed in the lateral ventricles. Portions of the brain-substance were preternaturally soft, and in the left anterior lobe was a minute cell containing a blood clot.

The above is a very valuable case, especially as regards the existence of extravasated blood in the substance of the brain. Did that change occur at the time of the fall alluded to in the nar-

rative, or at any time prior to the accession of symptoms? It is, perhaps, a bare assumption to say that it was there and then operating to set up the irritation and subsequent meningeal inflammation whereof this gentleman died, not being large enough nor so placed as to evoke the signs of sanguineous apoplexy. Still I have my suspicions on this head; and although we know from repeated dissections that recent laceration either of surface or substance, to a very limited extent, is quickly followed by the death of the patient, I have seen cases of irritation where it appeared doubtful whether a very minute disintegration might not have existed as a predisposing cause of the subsequent mischief.

The remote consequences of head injury are very peculiar sometimes. I allude to the loss of power in particular nerves, or it may be that they are excited to irregular action. Thus, I knew a gentleman who, after severe head injury, suffered for a long time from painful venereal desire and spasmodic erections, over which no medicine ever exerted the slightest influence.

I have elsewhere observed that continued irritation of the brain, whether functional or organic, whether local or remote, if unrelieved, terminates in an act of inflammation which is fatal. The foregoing case constitutes no exception to the rule; that which follows is very interesting, and more fully illustrates my meaning.

## Case III.

In September, 1831, John Webster, a young seaman, applied on account of a severe lancinating pain over the right eyebrow, from which he had suffered some weeks, darting occasionally inwards or across the forehead. This pain was so acute in character as to take away his senses, and so disturbed his whole frame, that two or three persons were at times required to prevent his injuring himself. This state continued for a period of six weeks. There was no febrile symptom present except a hurried pulse and some thirst; there was a partial hemiplegia of the right side, and the bowels were so inactive as to be moved only by the strongest purgatives. There existed great intolerance of light; perception and memory were entirely suspended; in fact, the patient declined almost into a state of idiotcy. In the middle of the following November, a hard tumour arose over the right eyebrow; it suppurated, and, when opened, a quantity of bloody pus greatly exceeding the capacity of the tumour followed. It was suspected from the pre-existing symptoms and present abatement of brainular suffering, that this collection was not superficial: the treatment at this time was antiphlogistic. In January, 1832, the patient was admitted into St. Thomas's Hospital. At this time the right eyelid was in a state of complete ptosis,

and the vision of that side was much impaired. The patient was perfectly rational, though somewhat drowsy ; the pain he described as strictly confined to the brow, the right pupil was permanently dilated. A considerable sinus running upwards and outwards was laid open, the director grazing over denuded bone ; a copious and very offensive discharge followed. 20th inst. Erysipelas being at that time prevalent in the ward, he became the subject of it upon the affected side of the face. It was ushered in by long-continued rigor ; for this he was ordered Hyd. subm. gr. v. statim, and subsequently Mist. salin. antimon. At the end of thirty-six hours, camphor and ammon. were ordered instead of the saline. January 25. Has been delirious and sinking the whole night ; towards six A.M. he was suddenly and severely convulsed, and died in that condition.

*Appearances p. m.* — A small sinuous and sloughy opening just above the corrugator supercilii of the right side. The vessels within the head were unusually injected, sinuses much loaded. Upon section, the medullary structure of the right hemisphere was softer than is natural, and anteriorly it was extensively elevated. A second section of the top of this tumour opened a large circular cavity in the anterior lobe, containing upwards of three ounces of well-formed pus, which flowed over freely. Having emptied the cavity, I ascertained that the course of the ventricle was wholly uncon-

nected with it (the abscess). It was, however, much compressed by the wall of the latter. The internal surface of the cyst was much reddened, and had a villous appearance. In front the brain adhered firmly to that part of the dura mater which corresponded to the external wound; this membrane formed in great measure the anterior wall of the abscess. On stripping the thickened dura mater from the os frontis, a circular aperture $\frac{1}{4}$ in. in diameter displayed itself in that bone. Both tables of the skull were gone, but the external had suffered most, so that the edges of the opening were sharp and bevelled off. There was stretched across the breach in the bone a condensed tissue, constituting the only partition betwixt the external and internal parts; even this was fistulous and otherwise diseased, so that the matter would probably have found its way out in a few days. The æthmoidal cells were much broken down and sloughy, as if from disease of long standing; the frontal sinuses were in a similar condition.

## Case IV.

*Delirium Tremens.*

In July, 1844, a man was brought to the hospital with a large scalp wound, the skin hanging in a flap, and leaving the right parietal bone quite bare. He was an intemperate person, and lost a

good deal of blood before admission from the wound. He was so violent as to require restraint. He talked incessantly; his expression was very wild, eyes staring and injected. The limbs trembled very much. His pulse was very rapid and compressible, and his surface damp. He took eight half-grain doses of morphia, which were washed down with liberal draughts of gin before he slept. He recovered perfectly.

Such a case is in contrast with some wherein we bleed largely, and abstain religiously from the use of alcohol and narcotic medicine. In this case one recognises at once the symptoms of delirium tremens, which are always to be dealt with primarily and by themselves. No local measures can be had recourse to with effect, until the system is tranquillised, and the cerebral irritation subdued. Although this man was in a frenzy, it was an asthenic action, in part due to loss of blood, and in part to an enfeebled nervous system, brought on by habits of drunkenness. Although his eye was wild and bloodshot and he raved aloud, yet his skin was cold and his pulse powerless.

## Case V.

### *Frenzy.*

I happened to stroll into the Accident Ward on the night of February 26, 1843, where I found five or six of the dressers and attendants busied in

holding a powerful young man down upon his bed who was in a furious state of excitement; convulsed, wild and kicking, so as to be very dangerous. The story ran that he had fallen upon his head during an excursion in the vicinity of Peckham, but that he was not drunk at the time. The man who brought him to the hospital stated that he appeared to be insensible but was quite tranquil during the journey. The pupils were contracted and did not enlarge at all on exposure. The skin was warm. The pulse oppressed and not of much volume. The breathing was easy but interrupted by deep sighs, which I attributed to muscular fatigue.

I took thirty-six ounces of blood from his arm on the spot. He did not faint, but became very sick, and tried to vomit ineffectually. In about an hour afterwards he fell asleep, and was quite himself the next morning. I would not part with him until I had purged him freely, and dieted him very strictly for a few days. He perfectly recovered. The man remembered his fall, but nothing beyond that occurrence. This is a pure commotion, and I could cite many such cases. The progress of the disorder is often modified by excessive drinking, or hysterical symptoms in women and young boys, as in the following instance.

## Case VI.

In September, 1843, a butcher's lad belonging to Leadenhall Market was struck with a saw, which inflicted a severe wound upon the right cheek and produced insensibility, a state from which he did not recover for many hours. He was so restless with frequent hysteric sobbing, that I bled him from the arm to a full pint. Soon afterwards he became tranquil and slept. He answered questions naturally when he awoke, but continued for some time to be strangely agitated when noticed or chided. This is a sign of severe shock in young people. It is allied to the "passio hysterica" in women, and if it is not checked, chorea or epilepsy may follow.

## Case VII.

*Depression. Fatal.*

In March, 1847, a little boy fell into a ship's hold and fractured his os frontis; a portion of bone was removed at the time, being loose and nearly detached. He became sensible but remained in a low feverish condition, moaned a good deal and was very restless. He vomited more than once and was convulsed before death. The pulse generally was rapid and small; in short, the symptoms were not indicative of pressure, but rather membranous or brainular irritation. After death, the

inner table was found to be depressed in a large angular fragment which had grooved and partially lacerated the dura mater beneath the frontal bone. This child's calvarium is preserved in the Museum of the Hospital.

There is perhaps in the whole round of surgical observation no case more difficult than depressed fracture of the internal table. It is often overlooked for want of primary symptoms, and the patient dies after an interval of variable duration. After death the membranes, or even the substance of the brain, are seen to have suffered from the effects of inflammation due to prolonged local irritation. I have elsewhere narrated a case which terminated fatally in the third week, wherein the inner table was simply cracked without any depression.

### Case VIII.

*Depression of the Inner Table overlooked during Life, terminating in fatal Inflammation, which was preceded by obscure Symptoms of Irritation.*

Edwin Mews, ætat. 39, a stout man but not intemperate, was admitted into the Accident Ward at St. Thomas's Hospital, on 13th September, 1838, with a lacerated and angular wound on the right side of the head, extending through the scalp, temporal fascia, and muscle. No fracture was

detected on admission. He complained of being sick and faint. His surface was cold and his pulse quick and feeble, but he made no special reference to his head, which was perhaps owing to loss of blood. About four hours after admission he was very restless; but his surface was warmer, and the wound, which was lightly dressed, easy. The wound, which was at first puffy and swollen, seemed likely to slough on the third day. He got little or no natural sleep, but he was very collected and tranquil; his pulse was still small though accelerated. In virtue of his previous habits (he was a brewer's servant) wine and beer were allowed daily. On the 17th he is said to have been better in all respects, complaining but slightly of his head. On the 23rd he had relapsed; the wound was sloughing actively; there was an unnatural calmness of manner about the man, amounting almost to sullenness or indisposition to answer questions. About three weeks after the accident, bone began to escape in fragments by the original wound. He died in October, having survived the injury about five weeks. He sank gradually but perceptibly, and about forty-eight hours before death he became very restless: he was incoherent, getting out of bed, with a rapid powerless pulse, some heat of skin but no convulsion. He suffered latterly from hectic exacerbation and diarrhœa; but these did not recur for some days before death, and the act of dissolution was not

difficult although prolonged. Pus was seen welling from the wound, and the dura mater was known to be separated from the bone and sloughy before his decease; but examination afterwards showed a much larger amount of mischief than had been suspected during life.

P. M.—The body was emaciated. There was a wound about the size of a shilling in the right temporal region, and a smaller opening through the skull in the same situation. The dura mater had not given way,—it was pushed inwards and retained along with the brain beneath, the impression of a projecting angular fragment of the internal table of the skull. The outer surface of the exposed dura mater was smeared with pus. The depression in the surface of the brain was very marked, but its texture was not unusually vascular, nor had it undergone any change as to substance: a little fluid was found in both lateral ventricles. The left sterno-clavicular articulation was full of pus: a similar collection was found amongst the hyoideal muscles. Small circumscribed abscesses existed in the liver and both lungs, and the lining membrane of the chest showed marks of recent inflammation on both sides of the body. No suspicion existed during life as to the real cause or extent of the mischief. The man was said, or rather supposed, to be dying from continued cerebral irritation, not to be relieved by Art!

## Case IX.

*Compound Fracture with Depression of Bone, not marked by the ordinary Symptoms.*

A healthy lad, ætat. 15, was kicked by a horse in the right temporal region behind the external angle of the orbit. There was an incised and contused wound leading to a fissure with depressed edges. There had been some bleeding, but the boy was in no respect seriously affected, being perfectly natural in his manner, with a slight disposition to sleep, not greater however than would follow an ordinary blow on the head. The pupils were active, the pulse tranquil and rather feeble. The following day his scalp was hot, he was drowsy, the pulse was quick and hard, but he was still sensible and answered distinctly when spoken to. The pupils were less active and more open. He had wandered a little in the night. I now bled him from the arm plenô rivô ad deliquium, and gave him two grains of calomel every two hours. Later in the day, my senior colleague, Mr. South, determined to trephine the patient, an operation which was performed with the happiest effect. An angular fragment, which had been driven below and behind the cranial surface, was removed. By the fifth day the symptoms of inflammation had all subsided, and the patient perfectly recovered.

The above is a good example of a case of de-

pression without symptoms, and therefore not of compression. Where the brain is compressed or irritated it will always show some sign. These are the cases concerning which one inquires, Shall I operate ? and when ? I believe operation is at the worst an error on the safe side on such occasions, and therefore right, so it be in time to anticipate the ill consequences of an inflammation.

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## MISCELLANEOUS.

### Case I.

*Improper Administration of Mercury to a Child, in Concussion.*

In April, 1845, a little child was brought to the Hospital, having fallen against the kerb-stone upon his forehead with considerable force. A tumour appeared at the part, and he vomited repeatedly. All the symptoms of concussion were present on admission. Besides other remedies, calomel was exhibited at short intervals. Three days afterwards, I was asked to look at the little boy, as he was very ill, had acute pain in the head, with confined bowels, and a hot skin; indeed, he was suffering from a smart attack of continued fever. I clapped a small blister on the nape of his neck, and purged him freely with a senna-

mixture, omitting the calomel entirely. He recovered afterwards rapidly.

I do not approve of giving mercury to young children, especially after injury, unless the symptoms be very urgent. Their textures cannot bear its operation. It may alter, but it is also capable of perpetuating a diseased action in children. All this is perfectly consistent with its employment in ½ gr. doses in certain cases of eye-disease or acute synovial inflammations. Scrofulous children fortunately bear its operation under such circumstances for a time, far better than the rubicund and well-fed issue of more healthy parents.

