

Illustrations of some of the injuries to which the lower limbs are exposed / by Charles Brandon Trye.

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ILLUSTRATIONS

OF

SOME OF THE INJURIES

TO WHICH

THE LOWER LIMBS ARE EXPOSED.

By CHARLES BRANDON TRYE,

MEMBER OF THE LATE CORPORATION OF SURGEONS IN LONDON,
OF THE ROYAL MEDICAL SOCIETY IN EDINBURGH, OF THE MEDICAL SOCIETY
IN LONDON, AND SURGEON TO THE GLOUCESTER INFIRMARY.

LONDON:

PRINTED FOR THE AUTHOR,

AND SOLD BY MURRAY AND HIGHLEY, FLEET-STREET, LONDON;
AND BY J. WASHBOURN, AND J. J. HOUGH, GLOUCESTER.

1802.

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Printed by A. Strahan,
New Street Square.

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TO

*The President, Vice Presidents, and Governors of the
Gloucester Infirmary.*

MY LORDS, AND GENTLEMEN,

TO you I inscribe the following Work, because much of the knowledge, which it professes to communicate, has been derived from that Institution, which, for nearly twenty years, you have in part confided to my charge; an Institution, which yields to none in the liberality with which it is supported, in its kindness to the objects of its care, and in the good management which prevails in all its departments.

Half a century has witnessed the public approbation of the liberal system adopted by its judicious and munificent Founders; and when the ordinary contributions have fallen short of its purposes, extraordinary aid has been freely and generously given. Indeed, while the Infirmary retains its eminently good habits, can it ask in vain for assistance proportioned to its necessities, addressing itself, as it may do with truth and

justice, as forcibly to the interests of all who have a stake in the property and prosperity of this district, as to the feelings of those who compassionate the complicated affliction of poverty, pain, and sickness?

Never, then, may the sphere of its beneficial influence, hitherto powerfully diffused throughout this county and its surrounding borders, be contracted; but may it for ever be *seen* and *felt* an extensive public good, and consequently flourish an object of public favour!—And may instruments to give effect to the bounty of its Donors never be wanting, superior in abilities, and equal in zeal to

Gentlemen,

Your most devoted humble Servant,

CHARLES BRANDON TRYE.

ILLUSTRATIONS,

Éc. Éc.

THE Thigh Bone is rarely dislocated; for which reason the generality of practitioners must derive, what they know of this accident, from verbal descriptions alone, which, even if correct, will not always communicate clear ideas of the cases they undertake to explain; so that many individuals in the profession of surgery must be supposed to understand and distinguish such cases imperfectly, and of course be ill prepared to undertake their management.

I could speak of fractures of the neck of the thigh bone, which had been taken for, and treated as dislocations; and I could speak of real dislocations, whose nature had been overlooked, and whose reduction had never been thought of, till they had become inveterate, and incurable.

But to animadvert on those, whose practice I have seen, or whose writings I have read, is not my object. Nor is it to go over the beaten ground of giving *general* descriptions of these injuries of the hip, and *general* directions in respect of their treatment. It is in *another*, and more *particular* way that I proceed, while I submit this paper to the public.—For, as I have had opportunities of dissecting these cases recently after the receiving of the injury, which opportunities few, if any, are recorded to have had before me; and as I have taken opportunities, which none before me are recorded to have taken, of accurately delineating the preternatural appearances of such cases, I hope it is in my power to add something to

the general flock of real information, and therefore, that I am justified in my present attempt.

Neither simple fractures, nor dislocations of the hip joint, are mortal accidents; they must, in order to destroy life, be combined with additional mischiefs. Such combinations having fallen in my way, the following publication will shew how far my industry availed itself of my situation. I will hope indeed, that I have not thrown away my time and labour, but that what I have done may conduce to the prevention of errors, which never fail to bring upon the patients torment, and perpetual lameness; and upon the surgeons reproach if not remorse.

To my observations and tables respecting these injuries of the *hip*, I have subjoined a few remarks on certain derangements of the knee and the instep: they have the merit of correctness, and, I may suppose, of being new to some of the profession.—They also contain a case which is without a parallel in any chirurgical history, which I have read, and remembered.

A FEW years ago a man dislocated his hip joint, and at the same time he received a concussion of his brain, and grievous contusions of the chest and belly; the other injuries prohibited all attempts to reduce the dislocation, and he died on the 22d day after his accident. This subject furnished the first four tables.

The fifth, sixth, and seventh plates are representations of appearances in an elderly woman, who died of a dysentery a few weeks after breaking the neck of the thigh bone.—These form a contrast with, and illustrate the preceding ones.

Dislocation of the Thigh Bone.