### Case II.

A boy, ætat. 6½ years, fell and struck his head against the corner of a brick on the 15th of October, 1845. The wounded scalp bled freely, but no untoward symptom arose until seven days afterwards, when in a struggle with another lad he got a second blow on the same spot. The wound bled afresh, and in the evening of the same day he became dull and sleepy, and complained of pain. Inflammatory symptoms set in, and he died on the 18th of November. There is a semicircular crack or minute fissure without any displacement to be seen in the bone on its internal surface (as preserved at St. Thomas's Hospital). A layer of pus was spread over the upper part of the left hemisphere of the brain, which organ was softened throughout.

It would be overbold to assert that an operation

might have saved this child; at the same time it is difficult to absolve the bony lesion of all participation in the subsequent act of inflammation which destroyed life. It may be that an amount of force capable of cracking the internal table without displacement, is more than enough to provoke a destructive inflammation of the brain and its membranes. Still it appears to me to be a grave question, whether the condition of the bone and its altered relation to surrounding parts, did not in this case create a source of irritation, which should have been removed. Would this lad's chance of recovery have been bettered by trepanning the skull on the evening of the 7th day, when the symptoms of drowsiness first appeared? I believe it would; at all events such an experiment would be quite justifiable under similar circumstances.

Sir B. Brodie, in a very elaborate and complete treatise upon head-injury, to be found in the 14th vol. of the Medico-Chirurgical Transactions, mentions a case where a depressed fracture produced no sign of disturbance except acute pain, which was removed at once by elevating a displaced fragment of one of the parietal bones.

### Case III.

*Scalp Wound fatal, from pre-existing Disease.*

A little boy under five years of age fell down stairs and received a bad scalp wound, which laid bare the greater part of the frontal bone. The flap

was carefully readjusted, and the parts seemed to have healed completely on the third day by the first intention.

Suddenly rigor, vomiting and purging of green matters, dulness of eye followed by cold surfaces, and finally coma with fixed and fully dilated pupils supervened. The child survived this latter change about twenty hours. On examination I found white granular patches in the liver, as if the blood and other colouring matters had been washed out of its substance; also a granular appearance in the kidney, which did not depend upon fatty deposit, as was well ascertained for me by an experienced microscopist. This child had been accustomed to drink gin almost from its birth.

I mention this case to show the great importance and satisfaction which attach to examination after death. The case itself is not uncommon perhaps: the circumstances are illustrative of morbid action amongst the very poor and intemperate beings who come to the large Hospitals for assistance. Sometimes such a subject is attacked by cancrum oris or local gangrenous inflammation. Had this poor child been the subject of operation for stone or amputation, it would certainly have died, and without examination the surgeon would have obtained the credit of having killed his patient.

In the translation of Chelius by South, there is a notice of fractures of the skull with impression. To this class, I suppose, it is intended to refer all

cases which exhibit no corresponding symptoms of compression or brain-injury at the time of the accident, or any subsequent period. The outer table may be driven into the diploe without injury to the tabula vitrea, and in very rare instances both tables have been found depressed and broken without provoking any of the characteristic symptoms of the accident.

There is a calvarium in the museum of St. Thomas's Hospital which was taken from a man who died in one of the medical wards, in whose case no suspicion of head-injury existed during life. In it there may be seen externally a large "fossa digitata" at the angle of the lambdoidal suture, right over the longitudinal sinus, the result of depressed fracture of both tables. Ossific reunion of the fragments is complete, and it is evident on examination that the part was never meddled with by a surgeon.

When compared with similar specimens, or contrasted with the known results of a much smaller amount of injury in other parts of the skull, one can only explain such a fact by a reference to the site of the mischief; but it is hard to believe that the circulation was not at times seriously disordered under such circumstances.

The following very interesting statement is extracted from Mr. Hennen's work on Military Surgery. It occurs at p. 95. of the Second Edition of that book. A slight lad, ætat. 24, whilst employed

with a fatigue party at the Fort of Puntales, in advance of Cadiz, was suddenly exposed to a very heavy fire at a distance of about 1000 paces. A 24lb. shot struck a sand-bag which he was carrying on his head towards a new traverse then throwing up in the works. He immediately fell, and was carried to the hospital, about a mile off. He remained in a state of utter insensibility, and, except a slight derangement of the hair in the line of the sagittal suture, no local manifestation of injury was detected. One pupil was inactive and dilated, the other contracted. He had a soft sustained pulse of fifty in the minute. Breathing slow and uniform. His efforts to vomit were incessant and unavailing. Skin cold and clammy. Mr. H. describes his condition as that of a person placed on an insulated stool, and subjected to electricity. He died in twenty-four hours, and after death "not the most trivial morbid appearance could be detected in the head, nor any derangement whatever either in the thorax or abdomen."

"I have twice seen the trephine applied in practice where there was no other indication for the point of its application than the existence of paralysis in the opposite side of the body. The symptoms of compression certainly justified the attempt, but they were both unsuccessful."—*Hennen*, p. 329.

Loco citatô, vide case of Michael Cavanagh, trephined successfully for the removal of coagulated blood. (p. 324.)

# OBSERVATIONS UPON PUNCTURE OF THE BLADDER:

READ BEFORE THE WESTMINSTER MEDICAL SOCIETY IN MARCH, 1849.

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In the summer of 1835 I saw a man at St. Thomas's Hospital, carried from the operating theatre with a distended bladder, unrelieved, and in a dying state from the rapid loss of about a pint of venous blood. This hæmorrhage ensued upon a free division of the raphe perinei, and a subsequent deeper cutting for the purpose of pushing an instrument into the bladder through an impervious stricture, which had caused the formation of an enormous urinary abscess. The man presently afterwards expired, and so extensive was the disease of these organs, as ascertained by examination after death, that he could not have recovered permanently. Still the distended bladder might have been relieved by puncture, and the patient's sufferings materially curtailed. This, then, was one of several such cases whose event determined me afterwards to exercise a very careful discrimination in reference especially to

the kind of operation demanded by the particular circumstances of the individual; and I am only the more confirmed in this opinion by later experience. It does not follow, because a man cannot make his water, that immediate operation must be had recourse to on all occasions; neither are we borne out by facts in affirming, that the section of the raphe perinei is the best method of dealing with permanent and impassable stricture without exception. Not that I would be understood always to deprecate such interference, or undervalue an operation which is sometimes the only plan to be adopted; but, be it remembered, it is often tedious and dangerous to life, many times from the exhaustion so produced. Paracentesis is neither tedious nor dangerous, and may often be practised where deep or large incisions are inadmissible. At all events, in the words of the late Mr. Samuel Cooper, "delay is more dangerous than even the worst modes of making an opening into the bladder; and, while life exists, the patient should have his chance." The following case is submitted to the Society in further illustration of this very interesting point in surgical practice.

### Case.

On the night of the 21st of February, 1843, I was called to William Frost, at that time an inpatient of St. Thomas's Hospital, who was suffering severely from retention of urine. He was a la-

bouring man, and had not yet reached the middle period of life. He had been the subject of permanent stricture for a term of between six and seven years previously. The case was described to me as one of great difficulty. Mr. Green, one of the surgeons of the hospital, had pushed a straight sound into the bladder some days before, which subdued the incessant desire to make water at first, and some other urgent symptoms also subsided. After the lapse of twenty-four hours these recurred, and were all much aggravated. The man grew rapidly worse, so that when I saw him he could not make one drop of water. This crisis supervened upon a state of dribbling or stillicidium, which had endured for some days. He had rigor, incessant bilious vomiting, cold extremities, was incoherent, with tense and painful belly, and a thready pulse; the breathing was hurried, in short the man was sinking rapidly and it did not appear to me that he could survive if subjected to any operation involving delay or loss of blood. The advanced hour of the night, and there being no assistance to be had at the moment beyond the services of a young and inexperienced dresser, determined my mode of procedure. The patient having been first drawn down to the foot of his bed, and his chest raised with pillows, I divided the skin immediately above the pubic symphysis, and as nearly as I could in the median line, with a lancet. I then pushed a straight dropsy trochar

and cannula into and through the anterior wall of the bladder. On withdrawing the trochar, the first jet of urine went fairly half across the ward floor. The relief, of course, was very decisive, but so sudden as nearly to produce a fatal collapse; and, for a few minutes, I thought the man would die. I gave him a large dram of gin; after which he rallied, and very soon recovered his faculties so far as to give grateful expression to his feelings on the occasion. I fastened the cannula by means of tape passed round the body and underneath the nates, and then stoppered it. For forty-eight hours the bladder was kept empty, or nearly so, by withdrawing the plug occasionally, the man's condition being in all respects satisfactory. Very soon after this the water began to dribble by the side of the tube, and the orifice of the wound looked sloughy and enlarged. Seeing that the cannula was now acting as an irritant, or, at all events, in nowise hindered, but rather encouraged, the constant drainage, I withdrew it, without any increase of the local mischief, and much to the patient's relief. In the course of the following month of March, the wound was small and fistulous; and, as little or no urine escaped by the urethra, the bladder gradually became again distended, so that Mr. Green was induced to cut down upon the stricture in perineo, and succeeded in pushing a catheter into the bladder by the natural passage. An elastic instrument was worn constantly, through which all

the urine flowed. He now gained flesh and slept naturally, and both wounds began to heal apace. He took porter, mutton chops, beef tea, and was much benefited by a draught composed as follows, and taken twice daily: Acid. nitric. dil. ʒss., syrup. papav. ʒss., aquæ ℥jss. On one or two occasions the bladder was carefully injected with tepid water after the performance of the operation, in consequence of the production of a quantity of ropy mucus, the result of such prolonged irritation of the lining membrane.

On the 28th of April, my notes make mention of the patient's rapid convalescence, although still recumbent. The wound above the pubes had permanently closed at that date. He could bear moderate pressure in the pubic region without complaint, and all morbid irritation had subsided. Nothing of importance occurred after this time, and he left the House perfectly cured, in the early part of the summer of the same year, "43," passing his urine naturally, aided by the occasional introduction of an elastic instrument. I regard the foregoing particulars as furnishing information of much practical value. Here was a man, who certainly had not twelve hours to live had he remained unrelieved, in fact, he was in the very worst possible condition for operation of any kind; nevertheless, the complete removal of the local irritation so heartened and unburdened his system, that he survived to undergo a second and more

severe operation, and discovered power sufficient to heal two wounds, both having a direct communication with the cavity of the bladder. My own project had been to re-establish the urethral passage by persevering in the use of a metallic sound or by using caustic; but the parts had become so very callous, that the operation actually performed was thought to be the better and safer plan. The operation of tapping the bladder is by no means new, but it may be considered as a revival of the practice in former days so much approved and recommended by Sir Everard Home and Mr. Abernethy. Those gentlemen repeatedly performed the operation upon patients "in extremis" with perfect impunity; and the older members of the profession still speak of more than one of these cases, where the party survived many years, making all his water through a cannula accurately adjusted to the permanent opening so established. The case most suggestive of puncture is that of enlarged prostrate, where the end of a catheter cannot be made to pass over the projecting growth without an amount of force which involves the risk of transfixing the diseased tissue; an accident, it is true, which has often happened without provoking serious mischief at the time, but which is fraught with great ultimate danger to life. The following case, which I saw in private some years ago, is explanatory of the result of the error here alluded to.

CASE.

On the 2d of June, 1835, I was summoned to examine the body of a gentleman, formerly a distinguished member of the House of Commons. The body was much emaciated and the jaws edentatous. Several pints of a turbid fluid, having a strong urinous odour, were found in the cavity of the peritoneum, and the abdominal viscera were coated with recent lymph. The cellular substance of the pelvis was sloughy and disorganised, the bladder thickened and inflamed. The lining membrane had lost its opaque, rugous character; it was much attenuated, and a diffused ecchymosis was very apparent. There was a spherical enlargement of the prostrate, which was hard and udder-like in texture. The course of the urethra was much diverted and elongated; a circular opening existed in its prostatic part, communicating directly with a large abscess between the bladder and rectum. (The point of the catheter had no doubt frequently travelled in this direction.)

This latter collection communicated by fistula with the sac of the peritoneum, thus accounting for the peculiar odour emitted on first cutting open the abdomen. The cavity of the left tunica vaginalis was converted into a circumscribed abscess, the testicle remaining sound. For more than a month previous to his death, this gentleman's bladder was never emptied except by an instru-

ment, which was ordinarily introduced twice a day,—sometimes easily, and sometimes with great difficulty, and after repeated trials by various hands. The continued residence of the catheter in the bladder could not be borne.

During forty-eight hours immediately preceding the patient's dissolution, no more urine could be obtained by the instrument, but all desire and local distress had subsided. He was comatose for twelve hours before death, and the diseased appearances were confined strictly to the parts mentioned in the foregoing narrative.

The operation of puncture per anum, which is performed by means of a long curved trochar, is not difficult, and where the relief required is only of a temporary kind, and the parts admit of it, I am disposed to think it is the best mode of procedure. It is not necessary to keep the cannula in the rectum for more than twelve or twenty-four hours, nay, it may be withdrawn at once without risk of dangerous extravasation.* Sir E. Home

* Dr. Hamilton, an Edinburgh graduate, operated by puncture per anum, at King's Lynn, in Norfolk, in the year 1774 (March), on a man ætat. 31, who had had a retention for three days. He withdrew the cannula or straight catheter immediately. No ill consequence whatever arose from this proceeding, and the water began to resume its natural course on the fifth day. The use of bougies completed the cure in two months. *Vide* Phil. Transactions for 1776. He, Dr. H., knew nothing of the plan adopted by Flurand, until told of it by Sir John

states that the evil of cellular extravasation depends upon the presence of a quantity of stale urine oozing into the surrounding tissue, which diffuses itself because it can find no external outlet. Where the recent secretion can dribble off through an orifice so situated as to favour its escape, the edge of such opening soon festers and thickens, and a sufficient barrier is presently raised against its further diffusion. It is a matter of fact, founded on repeated observation, that when and where the natural passage can be reopened, the fistulous opening will begin to heal from and after the date at which the secretion begins to flow in its natural channel. This law is so well established, and has been so far acted upon, that upon one occasion a lady who suffered from vesico-vaginal fistula was perfectly cured by consenting to lie upon her face for a period of two years. I have operated upon other occasions per anum with the curved trochar, and also by the supra-pubic puncture; in these cases, temporary relief only

Pringle, through whom the paper was communicated to the Royal Society. Flurand operated at Lyons three times, and *successfully* on two occasions, between the years 1750 and 1757. *Vide* Pouteau, Mélanges de Chirurgie.

The perusal of M. Flurand's cases, coupled with Dr. Hamilton's narrative, and some other considerations, have confirmed me in the belief that the puncture per anum does not at any time involve the retention of the cannula in anô afterwards as a matter of necessity. After the evacuation of the bladder, I believe the cannula may be withdrawn, as in Hamilton's case, immediately and with perfect impunity.

was procured by evacuating the retained urine, for the patients suffered from complicated disease of long standing, and were already on the verge of dissolution. The parties did not live long enough to test the permanent efficacy of puncture, but it certainly in no wise hastened their death.

I will, in conclusion, take the liberty of warning the young practitioner who may contemplate an operation of this kind, not to mistake a tympanitic belly for a loaded bladder, and therefore, before operating, I would suggest that a very careful examination should be made, not only of the parietes of the belly, but of the fundus of the bladder per anum. It is often difficult in the face of very urgent symptoms to determine the exact capacity or dimensions of the organ; and upon post-mortem examination, where one might have expected thickening and contraction, there is sometimes discovered an enormous dilatation; so, on the other hand, where there has been an habitual retention, it is not uncommon to find an amount of contraction and displacement, which it is difficult to reconcile with the symptoms of the disease during life. Perhaps this observation may be deemed trite or fanciful by some, but I have had reason to appreciate its value in practice more than once. On the whole, I think that experience past and present bears me out in saying that there are occasions upon which this operation of tapping the bladder is very useful, if not the very best as yet devised for the

patient's speedy relief. The situation selected for its performance must depend upon the individual circumstances of the case for sometimes the puncture per anum is inadmissible or impracticable from prostatic tumour or other diseased changes in the parts; so obesity of the walls of the abdomen, or a retrocession and partial displacement of the bladder, render this operation above the pubes difficult if not actually hazardous in that direction. It must always be regarded as an extreme measure, but where incision is not advisable as by cutting deeply in perineo, and where the circumstances of the case are critical, it supplies, first a mode of speedy and complete relief, without inducing further exhaustion. In the second place, it must be highly advantageous, where, as in the present instance, it provides an interval of repose, during which the powers of life may be refreshed, or so invigorated by treatment, as ultimately to ensure the patient's recovery.

I shall offer no apology for the introduction in this place of the following note, which was addressed to me by a gentleman for whose professional opinion I entertain great respect.

Saint Thomas's Street, March 13. 1849.

My dear Travers,

So far from regarding puncture of the bladder through the rectum as a pis aller, I am induced to consider it as a most valuable adjunct to our treatment of retention and obstinate stricture; enabling us to relieve the patient, and keep the bladder empty without the constant use of the catheter, which

produces daily lacerations of the urethra, abscess, and often death. In some cases of impermeable permanent stricture, where retention did not actually exist, I have found the operation of the greatest service in effecting a cure, by diverting the course of the urine, and allowing the urethra perfect rest, until the canal had either resumed its normal condition, or readily permitted the entrance of the catheter. The disadvantages of the operation are some difficulty and risk in cases where the bladder is much thickened, contracted, or only partially distended with urine, or where the prostate is much enlarged and diseased. I use a long and slightly curved trochar and cannula. I "leave" the cannula in the bladder, and as soon as irritation commences, substitute for it an elastic catheter, which is passed through it. The length of time that this last is retained will depend on the degree of irritation it may produce, and the disposition which the urethra may evince to resume its normal functions. The after treatment is somewhat troublesome, and requires a good deal of care. I think the operation is particularly adapted to hospital practice, as it saves the patient from the misery of frequent fruitless attempts at catheterism, and the almost inevitable destruction which sooner or later results from the discipline which he undergoes.

Believe me,

Yours ever sincerely,

EDWARD COCK.

## OF SEVERAL DISORDERS OF THE MALE URETHRA, REMARKS UPON THE TREATMENT OF STRICTURE, AND STONE IN THE BLADDER.

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THERE may be many forms of local disease more painful in their origin and progress, but there are none productive of more distress and anxiety, than those which affect the urethra. These disorders are often aggravated by a want of circumspection in the early treatment, and it is most important, when a surgeon does interfere, that he should do so with accuracy and decision. Much evil has arisen from an imperfect appreciation of the true nature of stricture, which exists but in one kind, and admits of but one method or principle of treatment. It is not scientific to speak of the cure of stricture. It may be summarily overcome for a season by dilatation, but if this operation be not repeated from time to time, the difficulty will inevitably recur. This remark does not apply to cases of spasm, or an excessive irritability of the lining membrane of the canal, for a time productive of symptoms resembling those of true stricture. These furnish the examples of "cure" when carefully managed, which is due, not to the use of an instrument, but rather to its entire omission in favour of remedies which are addressed to the correction of functional

derangement and the renovation of impaired power. It is probable that many spasmodic obstructions which terminate at length in a real narrowing of the canal are produced by the use of instruments. Let us consider briefly some of the causes of this complaint at different periods of life. A young lad contracts "a maiden clap." He is actively, if not very wisely, treated by powerful purgatives; he takes the balsam of copaiba, until his stomach rejects the remedy, or cubebs are given until the bladder becomes so irritable, that it will scarcely hold an ounce of water for ten minutes. To complete, but not overcharge the picture, we must enumerate the use of injections. Specifics having been given by the mouth ad nauseam without exhibiting the slightest power to control the discharge, strong styptic lotions composed of alum, zinc, or caustic are now used as injections. The patient becomes nervous and exasperated, disobeys the directions of his adviser, and presently provokes such an amount of inflammatory swelling in the urethra, perhaps affecting the bladder itself, that many of the signs of stricture now present themselves, such as pain, difficulty in making water, incessant desire, straining, and the like. This is a condition brought on by excessive treatment, not by disease; and if unfortunately the surgeon is tempted to meddle further, as by the introduction of a bougie under such circumstances, he will in no wise relieve his patient, but rather add to his

torture, and probably lay the foundation of serious mischief in the part. Very few of those who apply to have a bougie passed soon after the first subsidence of gonorrhea ought to be so gratified, and in the cases which really do require this operation, it is wise to postpone it until all pain has finally ceased. It may be mentioned here by way of exception, and as a rare incident, that complete retention sometimes supervenes in the first stage of acute clap. I have been twice called to relieve the bladder in young and plethoric men, soon after the appearance of the discharge, where not one drop of urine had escaped for many hours, and that organ was enormously distended in both instances. Under these circumstances, the operation is most painful, and once the party required powerful manual restraint during its performance. On these happily rare occasions there is either an idiosyncrasy, or the party has been drinking to excess. The introduction of an instrument is difficult in these cases, but there would appear to be a diffused infiltration of the submucous tissue from one end of the urethra to the other, which quickly produces an obstruction so complete, that there is no alternative to the somewhat forcible use of a catheter. The rapid kind of tumefaction here alluded to, resembles that which follows the sting of a venomous insect in other parts of the body. Copious leeching and brisk cathartics answer well enough sometimes, but in hospital practice the parties are not usually

brought under the notice of a surgeon, until retention is permanent and very urgent. Gonorrhea is sometimes so virulent, quite irrespective of remedies, that it will leave behind it a morbid irritability of the part which is the forerunner of spasmodic action in the neighbouring muscles, slight incontinence, and a feeling that the bladder is never quite empty. Sometimes there is a copious escape of mucus at stool, or nocturnal emission harasses and depresses the patient. Such symptoms follow excessive venery, immoderate drinking and self-abuse, but they are also familar to me as a consequence of severe and prolonged clap in weakly habits during the early adult period, where bougies and injections have been improperly employed. In these cases a violent hæmorrhage will occasionally follow the introduction of a bougie or catheter, and it will continue for many hours if not attended to. This must be accepted as a sign of great congestion in the mucous membrane; and although the patient may make water more freely after the operation, still it is not safe to persevere in the use of instruments under such circumstances.

In middle-aged men we observe the irritable urethra depending upon other causes; here also the course of the complaint is characteristic and peculiar. A sailor once applied to me at the hospital, stating that he sometimes made his water very well, and sometimes could hardly void a drop all day. He suffered no pain, but had gradually lost his

desire for women; he complained of want of rest and appetite, and was becoming uneasy about himself, having taken advice without effect. He insisted upon an immediate introduction of the catheter, a measure to which I consented. A very small quantity of healthy urine followed the removal of the stilette, and no obstruction was offered to the progress of the instrument at any part of the canal. He returned the following day, saying that he was much worse for what had been done, "was sure he should never get over it," and so on. I now made some exact inquiries into the state of his general health, and having ascertained that his bowels acted very sparingly, he was directed to take a strong purge containing nitre and jalap and the supertartrate of potash, which operated very powerfully, and restored him to a wholesome conviction that he was not the subject of stricture. This case is not uncommon, indeed simple enough, but it is illustrative of one mode or cause of symptomatic irritation in the urethra, which is materially aggravated by the use of instruments.

In more advanced life where there is gout in the habit, the case is often very obstinate, and irremediable for a long time. The patient may be unable to pass water in quantity for many hours, and the urine is clouded with mucus, or deposits a red sediment. Micturition is very painful, and there is frequent sudden and prolonged erection of the penis with an inexpressible desire to make water

at short intervals, especially during the night. The symptoms of stone are sometimes very accurately portrayed. Under an impression that there may be prostatic stricture, perhaps an instrument is introduced, but the only result of this proceeding is a renewed expression of violent pain at the time and increased local suffering afterwards. By and by the gout shows itself either in a gonorrhea or upon one of the extremities, and then the other symptoms subside; when the fit is over, the patient recovers perfectly. The gouty swelling of the prostate gland followed by a complete retention which necessitates the use of an instrument, implies a different condition of the parts and belongs ordinarily to a still later period of life than the action here alluded to. In the latter case, the urine is often ammoniacal, and that secretion is always more or less diseased. The constitutional symptoms also are of a more aggravated kind; if indeed, the subject of this affection be a very old man, or should he have sustained repeated attacks of retention, the parts become irrecoverably disorganised and the system does not rally.

The following observation is valuable, as having been made at the time by an experienced professional man, being himself the subject of the disorder which he here describes.

"In February 1840 I suffered from an attack of acute inflammation, after a tedious journey in very bad weather. The parts affected were the glans

penis and prepuce, which became greatly swollen and painful to excess. The inflammation was accompanied by a copious purulent discharge, having the appearance of acute gonorrhea. The passage of urine was frequent, and attended with most severe scalding pain. These symptoms were greatly aggravated by erection, or indeed any motion of the body. The pain at the time extended to the perineum, which felt indurated, as did the whole course of the urethra. The urine was intensely acid. I had not much fever, but pain deprived me of appetite, and I was obliged to procure sleep by opiates, taking morphia at intervals during the day to assuage pain. Alkaline salts, blue pill, and colchicum seemed to do little if any thing for me. I was laid up entirely for three weeks. The discharge gradually became thin and colourless, but lasted for more than two months. Hot baths, which I had recourse to constantly, were the only local remedies employed. My medical friends called it 'gouty gonorrhea.' I can only affirm that it was not 'venereal,' and could not be. The local suffering and disfigurement were far greater than occur in acute phymosis from ordinary causes, and the œdema chiefly affected one side of the penis. The above opinion as to the cause of this disease derived additional countenance from the comparative infrequency or rather cessation afterwards of a severe hemicranial and brow pain, which always lasted two days, and which recurred

before this illness about once a month on an average. Moreover my system was relieved generally in a marked degree, although I suffered long and severely from lumbago, which seemed to be a sequel of the complaint."