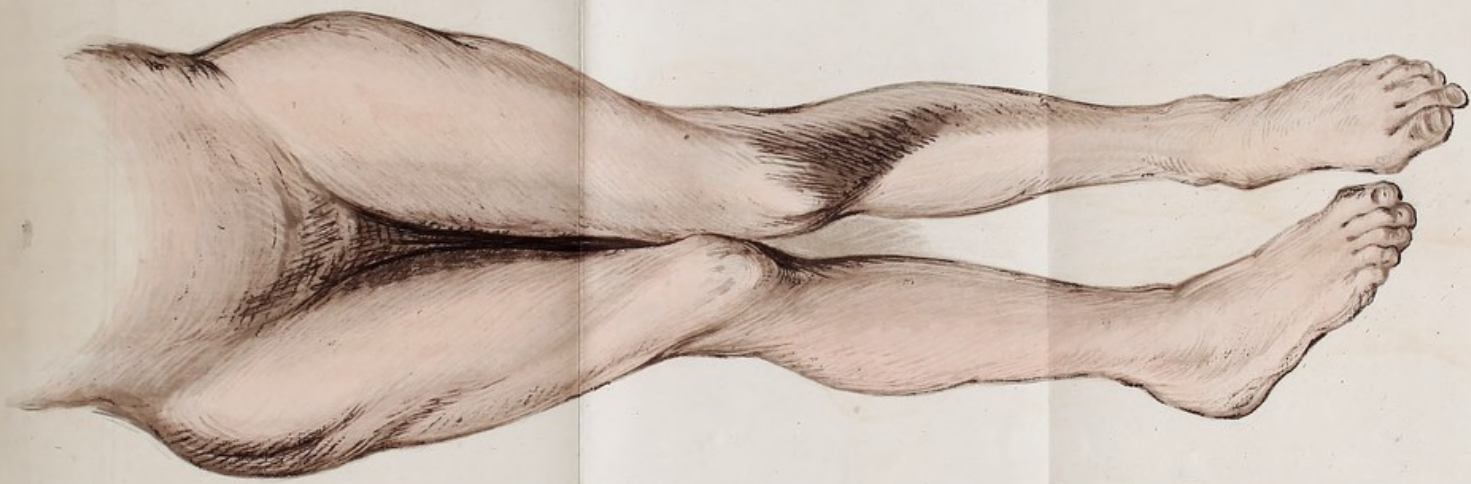
PLATE I.

This Plate represents the subject lying *supine*.

The dislocation was upwards and outwards.

The limb is shorter than its fellow, the knee is a little inflected, though less so than when the patient was living. The top of the right hip much higher than the same part of the left; and the outline of the hip and thigh is much more convex, than the outline on the opposite side.

The knee and the toes are turned inward; and the outer ankle, and at least three quarters of the outside of the thigh and leg, are in view.



Tab. 2. Mus. corp. h. C. D. 179.

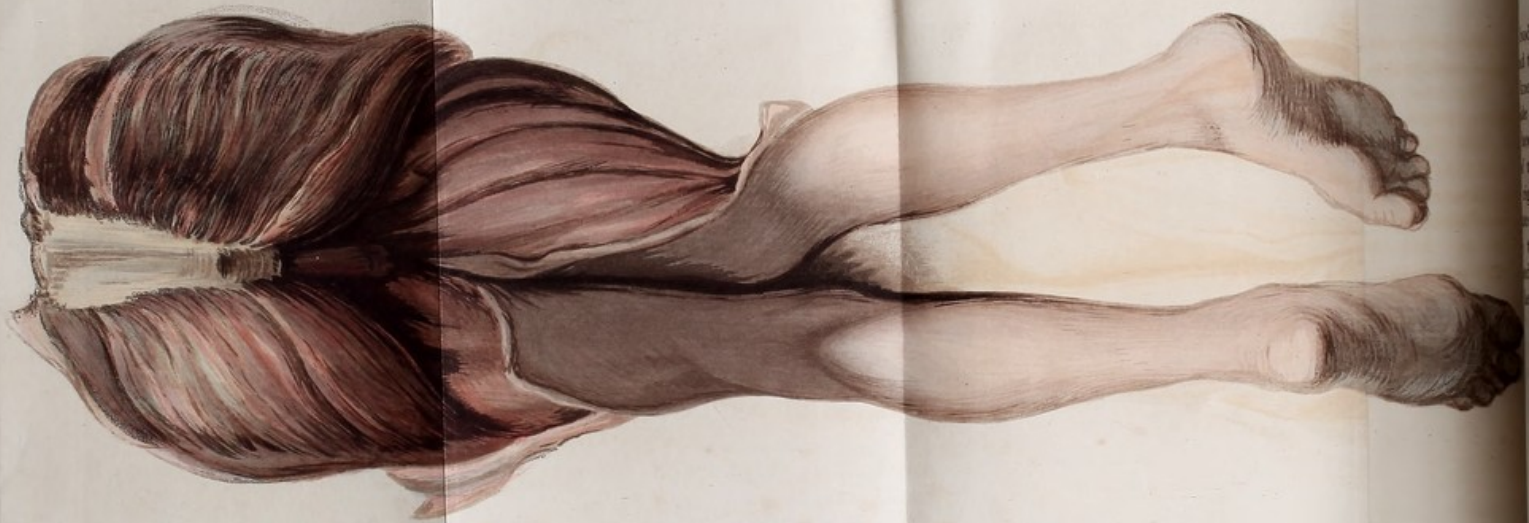


PLATE II.