## TREATMENT OF STRICTURE.

I do not admit the distinction between a temporary and permanent constriction of the urethra: the terms "spasmodic" and "chronic" I regard as inapt and not descriptive of a complaint which exists but in one kind, and which is in its nature unchangeable, depending as it does upon the degeneration or disorganisation of a healthy tissue. Where there is stricture there is always thickening and coarctation, which is also progressive, and can only be restrained by the use of instruments. The disease may be rendered comparatively harmless by treatment but it is never cured. The urethra, in common with the œsophagus, and all other mucous canals, when once it has acquired this tendency to contraction at a particular point, never afterwards rids itself of a liability, which depends upon a permanent change of tissue.

Spasm is an incident, not a component part of this complaint; it is an evidence of excessive contiguous irritation, but it never directly compromises a sound texture. Bougies and catheters should be used for purposes of dilatation only;

purgative and antispasmodic medicines, the warm bath, venesection and leech-bleeding are indispensable in cases marked by the complication of convulsive movements in the surrounding parts.

As a general rule I am no advocate for the use of bougies, they are often inefficient and sometimes unsafe. Still it is necessary for the surgeon to be so provided, for many can only be induced to submit to the introduction of a metallic instrument by slow degrees. During a lengthened residence at St. Thomas's Hospital, a week seldom elapsed without my being called upon to deal with one or more cases of stricture in its worst form. I never employed or counselled the use of any thing but a silver catheter on these occasions, and there are many rising members of the profession who can bear witness alike to the truth of this assertion, and the success which attended the practice. That which is here advanced in favour of an unyielding material is in no wise inconsistent with the recommendation of the elastic instrument where there is prostatic enlargement. In such cases the latter should always be tried first, but there are occasions upon which it will be found that nothing but a long silver catheter with a bold curve, will reach the distended bladder and so provide for the relief and safety of the patient. Bleeding and hot water are most salutary where the system has been vexed for many hours by a progressive distention of the bladder. The blood should be abstracted during

immersion if possible. Such measures backed by a full opiate save both time and trouble, and will frequently by themselves alone determine the early relief of the organ without any further assistance of a mechanical kind. When the patient is very old or much attenuated, there will often be an amount of local congestion—which renders it necessary to abstract blood by leeches. These may be applied above the pubis with advantage; by such means the patient will slowly reacquire the power of expelling his urine. At first it flows in small quantities or dribbles off, afterwards the relief so procured is more abundant and sustained, and the parts are thereby placed in a very favourable condition for procuring the final relief of the patient by the judicious use of instruments at a later time. The question of cutting upon old and callous strictures has been largely discussed of late, and much that has been said might well have been spared, because the proposition is not novel in itself, and some of the moderns would extend their application of the rule to many of the cases which do not call for such summary measures. It may be roundly asserted that so long as surfaces remain unbroken, cutting instruments should not be used in the perineal region. If an abscess has formed behind the stricture, or if fistulous openings exist, we must proceed here, as in other parts, by incision, but not otherwise. If the urethra has not given way, or be not compromised by a puru-

lent formation, retention may always be relieved by one of three methods; viz., 1. the forcible passage of an instrument: 2. the judicious use of caustic: 3. puncture of the distended bladder. The cutting down upon mere stricture, however confirmed or complete, should always be regarded as an exceptionable mode of proceeding, to say the least of it. The operation is one of great risk at the time, from hemorrhage and exhaustion, the effect of confined posture and past suffering; but the chief objection to it is embodied in the fact of its being seldom finally successful. After cicatrisation, the parts become as hard and callous as before. Some of the worst strictures I ever dealt with, existed in a more unmanageable form than ever after this perineal operation. As to the necessity pleaded for this proceeding, the perineum remaining sound, it may be stated that some surgeons always yield to an implied belief in its existence, whilst others of equal eminence never recognise it; so that after all there will probably never be any fixed rule of practice in this matter. Like the controversy about "opening the sac" in the operation for strangulated hernia, it will remain an open question.

As an accompaniment of old strictures, there is sometimes observed a peculiar fulness or thickening in perineô, which being mistaken for abscess is treated accordingly, but incision of the raphe does no harm on these occasions. If matter does not make its appearance, still the operation often ac-

celerates the flow of the urine by the urethra without the aid of a catheter, which should therefore be used cautiously or not at all, unless the symptoms of retention become suddenly urgent. I lately attended a gentleman in the city with my friend Mr. Charles Croft, in whose case these directions were followed with great advantage. This state of the integument in perineô is probably due to prolonged irritation. I have never seen it in young men, and it does not belong to the formation of abscess in perineô, in its ordinary form.

## NOTE ON LITHOTRITY. — CASE OF LITHOTOMY IN WHICH NO STONE WAS DISCOVERED, ETC.

The operation for the relief of stone in the male bladder has acquired a new interest of late years, from the great progress of lithotrity, which seems likely to render the old method of lithotomy a very rare occurrence, if not altogether obsolete. Having seen two cases of lithotrity terminate fatally during the last twelve months within the first fortnight next after the operation, and having remained in personal attendance upon more than one occasion, where the parties appeared to me to suffer a great deal more during the passage of the detritus than is customary in the worst and most prolonged operations by the knife, considering also how difficult it is to trace the after history of the results of lithotrity, the patient being usually pro-

nounced well, or the practice being declared successful, long before it can be certainly ascertained that no more fragments exist, it does appear to me that the superior claims and advantages of the new method are by no means established. It has been shown upon authority recent and familiar to all that there are occasions and forms of the disease which are suggestive of the employment of the lithotrite; but with a hard stone of average dimensions, the bladder and kidneys being sound, and the patient not being exhausted but suffering severely from broken rest, progressive loss of strength, and the other consequences of continued pain, it has not yet been proved that any better or safer plan of treatment can be adopted than that of cutting in perineô, as first performed by the great Cheselden now more than one hundred years ago. The following are the particulars of one of the cases just alluded to. Mr. P. ætat. 68, a tradesman of abstemious habits and healthy in aspect, had suffered for eighteen months from symptoms which marked with comparative certainty the presence of a stone. His early difficulty had been frequent desire to pass water in small quantity when moving about and after retiring to rest, pain when riding in a carriage, and occasionally an appearance of blood with which his urine was much stained after a journey even of short duration. It was with difficulty that I could persuade him to submit to the operation of sounding, for as often happens, he

was loath to be convinced that he was the subject of stone, being a timid man. On Friday, the 30th May 1851, he being tranquil, and in all respects prepared for operation, Weiss's instrument was introduced after a copious injection of the bladder, and a stone was easily griped and repeatedly broken. On Sunday evening he had a smart rigor, and on Monday this recurred, and was followed by copious vomiting. His rest was much broken by constant desire to expel water, which passed with great and increasing difficulty in very small quantities, much stained with blood, and charged with small detritus. The pain at this time was intense, referred especially to the pubic region and end of the penis. Morphia procured him some remission of suffering and intervals of broken rest. He was also much worried with tenesmus after the operation. No change for the better took place, and he died, exhausted by incessant pain, on the 14th June, surviving the operation fifteen days. No more water was secreted for many hours preceding dissolution. After death, the bladder was found contracted. It contained three stones unbroken, each as large as a small pebble, and a fourth fairly crushed. One kidney was loaded with blood, its tissue of the deep purple hue which marks acute congestion; the other had reached the stage of muco-purulent infiltration, but was not otherwise disorganised. I cannot but think that the operation proved fatal to this old man. At all events, his previous suf-

ferings had been comparatively slight, and his pain afterwards often amounted to agony, of which I was an eye-witness. If nothing had been done, he might have survived much longer. The prostate was not diseased, and I believe many have recovered after lithotomy in no respect better prepared than he was at the time the operation in question was performed. I do not feel at liberty to say more of another case resently under my observation, than that the result was still more unsatisfactory.

In two other cases wherein I have been personally concerned, or cognisant of all the circumstances of the operation, one having been treated by the late Mr. Key, who broke a stone three times for a gentleman past sixty years of age, who is again suffering from a return of the symptoms, having enjoyed an interval of comparative ease for some years, the other, that of an aged clergyman, from whose bladder I obtained on three occasions large, hard detritus, weighing in all upwards of ninety grains, and much resembling fine gravel picked from a garden-walk, the symptoms remained in abeyance, but were never entirely subdued. My present conviction is, that the complete removal or passing off of all the detritus is a rare as it is a most happy accident; at the same time, where lithotomy, from age or exhaustion, would be hazardous, or other insuperable objections exist to the performance of that operation,

there can be no doubt that lithotrity, in skilled and careful hands, is a great boon to the patient, and offers at least a fair prospect of relief. As to the circumstances or symptoms which are supposed to make it probable that one will do better than another when subjected to this mode of treatment, they are not of much value, and the most experienced surgeons are the first to admit that this is a matter of pure speculation. A nervous, fidgetty old man often suffers less, and makes a better ending, than a younger person of a firmer temper and more robust aspect. Worry and unrest are the natural atmosphere of the one, whilst the other will suffer a martyrdom without complaint; but then his constitutional powers are proportionably depressed by great and sometimes unremitting pain.

I shall now mention two cases of cutting for the stone in infancy where no calculus appeared after introducing the forceps in the ordinary manner. I was present when the late Mr. Tyrrell, a most able surgeon, operated upon a little boy under the following circumstances. Master B. was first seen by a professional man in 1836. He was a delicate child, rapidly wasting in flesh, and daily losing strength and appetite under the ordinary symptoms of stone in the bladder, which were thought to be well marked. He was sounded four times, twice by hospital surgeons. A calculus was declared to exist, having a hard surface, and pro-

bably of some size. The operation was performed in November, 1836. It is needless to say that it was dexterously done. No calculus was found, the wound never healed, but all the previous symptoms were relieved at once. The child did not rally, and died hectic in the following February. On examination, it appeared that a process of ulceration had destroyed the anterior part of the bladder entirely. The edges of what remained were firmly adherent to the back of the pubis and margins of the open wound in perineô. This remnant was much thickened, its cavity presenting a series of recesses. There was no trace of healthy mucous membrane left, the surface being uniformly broken and sloughy. The left kidney was three times its proper size, and on section it was found to be converted into a large sac or bag containing pus. The same secretion was found in the ureter, and the cellular substance in the cavity of the pelvis had undergone a similar change. There can be no doubt that this disease commenced in a chronic inflammation of the mucous membrane lining the bladder and urinary passages. Hence arose the peculiar irritation which caused so exact a counterfeit of the symptoms of stone as to lead to the performance of an operation for the relief of the patient. The extensive adhesions and other traces of disorganisation observed in the coats of the bladder do not belong to any period antecedent to the date of the operation. In 1824, a similar

*contre-temps* occurred to Mr. Travers when operating upon a very young child at St. Thomas's Hospital. A smart gush of water followed upon a free section of the parts with the cutting gorget, and on introducing the forceps no stone could be found. But on this occasion the surgeon's accuracy was quickly vindicated, and the mystery explained by the discovery, on searching the wet sand at the foot of the operating-table, of a small, brown, pea-shaped calculus, which had escaped with the fluid contents of the bladder. It so happened that this child's sufferings had been very severe, and the symptoms so decided, that the sister of the ward would not be satisfied with the result of the operation, and thereupon instituted a successful search for the missing stone after the removal of the patient. All lithotomists will admit the possibility of an accident of this kind when operating upon very young children. On such occasions, if the bladder and kidneys are sound, the calculus is usually small, smooth, and light, easily floating when the bladder is full. In the case I am describing the stone seldom exceeds the size of a small bean, and I have more than once seen it picked out of the freshly-incised wound with the finger. Sometimes these small bodies find their way into the urethra before the child has exhibited symptoms of their presence in the bladder, an accident familiar to all operators, but nevertheless at times requiring great care and nicety of mani-

pulation for its prompt relief. There is often great difficulty in striking the stone in little children. The parts being very irritable, the bladder easily contracts upon its fluid contents, and an amount of corrugation and constriction is provoked by the continued presence of the sound, which will create a sense of resistance not wholly unlike that which is imparted to the hand of the performer by the unyielding surface of a small stone. This operation of sounding, in the very young subject, is certainly one which calls for great tact and caution in obscure cases.

The early symptoms of stone are sometimes overlooked, because they are more difficult of recognition from a certain dulness of sense in old men, who are apt to suffer from lumbar pain and catarrhal disorder, but are more slow to discover the exact site and nature of this formidable malady. An old man will carry about a stone in his bladder for months, and never complain of more than a slight difficulty in making water. He is frequently disturbed at night, it is true, but then aged people usually rest ill, or only sleep for a short time, so that this incident is the less noticed. When the urine is stained with blood, which it commonly is after slight exertion, the case is full of suspicion; but the most certain sign of a stone in the bladder at all times short of sounding, is the occurrence of a sharp burning pain in the glans penis after voiding difficultly a small quantity of urine, the stream

being fine and stopping abruptly. I am inclined, from observation, to suspect that elderly people are sometimes treated for kidney disease or irritable bladder long after the actual formation of calculus, by which the bladder is not distressed, but which provokes a morbid sympathy in the side of the loin or urethra, about which even careful surgeons may be misled for a time.

In certain cases of enlarged prostate, where the disease has been unusually slow and insidious, so that there has existed a residual secretion of mucus mixed with stale urine for a much longer time than is at first believed or even suspected, irritation of the lining membrane of the bladder has become so much the habit of the part—or indeed one might almost say of the system—that a concretion will sometimes be formed in the pouch behind the gland, and even acquire considerable size, before it attracts the notice of the patient or his attendant. Some particulars of a case of this kind were imparted to me by my father, who was one of the parties first consulted, and I am enabled to complete the narrative through the kind favour of my friend Mr. Edward Cock, under whose observation the patient remained during the latter part of his illness.

A gentleman long resident in the East Indies, under treatment for enlarged prostate with muco-purulent urine, was found to have a stone in his bladder. This discovery was not made for more

than a month after the first introduction of an elastic catheter, which was frequently withdrawn and replaced during that interval. The patient never complained of any of the usual symptoms of stone at that time. In 1837 he was cut successfully by Mr. Key.* He died in the summer of 1850, and the following account of the state of the parts after death was forwarded to Mr. Cock by Dr. Madden of Torquay.

"The anterior surface of the bladder was adherent to the abdominal parietes, so that that viscus was opened by the external incision. It was contracted, but not thickened; the mucous membrane was of a dark slate colour, almost black, but not otherwise unhealthy. The prostate was very much enlarged and riddled with abscess. A catheter passed by the urethra entered the abscess, but did not reach the bladder. There was a small round opening about the size of a goose quill through the mucous membrane leading into the cavity of the prostatic abscess on the left side. The kidneys were so decomposed that it was impossible to say any thing of their condition. (48 hours after death.)

"Torquay, July 16, 1850."

This then was essentially a case of enlarged

* He was seen repeatedly by Mr. Travers, who was present at the operation in '37, and personally cognisant of the early particulars of the case, and it is to him that I am indebted for the above brief but interesting note.

prostate gland running its course to disorganisation and so destroying the patient. It is a good example of the incidental complication of stone, and it proves that the operation under such circumstances is not always incompatible with a prospect of relief if the bladder be not otherwise seriously diseased. This gentleman survived the removal of a large calculus by extraction thirteen years.

I have elsewhere stated that bloody urine is a suspicious symptom. In old men where no stone exists and hæmorrhage is constant, or of frequent recurrence, it commonly proceeds from the torn or abraded surface of the enlarged prostate. After having provided for the strict observance of a recumbent posture, spare diet, and a cool apartment, I have known the gallic acid in five-grain doses given in a decoction of Pareira brava every four or six hours very efficacious.

As to solvents, I shall here mention a case in which the alkaline salts appear to have reduced a hard calculus to powder after it had been exposed to their action for many months. The particulars of this curious experiment were given to me by my father, who saw the patient, and advised him to submit to an operation; they are briefly as follows. A tailor who had long been afflicted with symptoms of stone was examined by Mr. Travers with a full-sized steel instrument; the calculus being struck audibly, an operation was forthwith proposed, and its propriety was strenuously urged

upon the patient, as his circumstances were in all respects such as rendered it probable that his cure would be speedy and complete. The man however was very timid, and resolved to place himself under the care of an empiric at Henley-in-Arden, who administered a "constitution water" to the extent of two or three pints per diem. He soon began to pass sand and fragments in quantity, as after "breaking;" and this state was marked by acute pain both before and after micturition.

The pain and the discharge of fragments continued for many months; but both subsided at last, and at the same time. This man was examined after death, and no vestige of a stone could be discovered. The body was inspected by Dr. Charles of Kensington, who brought the case to Mr. Travers in the first instance. The patient was in the habit of showing a box full of the debris of his stone reduced to a powder. Dr. Prout stated at the time the basis of the drink which this man took with such good effect, to be carbonate of soda and potass, with a small quantity of nitre, as follows:—

Sodæ carbonatis, gr. x.
Potassæ bicarbonatis, gr. viij.
Potassæ nitratis, gr. ij. *

* Mr. South has already published an account of this case in his translation of Chelius's Surgery, but as it is authentic and very curious, I need offer no other apology for its reproduction.

## FORMS OF LOCAL INFLAMMATION. BOIL. CARBUNCLE. BURNS AND SCALDS.

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It is not my purpose, in the purely practical sense in which the following remarks are submitted to the student of surgery, to attempt more than a simple and brief delineation of symptoms, together with an enunciation of such general principles of treatment as each kind of inflammation in turn suggests. The constitution of the blood, the changed relation of its elements in disease, the organisation of lymph, the production of pus, the incidents of ulceration, involve an amount of research and theoretical reasoning incompatible with a plain narrative of appearances which are to be recognised and subdued by the exercise of common sense applied to their truthful and patient observation. Simplicity and singleness of purpose are as important to a writer as to the practitioner of medicine. Minute subdivision and lengthened detail are not required where it is meant to impart only so much as is requisite to guide us to useful conclusions and clear systematic notions of practice in general.

Inflammation of the surface of the body is of four kinds: 1. Erythema, or inflammation of the cuticle; 2. Erysipelas, an action having its seat in the true skin; 3. Phlegmon, affecting the subcutaneous cellular substance; 4. Fascial Inflammation, having its seat in the white tissues, tendons, and aponeurotic coverings of the muscles. Of these four kinds of inflammatory action it may be stated that the two former ordinarily have a constitutional origin, and retain that character throughout their course, whilst the two latter generally begin in the part; but when excessive or of long continuance, they also provoke a powerful and dangerous sympathy on the side of the system.

Erythema, which, for the sake of a more perspicuous arrangement, I have called the inflammation of the cuticle or epithelial investment of the true skin, cannot be regarded as having a site wholly distinct or apart from the cutis, the external face of which tissue must always be affected on account of the vascular arrangement of the parts, and the vital dependence of the former upon the latter, which is the reproducing material of the outer layer. I have said that erythema is usually a constitutional or sympathetic disorder. It is marked by a diffused blush paler than erysipelas, having a ready disposition to spread, and variable as to its selection of a site. It is erratic, and often very painful, as in the cases of inflamed superficial absorbents. It is produced by all forms of local

irritation, by abrasion, by wounds both poisoned and simple. The more remote causes comprise gastric irritation and poisons circulating with the blood. Lastly, the proximity of diseased tissues, as fascia and periosteum, or absorbents and circumscribed collections of matter. The pulse in erythema is accelerated and irritable. The bowels are impeded; but the secretions are not, generally, much disordered in mild cases. The tongue is coated rather than loaded or foul. The treatment should be simply but directly antiphlogistic. Saline aperients, a restricted diet, and calomel in one or more decisive doses, with or without an antimonial according to circumstances, usually meet all the indications effectually, and the cure is presently obtained. Where the disease depends upon sympathy, whether proximate or remote, the blue pill, antacid and purgative medicines, sarsaparilla, nay, an operation, may be necessary to remove the cause of offence and subdue the erythema. The best local application in this disorder is the white wash without exception. Opium, ice, evaporants, or any thing likely to provoke reaction, does harm.

Erysipelas, or inflammation of the true skin, *cutis*, is marked by a deeper tint, a well defined edge, more fulness and a quicker sense of pain than is felt in erythema. Any accident which directly injures the organisation of this tissue, as bad bruises and lacerated wounds, especially where it is very tough and vascular, as in the scalp, may

determine the occurrence of erysipelas; but its cause is usually to be sought for in the constitution of the individual, and it always provokes a very rapid sympathy on the part of the system however much its first approach may have appeared due to an origin purely local. Unlike erythema, erysipelas has a direct tendency to terminate in effusion, sometimes serous, but more commonly purulent, with which the subjacent cellular membrane becomes gradually so infiltrated as to break down and occasionally slough or die outright with great rapidity. Circumscribed abscess following an attack of erysipelas is not common; the matter diffuses itself so as to occupy a large portion of a limb or other member, as the head and neck. This accident proceeds from great congestion, and the weakly character of the action under which lymph is sparingly supplied, or is of so poor a quality as to retard rather than accelerate the healing process.

Erysipelas spreads by continuity, or is erratic, *i. e.* it observes a remission, or actually subsides in one place only to reappear in another situation, and that, perhaps, some distant part of the body. This arises from the faulty state of the blood, and is not due to any specific degeneration of the part affected. It is rather more picturesque than true to describe erysipelas as fading gradually. It does not undergo a resolution, nor does it terminate in simple disquamation of the cuticle: at least, this

is not a correct description of its course as seen in the metropolitan hospitals.

The early presence of matter, no less than the manner of its effusion, implies that the blood is disposed to part with its materials more quickly and at a greater cost to the system, than in a common abscess; certainly the local results of erysipelas exhibit no signs of a sthenic action. This mode of inflammation is never, I believe, determined by a purely local cause, whether in man or woman, in youth or in age. It depends throughout upon an enfeebled state of the system, brought on by a poor or diseased blood. So true is this that parts thus attacked will suddenly fall into gangrene, blacken, and die outright. Such an accident has sometimes befallen the female mamma, the pudenda of both sexes, also the nates and portions of the face, as cheek, nose, and lips.

The local management of erysipelas depends upon providing against atmospheric exposure or sudden changes of temperature. Astringent, cooling, and sedative applications are to be preferred to those which provoke a very active evaporation. The stimulus employed should be immediate in its operation, not such as is reactionary, which is often transitory, or operates capriciously and with undue force. Like all weakly inflammations, erysipelas is characterised by extreme congestion of the capillaries, and its early stage is unquestionably relieved by incision, neither deep nor extensive,

but sufficient to penetrate the thickened rind of skin, and allow of free oozing from the vessels of the cutis vera, the seat of the disease. The two extremes of puncturing, which only irritates, and deep cutting, which is dangerous, are to be carefully avoided on all occasions, especially the latter; and it must be borne in mind that a patient may be as effectually killed by hæmorrhage at the end of thirty-six or forty-eight hours as though he had died upon the spot, if too much blood be withdrawn from the system under such circumstances. In all inflammations, where congestion is very marked or considerable, you cannot relieve a tissue too rapidly, nor at the same time interfere with the heart's action too slowly. This is an all-important distinction, and one which demands our special observance in the local depletion of inflamed parts, where there is reason to suspect failing or deficient constitutional energy. As to determining the confines or margin of this inflammation, I have seen the experiment fail as I have also witnessed its success. Mr. Hunter supposed that parts had a sort of warning in disease, and so prepared themselves submissively at one time, whilst under other circumstances they resisted disintegration powerfully and successfully. It is by a reference to some natural law of this kind that we may, perhaps, more easily explain the successful operation of the lunar caustic when the action has not passed the line so set up, than by attributing it to what after all is but

a superadded irritation. In the unhealthy this remedy will seriously aggravate the local disorder long before it can provoke such an action as shall prove an insurmountable barrier to the further spread of the disease.

The constitutional treatment of an erysipelas involves very careful and vigilant superintendence, together with some power of discrimination on the part of the surgeon. It is very important to obtain at an early period some clear notion of Nature's will or purpose in the course of the complaint. In the plethoric or intemperate, it is ordinarily the consequence of a direct sympathy with disordered mucous surfaces and vitiated secretions, ushered in by fever, or, if traumatic, by sickness and shiverings such as might be expected when disease attacks a highly sentient tissue. Suppuration is the natural crisis of such a condition, and it is wise rather to check and control its extent under such circumstances than to attempt any more violent mode of repression. The age, condition, and previous habits of life, must be well considered; if the latter have been intemperate, or irregular, it is certain that large or sudden evacuations must be avoided. The centres are in no condition to support such measures; and where it is probable that much spoiled material must be replaced, or breaches of tissue repaired, as when the cellular substance sloughs, or is infiltrated, and morbidly thickened, the powers of life should from

the first be carefully sustained. Of this, which I would term acute sympathetic erysipelas, it is sufficient here to state, that after free purging support is indicated; with this view, wine, quinine, opium, and alcohol if need be, are administered with the best results, together with a nutritious diet. There is another form of this action which, in so far as the system is concerned, may be called the indiopathic. This is that species which has a tendency, sometimes, in a bad atmosphere and from other predisposing causes, to become epidemic or contagious; but it usually attacks only those of broken or debilitated habit, or who happen to labour under organic disease or bad chronic distempers, or such as are much worn by prolonged illness after local injury. In these cases the intention of a crisis is not so observable. The skin, as a highly endowed and sentient tissue, partakes after an uncertain period of the latent distemper. Here the evidence of deficient power with occasionally indications of a palsied or irritated brain are well marked. At such a time early recourse must be had to stimuli of a strong and diffusible kind, such as ammonia, wine, and brandy. The practice of incision is here of uncertain event, and sometimes absolutely dangerous. The goulard wash combined with some liquor. ammon. acetatis is grateful to the part, and care should be taken to ventilate the apartment thoroughly. When congestion is likely to become serious, and excessive,

either of the head or lungs, opium in any form is contra-indicated, but henbane is given with the best effect at all times, sometimes with camphor, ipecacuanha, or the grey powder, at others uncombined and alone, on account of its great efficacy in restoring and tranquillising the nervous system without increasing headache, dyspnœa, or any other local derangement which may happen to prevail at so critical a moment. If after the regulation of the secretions, and the alleviation of pain, the local disease continues to spread, and the patient grows weaker, there will be too much reason to fear that the case may terminate fatally, especially in the aged. If the patient be not so reduced as to be actually *in extremis*, alcoholic stimulants, as French brandy, port-wine, with full doses of cascarilla, or bark, holding the volatile salts in solution, are useful; and sometimes such active measures are followed by slow but certain reaction of a healthy kind; suppuration is now defined and forwarded, or sloughs cast off; rest and appetite return; and where change of air and a good diet can be procured, convalescence ensues even in the case of very old people.

Acute fascial inflammation, in the surgical acceptation of that term, is a very formidable disorder. Its causes are very various. It is provoked by punctured wounds by abrasion, by contusions; but in its worst aspect it is sympathetic, or indicative of mischief and disease in the parts

subjacent to the inflamed tissue. In the neck, thigh, and fore-arm, situations where the aponeuroses are very septiform and complicated, where processes of the tissue are passing inwards to connect parts which vary much amongst themselves as to function and vitality, as nerves, glands, blood-vessels, periosteum, and their cellular investments, fascial inflammation is a most painful disorder, and quickly provokes a formidable reaction in remote and important organs.

I have seen this complaint run its course in seven days, and the entire cellular substance of a limb in a state of gangrenous dissolution at the end of that time, when the vital powers have finally given way under progressive exhaustion.

Perhaps the best illustration of this mode of inflammation is that provoked in debilitated or sickly persons, at all ages and of either sex, by the presence of pus, or a gangrenous disintegration of the cellular substance beneath such an aponeurosis as the fascia lata of the thigh, or that of the anterior tibial region in the vicinity of the knee joint. The appearance is that of diffused swelling and enlargement, a pale blush upon the skin, and a feeling of tension as contradistinguished from a sense of fluctuation, such as belongs to more superficial and circumscribed collections.

There is always a febrile excitement present in the mildest cases; but if the action has been prolonged, or matter be formed for some days before

the parts are relieved, the constitutional disturbance is of a more serious kind. The brown tongue and parched fauces, the wiry, accelerated, perhaps jerking pulse, total loss of rest and appetite, in extreme cases an active delirium, point directly to the nervous centres as being seriously affected by the mischief.

Under these circumstances there is no alternative: delay is unreasonable and most dangerous. The retained dead or decaying material, whether fluid or solid, must be found, and a decisive provision made for its exit, either by puncture or incision. I once saw a narrow straight knife passed through the front of the thigh, nearly at its centre, down to the bone, before the matter showed itself, being collected in quantity between the periosteum and bare bone, in a youg str umous subject. The circumstances of this young gentleman were very critical at the time of the operation; but he recovered eventually, and has since grown up to a comparatively robust manhood. On other occasions it is right to divide the aponeruosis to some extent upon a director; but it is well in all situations, especially if the presence of matter be still questionable, to puncture first, and then to dilate, if need be, to a sufficient extent upon a director. The indication in reference to medicine, after full local relief has been provided, is to subdue fever by laxative and diaphoretic remedies, postponing the use of tonics and stimulants until the secretions are

rendered healthy, and the circulation has grown tranquil. Sometimes the typhoid aspect of the case will not permit us to be so deliberate. If this be so, empty the lower bowel by one or more large clysters, holding some senna or assafœtida in solution. Prescribe a generous diet; give bark, ammonia, port wine, and full opiates at night. Parts so affected must be sedulously poulticed and fomented at first; at a later period, when convalescence is approaching, a roller, dexterously applied, and moistened with some goulard water from time to time, is very efficacious. Where it can be had, a residence at the sea-coast may be enumerated as one important means of regaining health.

It is well known that parts of a low organisation, which are, in consequence, of small capacity as regards their own means of restoration under disease or accident, always appear to rouse the sympathy of the centres more powerfully, and at an earlier period, than such as are more liberally endowed with nerves and blood-vessels. The course of the disease in question seems to corroborate this fact, which is quoted as exhibiting a generous impulse or instinct on the part of Nature to sustain the weaker portions of the human frame when attacked by disease. These fascial inflammations always spread rapidly; and if not restrained by treatment, the parts are soon spoiled, and begin to slough. Now of all the substances which offend the principle of life, dead or decaying matter is the

least tolerable; and its presence is sure to be resented by the system, which is roused by virtue of its desire to be rid of a burthen, rather than by a tendency to favour or interfere on behalf of any particular texture or organ of the body under circumstances of irreparable disorder.

### PHLEGMON.

The epidermis, the true skin, and the fasciæ or white tissues, all exhibit distinct and peculiar symptoms when inflamed; and the same may be said of the cellular substance belonging to the external parts of the body. But this material is so closely connected with the others, that it can scarcely be regarded as capable of any isolated change consequent upon inflammatory action.

The mildest illustration of phlegmon is a simple boil; its other extreme is a gangrenous disintegration, of which acute carbuncle is an example. If we except the extreme case of broken habit, or very advanced age, it will be found that Nature's intention in the phlegmonous or cellular inflammation is one of relief.

Boils occur in gross, overfed people, also in those where there are signs of a vitiated blood, as evidenced by the appearance of the skin, the mucous surface of the tongue, the margin of the eyelids, and the faulty character of the excretions.

When the furuncular irritation has run its

course, the other disorders will often disappear of themselves; and the patient is so sensible of the agreeable change in these particulars, that boils are still seriously considered by many to be a sign of health.

As a general rule they are not to be meddled with; but a soothing plan of treatment, by poultice, fomentation, and gentle laxatives, should be leniently carried out. Carbuncle is an extreme case. Its treatment by cautious but large rather than deep cutting, pursued without fear or hesitation, and a plan of active support, may be instituted cotemporaneously with the exibition of remedies destined to correct the disorders of the stomach and bowels, and restore them to a wholesome activity.

It is a circumstance well known to experienced surgeons, that the subject of a large carbuncle may be easily destroyed by an incautious use of the knife. These persons cannot afford to lose more blood than is sufficient to relieve congestion. I have known more than one instance where hæmorrhage proved indirectly fatal to the patient. In cutting a carbuncle, if a vessel of any importance be divided, it should be secured immediately. Instead of incision, some surgeons apply the potassa fusa to the surface of the tumour: it is spoken of as a safe practice, and one which promotes early cicatrization.

In the treatment of this disease, opium should

always be especially mentioned. It is convenient to give it in full doses at least twice a day in urgent cases, where a tendency to nervous prostration explains the efficacy of this remedy. In troublesome instances of boil the iodide of potassium operates most beneficially by restoring appetite and giving tone to the circulation.

Carbuncle sometimes terminates in sloughing of a most malignant and unmanageable kind. Many years ago, one Wheeler, an old and respected servant of St. Thomas's Hospital, died of this disease. The fleshy parts of the muscles at the back of the neck seemed to perish en masse, so that at last there remained nothing in the region of the nucha, but shreds of discoloured tendon interspersed with patches of livid granulation, pus occupying the interstices of the cavity in pools. The arches of several of the cervical vertebræ were distinctly visible before death in this case, which is quoted as an example of the character of the local action when the system is thoroughly cachectic.

## BURNS AND SCALDS.

We find in books ample authority for both warm and cold applications in the treatment of burns and scalds. These opinions were held, and the doctrines consequent thereupon were promulgated, by very good observers, who, moreover, gave themselves ample credit for all they saw and

taught; still many of their plans were little better than empirical. They saw and believed, but their attempts at explaining how or why their patients got well are too often strained and improbable. One party desires us to stimulate or maintain an otherwise diminished activity in the capillary vessels; another would equalise or lower their actions down to an ideal standard, based partly upon fear of violent reaction, and partly upon a belief in some imaginary mean of temperature, as essential to the curative process after burn. At the present time it is not thought necessary to go into any very elaborate investigation of the state of the capillaries, or rather we are indisposed any longer to make assertions about them which are too often mere assumptions. We know that we have as ingredients of the mischief, wound, and a state of parts obnoxious to all the ill results of delay in the application of that which shall constitute a defence from external irritation of all kinds. We find that the first step or condition of an inflammation is fulfilled in the surrounding stasis or extreme congestion of the small arteries and veins, and that the particular texture here involved, which indeed is often destroyed to a large extent, powerfully excites the sympathy of the constitution. The indications to be primarily met in all cases of scald and burn from cuticular abrasion to destruction of the true skin are uniformly, 1. Provision for equable temperature; 2. Defence from

atmospheric irritation; 3. Febrifuge, sedative or stimulant remedies, according to the greater or less amount of constitutional disturbance. The more simple the form of local application in the first instance the better. Flower-dredging, cotton-wool, the lime-water and turpentine liniments, also smearing the part with olive oil, and subsequently shaking a little powdered calamine or litharge over the anointed surface, are all recommended as useful modes of dressing. My individual experience would lead me to suggest that the cleanliest, the most soothing and most manageable of all primary applications is that of pieces of linen cloth dipped in tepid goulard water, and moistened with the same from time to time, by a careful attendant. Position and support must not be overlooked. During a lengthened hospital experience I never saw an instance in recoverable cases in which this plan failed in providing against all the first effects of the accident, giving great relief to the parts, and actively predisposing the injured tissue to early cleansing and cicatrization. Where the wounds are deep, poultices or cold-water dressings should be used in succession to the goulard wash. When granulation has commenced at a later period, the unguent resinæ, or a dilute turpentine or calamine cerate, are very effective in maintaining and completing the healing process.

As regards medicine, cordials and mild opiates are permissible and sometimes necessary; but as a

general rule much medicine is not advisable. A nutritious diet and well-aired apartment are all important in these, as in all other forms of cicatrizing wound, whatever be the character of the action, whether one of adhesion or granulation.

I have lately had an opportunity of witnessing some very novel and satisfactory results of the process of extension upon the fræna and contractions of old burns of the neck and limbs. Mr. Tamplin, of the Orthopœdic Hospital, the ingenious contriver of this plan of treatment, has succeeded in straightening and restoring parts so circumstanced in a most marvellous manner where excision had wholly failed, as it notoriously does upon these occasions.

In one very bad case, a dense cuticular band, confining the fore-arm, and entirely suspending all power of motion in the injured limb, was completely reduced and disappeared in about twenty weeks after the application of an apparatus along the back of the arm throughout its extent. The strain, which is never relaxed by day or night, has the effect, in the course of time, of producing an absorption of the substance of the band or web, and as the parts slowly yield under the stern influence of such measures, the power of motion recommences, which should be expedited by passive exercise from time to time. Burns and scalds, it is well known, may prove suddenly or immediately fatal, owing to their intensity and extent.

Thus, I once knew a powerful man, who accidentally fell into a vat of boiling dye, in a large hat manufactory in Southwark, taken out a corpse, although, as I was assured by credible eye-witnesses he was not immersed for more than a minute. As might be expected, the vessels of the brain, lungs, and other large organs, were all found to be in a state of extreme congestion after death, that is, loaded with black blood. As in gunshot injury, so the shock of severe cold or extensive burn is relatively greater than it is after the same amount of mischief to the surface, produced by other causes, as bruises or laceration, especially in young children, or feeble and debilitated persons of riper age. For this two reasons may be assigned: 1. The intense and complete operation of the destroying agent; 2. The rapid and very powerful sympathy which exists between the sentient surface and the cerebro-spinal centre. Hence the congestive tendencies observed in the brain, and its coverings after death, which, in extreme cases, are noticed also in the lungs and portal system. Mr. Blizard Curling has spoken also of the mucous membrane of the duodenum as being prone to ulceration after burns which, when it exists, is probably a fatal complication without exception. I cannot verify the fact from personal observation, but am content to accept it upon the clear and accurate testimony which I have quoted, as being of occasional, though probably rare occur-

rence ( *vide* p. 260. vol. 25. Med. Chir. Trans.). It is not difficult to explain the objection which some surgeons entertain to the use of stimulant or narcotic remedies after burn of the upper parts of the body, especially in the young. Nevertheless, I have often given a teaspoonful of the poppy syrup, at short intervals, to children, also brandy and laudanum, diluted with warm water, to older subjects, with marked advantage; nor do I believe that the danger of a fatal congestion is materially enhanced by such proceedings, in any case likely to be relieved or favourably influenced by the administration of internal remedies.

## ON DISEASES OF THE JOINTS.

Chronic ulceration, which is the disease *par excellence* of the articular cartilages, is ordinarily allied to a morbid habit of body; and the local degeneration is accepted as a type or evidence of the general disorder. This is one stage of that scrofulous action which begins upon the free surface of the joint affected, and it is preceded by inflammation of the synovial membrane, which may be regarded as the first serious symptom of all white swellings, as well as some other diseases of the part. After punctured or other penetrating wounds, blows, and contiguous fracture of the bone, also in severe rheumatic attacks, and as a remote consequence of poisonous inoculation of the body, pus may be secreted, and breaches suddenly made in the cartilage, or it disappears more slowly; but the mode of all such changes is in contrast with the more extensive and complete destruction which marks the progress of scrofulous ulceration. In the latter case, large or irregular ragged openings extend through this tissue, and the bone is inevitably implicated as the disease advances; whilst in the non-specific and simple acute inflammations, this progressive destruction is an exceptional occurrence,

and the white tissue only is removed, whether uniformly or in patches. The appearance so produced is one of thinning with sloped or bevelled edges, which will eventually expose the surface of the bone: but this latter part is by no means predisposed to submit to an extension of the process so readily as is found to be the case where scrofula prevails in the habit. When the cartilage alone is concerned, its removal is effected by a molecular or interstitial disintegration; but when the joint is affected, the bone, being one of its component parts, decays in its turn, like the rest of the surrounding tissue. A white swelling, therefore, does not depend merely upon an ulceration of the cartilage, but is essentially an unhealthy chronic inflammation of all the parts entering into the composition of the knee-joint, beginning in a synovitis and terminating in a true ulcerative absorption of the cartilage and bony apophysis in adults, or the epiphysis in young subjects: of course the same remark applies to the hip, ankle, elbow, and wrist. Now the end of all this we know to be either a complete anchylosis, or such an one as still permits a circumscribed motion in the part, or the health of the patient gives way, and death after an uncertain interval puts a period to a career of acute suffering, marked by a paroxysmal hectic and other symptoms which have been frequently described with great minuteness, but very seldom alleviated by treatment. The only instance which

I have met with wherein the removal of the cartilage by ulceration appeared to depend upon a primary or antecedent disease in the bone is to be found in the museum at St. Thomas's Hospital, where the sequestrum in a circumscribed necrosis of the head of a tibia is seen making its way through the joint surface into the cavity of the articulation, in obedience to a general law, of which this specimen is a very precise and beautiful illustration.

In strumous subjects, the question of prime interest to the surgeon, as it is all important to the patient, is whether the inflammation can, under any circumstances, be stayed before ulceration has commenced in the cartilage; for it is certain that the reaction on the part of the system at large begins to be most serious from and after that time. It falls to the lot of every one who has been long at an hospital to see much of the disease now under consideration at all periods of life; and I think I have sometimes succeeded in arresting the progress of the malady, in the hip-joint especially, by a plan of treatment which I am willing to admit is most likely to be efficacious before the period of puberty, when the successful operation of all remedies is eminently favoured by the great activity of the processes of growth and reproduction. Many years ago I witnessed in a very young child the good effects of an accidental salivation, under circumstances which justified the belief that we had to do with the genuine 'morbus coxæ' in its earliest stage.

This little boy had a tumid belly and white clay-like motions, for which Mr. Travers ordered a powder, composed of jalap and calomel, to be given at intervals, and in doses proportioned to the age and strength of the patient, until the proper colour of the evacuations should be restored. There existed at that time a fulness in the left groin. The soft parts about the hip-joint were swollen, pressure being excessively painful. The child was very restless, getting no refreshing sleep at night, and crying all day. He could not project the limb, nor put the foot to the ground. The skin was dry and harsh, and the tongue much coated. In short, the symptoms were very characteristic. Undesignedly, this patient, about five years old, was salivated, and the general health suffered for a time nearly as much from the effects of the remedy as the disease; but he rallied and recovered, slowly but perfectly, for he left the hospital eventually, walking without effort or support of any kind. For the most part he was kept constantly in bed and well nourished, little or nothing further being done for the part. Not long afterwards I obtained a similar result in the case of a little girl, eight years old at the time of her first indisposition, also the subject of hip lameness, with signs of synovial inflammation. On this occasion, after the calomel had produced the desired effect, and about six months from the time of her first coming under my care, a considerable abscess formed beneath the integument on

the upper and outer part of the thigh, which healed slowly, but never communicated with the cavity of the hip-joint, so far as I could ascertain that fact by examination. This girl limped a little in her gait afterwards, and the limb was not so much developed as its neighbour; but so late as her fourteenth year there had been no return of the disorder in the articulation. I have elsewhere alluded to the formation of an abscess as marking a crisis in the progress of cure by salivation. Perhaps when the tendency to congestion in a diseased part has been thus overcome, and the balance of the circulation is duly restored, the quality of the blood itself in that locality is still deteriorated, and being no longer fit for the general purposes of the circulation, its spoiled or refuse ingredients are eliminated by means of a circumscribed collection of pus. At all events, where these abscesses form in the neighbourhood of the part affected during convalescence, I have always accepted the occurrence as wholesome proof of the evacuant and alterative action of the medicine.

It is true that mercury will not always summarily stop the progress of a strumous arthritis, but this circumstance should never deter the surgeon from trying an experiment which, when cautiously conducted, leaves the sufferer in no worse condition than it found him; and it is certain that it does sometimes operate to procure an interval of release from local pain. When such an

opportunity is wisely improved by good living, change of air, and other restoratives, much good may be effected, and the period of remission so far prolonged, that the results of any local change are permanently counteracted, if not wholly and finally removed. As to the exhibition of mercurials in infancy, a child will take half or a whole grain of calomel every night, or night and morning, without inconvenience, if necessary. If there be great harshness of surface, a little James's Powder is a useful adjunct, or a small quantity of ipecacuanha. At other times, ten or fifteen grains of the blue ointment may be rubbed in at night, and the internal use of the medicine should then be wholly omitted. At the same time a little bark, in powder, combined with soda, or, if the bowels require such assistance, the compound rhubard powder (Gregory's), are often serviceable, and strictly consistent with the use of mercury. The precipitate and injudicious use of quinine and steel cannot be too much discouraged in the constitutional treatment of joint disease in its early stage. Jelly and mucilage, good animal broths, and a moderate allowance of well-cooked vegetables, should be suggested, but a total abstinence from wine and fermented liquor is essential to the favourable progress of the case. It is well known that the strumous child bears the operation of mercury, relatively speaking, much better than those who do not inherit or have not acquired that taint. It has been ascertained

that the organization of new deposits is very rapid in scrofula, and also that, whereas they are composed of a very fragile material, they easily break up, and are at times quickly re-absorbed. In the most promising cases, if the treatment is too active, or embraces the use of any substance offensive to the stomach and bowels, neither resolution, nor absorption, nor organization of a healthy and lasting kind will be obtained, but a quantity of waste and broken-down material will remain to be eliminated: hence arise suppurations and ulceration. The rationale of a method which interrupts, or altogether anticipates, an act of disorganization in a joint, which invites absorption in glandular enlargements, and fills the bed of a corneal ulcer with healthy lymph, is one and the same at all times. Mercury will do this if properly administered at the right time; iodine also exhibits the same powers in a less degree: but it should always be borne in mind, that parts are easily broken down, and the blood soon impoverished, under the too liberal employment of either remedy; so that the patient cannot be too closely watched when submitted to their operation for any lengthened period. Finally, all experienced surgeons never omit to lay the greatest stress upon measures which affect the regulation of diet, repose, and temperature; of which I shall only observe in this place, that no medicine can be expected to produce the smallest salutary result which is not backed and counte-

nanced by great vigilance and attention to these details.

The local treatment of incipient strumous disease in the large joints should be soothing, but decided. Where there is fulness, with acute pain, I prefer leeches to cupping, and repeated small applications answer better than full bleedings by the former method; that is, four, six, or ten fresh leeches, according to the age of the patient, applied twice in ten days, will allay swelling and local pain for a longer term, and at a smaller cost to the system than the abrupt employment of double the number; for the same constitution which will bear the alterative action of mercury, or even its evacuant effects for a long time without complaining, is sensibly and rapidly depressed by the abstraction of blood. Cupping is to many a very painful and repulsive operation: they sicken at the idea of the glasses; and such prepossession is of itself unfortunate, and likely to detract from the prospective good to be gained by the practice. Blisters are useful, but should not be carried beyond the production of a raw surface, to be presently healed. It is better to repeat the application, if need be, than establish a drain in the part which involves the presence of a sore, a most doubtful remedy at any time prior to the stage of ulceration. When the foregoing measures have proved successful, and pain and swelling have sufficiently subsided, support should be provided

for the joint or limb, if need be, by means of a bandage, stiffened with starch or mucilage; nor should exercise or motion of the most trivial kind be permitted until all pain has finally ceased. In the chronic stage, the plan of permanent counter-irritation often fails. The moxa, for example, is of itself a very severe infliction, and seldom in my experience repays the patient for his fortitude in submitting to it. I am not sure that it does not often operate to disturb and interrupt the function of organs without whose aid and connivance texture cannot be saved, nor the patient effectually rally. An attentive perusal of Mr. Pott's paper will convince any unprejudiced person that he by no means contemplated the indiscriminate and universal adoption of the moxa. His aim was not to inculcate a meddlesome, anticipatory system of surgery, but to point out how far, and in what sense, we might, at a particular stage or period of these diseases, stop the deeper-seated process, and countervail its course of destruction, by instituting artificially, and in another texture, an action like that prevailing in parts more deeply seated. It is better, as a general rule, to persist in a plan of rest and support, and work at the disease through the system. If the patient cannot sustain the action of alterative medicine, backed by tonics and opium, things generally go on from bad to worse, and disorganization cannot be prevented. The cases at all periods of life which make the

best ending are those in which least has been done locally, and where the remedies have been addressed almost exclusively to the system and the improvement of the general health.

It is impossible to speak in the most cursory manner of the morbid conditions of system attendant upon diseases of the joints, or the various vices of the habit which precede or predispose to such changes, without some allusion to those actions which have their beginning in the hysteric disorders of women. It has been my fortune to see several very marked cases of inflamed and enlarged joint when this temperament prevailed. In large hospitals they are notoriously of very frequent occurrence. I think it is a hazardous assumption to affirm that the local sites of hysteric pain are not ordinarily subject to a real and very tangible change, or that they do not manifest a decided aberration from the healthy aspect of such parts when this temperament prevails. Why a disturbance or hyper-irritability of the uterine system should not be accepted as a sufficient and reasonable precursor of local disease, I am at a loss to understand; and such an opinion does not consist with the results of surgical observation. Epilepsy, delirium tremens, and other remote organic disorders, are received as complicating or promoting diseased changes; and surely the functional derangement which they entail is not greater than that disturbance of the nervous system which

belongs to the suspended or altered function of the uterus. Such derangement is in a great many cases quite sufficient to precipitate a really diseased action in parts which so powerfully interest the resources of the system at large, as the white tissues of the body in a state of acute inflammation. I fear that those who accustom themselves, too often upon insufficient grounds, to say that there is no real disease in the part under such circumstances, greatly err. Hysteria, in the plain acceptation of that term, is to my mind a rife cause of inflammation; and no texture in the entire frame offers a plainer illustration of the fact than the large joints.

It may be said that there is here action and reaction; that in hysteric inflammations the part was primarily in fault, and provoked or induced the trouble in the system. Not unfrequently it may be so; but I would ask all persons of experience whether the converse also be not true, and whether the first symptom of an outbreak has not been often on the side of the system. Not to dwell upon slight complaints, such as are remedied at once by free purging, change of scene, occupation, and the like, — whenever there is local fulness or acute pain, it is certainly not safe wholly to neglect the part, or meet the emergency by a mere unmeaning "placebo" in the shape of outward application. In many cases there is a real local cause of suffering; and topical remedies must

go hand in hand with constitutional treatment to insure relief. Active depletion may be hurtful, and it tends sometimes to confirm or precipitate a true inflammation. It is rather the first stage of inflammatory action, viz. congestion and irregular distribution, than the completed act, with which we have to do on these occasions; and this view is borne out by the good effect of mild counter-irritation, as small flying blisters, cold or tepid douche-bathing of the part, and subsequently pressure, by means of a well-adjusted roller, so employed as to consist at least with a passive motion of the limb. Leeching, issues, cupping, all excessive counter-irritation, are measures of a doubtful character, and not unfrequently tend to exasperate a simple congestion into an act of destructive inflammation. Some of the worst cases of hysteric knee and hip disorders have been so produced. Careful purging and well-regulated habits of diet and occupation, together with pure air, include all the important points of constitutional management at the outset. A too early and liberal indulgence in steel medicines is to be guarded against; but if the malady will not yield upon these terms, there comes a time when steel may be regarded as specific, and as taking the precedence of any and every other form of vegetable or mineral tonic. Where there is restlessness or evidence of cerebral excitement, henbane is preferable to opiates of any kind; and five-grain doses of the extract once or

twice in the twenty-four hours often impart great ease and comfort, without risk of relapse from confined secretions. I formerly saw a lady who married unfortunately, and as one consequence became irregular and highly hysterical. After the lapse of some months she began to complain of pain and fulness in the knee-joint; but the mind of the surgeon was so riveted upon the constitutional disturbance, that he at first wholly disregarded the complaint, and only began truly to appreciate the disease when continued nocturnal pain, loss of figure and motion in the part, and a rapid declension of power, flesh, and appetite, no longer permitted him to overlook the local changes which should have been more promptly dealt with. A genuine white swelling and partial anchylosis were already established ere any serious measure of relief was adopted. In a second case, at present under observation, where the hip has undergone displacement in the course of the disorder, it was affirmed repeatedly, on high authority, that it was an instance of genuine hysteria, and that there was nothing whatever the matter with the hip. The intention of these observations is not to reflect improperly upon the performances of others, but to urge upon my contemporaries the importance of not neglecting the earliest complaints of pain in a joint, when as yet disease can hardly be said to have commenced. Gout and hysteria are formidable adversaries at all times, and never more

dangerous than when assuming to hide the work of a local disorganization. When too late it is sometimes discovered that the complaint was after all a reality, and may no longer be controlled by the appliances of an art, which, under the circumstances, always counsels "prevention" rather than any more summary measure of relief.

The results of excision of the ends of carious bones composing the larger joints, as stated on the authority of several eminent surgeons, where ulceration has already destroyed the substance and displaced the surfaces, as in the instance of the hip especially, seem in the present day to have tempted some to try their hands in cases which might have done better had they been left to nature. It should never be forgotten that this operation is only justifiable when there is such an extent of sinus, so large a discharge, and the parts to be removed are so bare and accessible, that the proceeding amounts to no more than the removal of dead or decaying substance, which keeps up a wasting secretion, and is operating rapidly to lower the remaining powers of life. In this sense it is a fair proposition; and the operation to this extent has met with its safest advocates, and some success. The extent to which a patient, should he survive, will recover the control of a limb for any useful purpose of support or progression, or in the upper extremity prehension, must always be matter of doubt and speculation. The positive advantage

gained, and the slight amount of deformity following in some instances after the removal of so much as three or four inches of the upper end of the femur, is really wonderful, and affords a fresh illustration of the great resources of the system when the burthen has been removed or lightened in time; but experience does not prove that this remote consequence is so certain as to constitute a sufficient reason for the frequent performance of such operations. They are to be recommended upon the same grounds, and for the same purpose, as those devised for the relief of other parts oppressed by confined matter, or irritated by necrosed bone, and the lodgment of foreign bodies. The object present to the surgeon's mind in cases requiring this operation should be rather one of present relief than prospective advantage. Like meddlesome midwifery, all surgery which anticipates or interferes with the natural course of restorative processes is bad and very hazardous. Excision of diseased joints, when offered as a palliative within certain limits, is a wise and useful suggestion; but if propounded as a rule for our ordinary guidance and adoption, I hold the suggestion to be fraught with risk and extreme uncertainty.

Mr. Key, who deservedly attained great eminence in his profession, broached a theory concerning the mode in which the absorption of the diseased cartilage is carried on by means of a contiguous tissue, in itself a morbid product, which does not

appear to me to be borne out either by analogy or the facts observable in the progress of ulcerations of this texture in joints. He supposed that the fringe-like processes, apparently remnants of the broken and disorganized synovial membrane, actually operated to institute and promote by a direct interference the breach in the diseased cartilage with which they are seen to be in juxta-position. A preliminary objection to this idea may be taken, on the ground that neither in health or disease can it be shown that the vessels of a distinct, albeit contiguous, texture ever can act the part of active absorbents, in virtue of mere contact. These productions may increase the irritation, and so quicken the action of the disease upon surfaces having the close relation of direct apposition to such tissue; but that their vessels are actually themselves engaged in the work of destruction is not consonant with the laws which govern the ulcerative inflammation either here or elsewhere. The idea is certainly not Hunterian which is suggestive of any other than the vessels of the part itself carrying on the process of absorption. The ulceration commences and goes forward often at isolated points or centres where no such supplementary tissue can by possibility exist; and in its progress it not unfrequently removes entirely these very productions upon which the action must depend for its further progress, if Mr. K.'s notion be correct. Furthermore, their own endowment or organization is so incomplete

as to preclude the notion of their effecting that for contiguous surfaces which they cannot originate for themselves. These fringe-like processes are in themselves only diseased and imperfect remnants of spoiled tissue; and were they possessed of the powers which this theory assumes for them, they ought, in obedience to general laws, to commence their operations by procuring their own removal.

Sir Benjamin Brodie has handled this matter with his usual ability, and fairly displayed the real merits of the question. To his observations the reader is referred for further information and satisfaction concerning a point of so much importance, seeing that, were the proposition tenable, it strikes at the root of what has hitherto been received as matter of fact concerning the causes of ulcerative absorption in the animal body. The articular cartilages are supposed to depend for their vitality upon the vessels of the osseous tissue; and this appears to me to be perfectly consistent with the proposition that they do not inflame until disease has done its work upon the synovial membranes, and so exposed them to destruction, in virtue of their being next in the order of parts obnoxious to the diseased action.

The two following cases, which occurred about the same time, are recorded as examples of the advantage to be derived from the continued operation of mercury in the early stage of joint-diseases.

## Case I.

March 8. 1835.— Andrew Little, ætat. 16, a shoemaker's apprentice, spare and pallid, with hazel eyes and thick black hair, first complained of illness twelve months ago. Shortly afterwards the left hip became uneasy. Locomotion immediately provoked pain in the joint, which otherwise observed a period of remission, but was always aggravated at night. For some weeks past increase of pain has caused him to remain almost constantly in a sedentary posture. He had not asked any one's advice or opinion before coming to the hospital, and always regarded the complaint as being due to a bad strain in swimming, which he thought he should get the better of in the course of time. On examination, there was found to be a fulness or thickening of the integument in the left groin. The glutæal muscles had lost their tone, and the buttock was much flattened; but there was little or no real elongation of the limb when compared with the other in the supine position. The pain was referred to the knee, groin, and trochanter. Skin was dry, pulse accelerated. Twelve ounces of blood were drawn by cupping from the back and outer sides of the articulation with marked benefit; and as the pain was now very severe, especially at night, Mr. Travers prescribed as follows:— Calomel, gr. j.; opii, gr. j.; pil. omni nocte sumend. A seton also was ordered for imme-

diate insertion in the sciatic fossa. On the 19th of March the seton was removed, having produced no good effect, and being much complained of by the patient. Next day a small blister was placed upon the front of the joint. 23. — To-day's report speaks of decided improvement as to the non-recurrence of pain when his limb is handled cautiously. 31. — Patient sleeps well, is free from pain: there is now an apparent shortening of the affected limb. A second blister to be applied behind the trochanter major. April 20. — The patient can maintain the erect posture without difficulty. He was ordered to omit the pill at night, which he has taken incessantly since 4th March, without any sign of salivation or other symptom of distress. April 30. — This lad has had six blisters applied in all, since his admission, at different points round the hip-joint. He can now stand and walk about the ward without pain; but the recumbent posture is still enjoined as a general rule. June 11. — He left the hospital, being able to walk without difficulty. The left limb seems to be a little shorter than its neighbour, which makes him limp slightly; but this is due rather to the pelvis than to the hip-joint, which, as often happens, has acquired a slight list or tilt, owing to the uncertain action of muscles and their loss of tone during a long interval of rest.

The points worthy of notice in this case (the lad being decidedly strumous) are the good effect

of full topical bleeding, the impunity with which the calomel was taken every night for upwards of six weeks, and the marked influence of the blisters as compared with the operation of the seton, which only made matters worse, because the patient was physically unable to bear it. The opiate also exerted a most benign and beneficial effect upon the pain and general disturbance consequent thereupon.

### Case II.

Charles Grindley, a pot-boy, ætat. 16, admitted also March 3rd, 1835, on attempting to rise in the morning, ten days ago, was attacked with so sudden and severe a pain in the right hip-joint as to render him incapable of standing upright or even turning in his bed without crying out. When brought to the hospital, his symptoms had undergone no material alleviation. His face was flushed, tongue coated, pulse quick and contracted. There was some fulness of the inguinal region on the side affected. Pain confined to the part strictly. Mr. Travers, under whom the boy was admitted, prescribed as follows. Twelve leeches, to be followed by a blister upon the groin immediately; also calomel gr. ij., antimonial powder gr. ij., opium gr. $\frac{1}{2}$, in a pill every night. The pain being but slightly relieved, on the third day fifteen more leeches were applied in the same vicinity, and an effervescing mixture was given

at intervals; the parts to be further sedulously fomented. On 13th March, twelve leeches were again applied, whereupon for the first time the pain began to abate. The lad remained in the hospital, and for the most part in bed, until June 24th, when he was reported convalescent — that is, he was able to walk about without pain. The fulness in the groin had wholly subsided, but the buttock on the affected side was somewhat flattened.

This case at the time impressed me as being another marked instance of the power of mercury and mild counter-irritation to overcome the specific quality of the local disease in its first stage; for the boy took the calomel pill every night until his gums were sore, and in addition to the leeches he was repeatedly blistered for pain which began in the joint without the slightest cause or accident other than what might belong to faulty secretions and a want of constitutional power.

## Case III.

### *Puncture of a Suppurating Knee-joint.*

The late learned and justly celebrated Dr. P.,* of Bristol, was taken ill after exposure to cold on the 5th of December, 1848, and was bled on

* For the early particulars of this gentleman's illness I am indebted to his son, Dr. Augustin Prichard.

the following day for acute pain in the side. On the 9th the knee became inflamed and extremely painful. The pulse was rapid, and perhaps rendered more so by the use of opiates. On the 11th the knee was distended by a large effusion of fluid. He was brought to London on the 17th, and was presently afterwards seen in consultation by Sir B. Brodie, Drs. Latham and Tweedie, and Messrs. Lawrence, Travers, and Estlin, of Bristol. On the evening of the 19th, under the direction and by the advice of Sir Benjamin Brodie, I made a deep perpendicular puncture into the distended cavity, by the side of the patella, where the tumour was prominent, and fluctuation very manifest. This was followed by a considerable discharge of thin pus. The operation did not produce more than a temporary local relief, but it was not attended by any ill consequence, nor did it appear in the slightest degree to quicken, if it did not retard the progress of the other symptoms of the disorder. Dr. P. died on the 22nd instant; and after death I examined the knee-joint, and the femoral sheath on the same side throughout its extent. The matter was confined strictly to the limits of the articular cavity. The cartilage was every where sound but reddened in spots. The synovial membrane in its loose portions was soft and vascular, having a villous appearance. The femoral vessels were healthy. This gentleman died of an acute

pericarditis. The sac of the pericardium contained more than a pint of fluid closely resembling that of an "empyema thoracis," the serous membrane being uniformly coated with a thick layer of furry lymph.

This idea of making an opening into the distended and inflamed joint was new to me, but I should not in future hesitate to counsel the like proceeding where there existed the remotest probability of either the part or the system being relieved thereby. Sir Benjamin stated that this was not the first occasion upon which he had made a similar suggestion, and he did not appear to regard the practice as hazardous, but rather as being strictly justifiable and correct, when the symptoms are urgent and the system is unable to cope with a fresh or superadded irritation.

## Case IV.

On the 31st March, 1838, I opened the body of one Mrs. Oakley, in company with Mr. Wilkinson, surgeon, of Great Marlow, at that time a student and dresser at St. Thomas's Hospital. Her disease was a psoas abscess on the right side, not distended but communicating with a fibrous pouch filled with scrofulous matter and the gritty debris of the broken cancellous tissue. This sac or cyst occupied the place of the fourth lumbar vertebra, which had wholly disappeared. The

ligaments and interosseal substance were comparatively uninjured, and preserved their usual aspect. The bodies of the third and fifth lumbar vertebræ were both affected, being softened so as to yield on pressure, when a viscid curdy secretion oozed through the interstices of the common anterior ligament. This woman died five days after her delivery of a dead child, in the sixth month of gestation. It was her third pregnancy, and the disease was of two years' standing.

The very fixed position of the right hip in this case (for she lay constantly on her left side with the right thigh flexed abruptly so as to be in contact with the parietes of the abdomen) induced some gentlemen to imagine that the disease was confined to the articulation, which proved on examination to be perfectly sound. This is not an uncommon error, and it was the more likely to be committed on this occasion, because there existed a fistulous orifice below and behind the trochanter major, belonging to a blind and half-obliterated sinus, which at no distant time had unquestionably communicated with the abscess above, but it had now virtually closed, and the secretion of pus may be supposed to have become very scanty if not altogether suspended by the state of pregnancy.

On the other hand, matter occupying the belly of the psoas muscle in quantity does not always operate to prevent locomotion, unless it be of very

long standing. I once saw a man admitted into St. Thomas's Hospital, with matter pointing both in the lumbar region and anterior part of the left thigh, who stated that within a week of his arrival in the Borough he had walked a distance of four miles during the day.

In certain recoverable cases of hysterical illness where pain is referred to the hip or knee, it is well to examine the spine cautiously and repeatedly. A young lady will lie upon a couch for months until her joints become stiff and she grows awry, because the slightest exertion induces acute pain referred to the region of the hip-joint. Now an extended examination will perhaps demonstrate that the same is true of the joints of the lumbar spine. Under such circumstances it is right to insist upon a certain amount of exercise of all the limbs daily, observing intervals of recumbency, but in no wise yielding to a desire on the part of the patient to remain constantly at rest; a system of indulgence which can only terminate in early decrepitude and irremediable deformity.

THE END.

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