The body *prone*, and the integuments removed from the *pelvis* and thighs.

The knee turned inwards, and the greatest part of the inner side of the thigh and leg and the foot are seen.

The heel of the right foot nearly on a level with the ankle of the left leg. The knee inflected.

The right *glutæi* muscles have their *fasciculi* remarkably corrugated, and the direction of those *fasciculi* is much less oblique than in the opposite limb. The *flexor* muscles are shortened and very much bowed out.

The head of the bone lay under the *glutæus major*.

PLATE III.

Represents the subject, lying with the right side elevated, so as to permit the artist to delineate, in the strongest manner, the most interesting parts of the injured limb.

The *glutæus major*, under which (as was mentioned in the last page) the head of the bone lay, is raised, and turned backwards.

The head of the bone is discovered with its new attachment; consisting of a fresh formed ligamentous substance, united to the remains of the *ligamentum teres*.

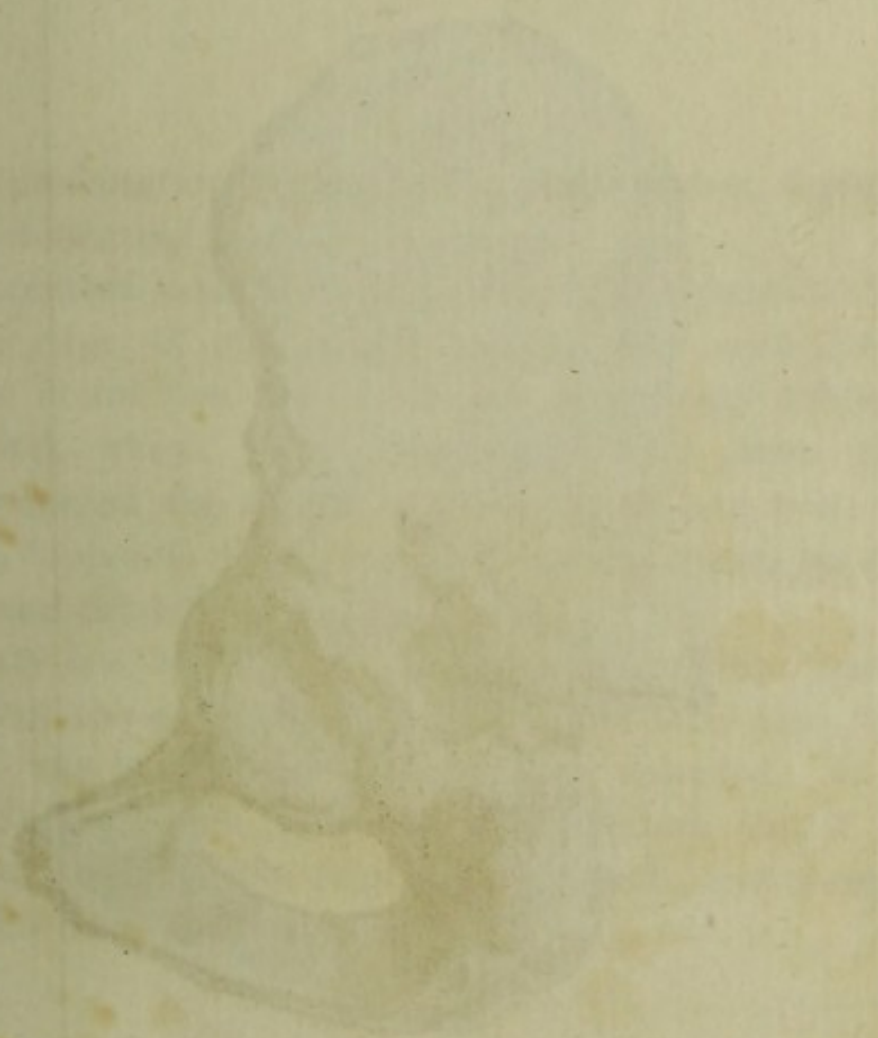
This attaching ligament is rendered more conspicuous by a bougé being placed under it.

The puckered state of the *rotator* muscles, which arise from the *pelvis*, is also perceptible; and the alteration in the figure of the *biceps* and of the *flexors*, whose tendons go to the *tibia*, is very well seen.



And. May. 1. 1841. by C. D. Peck.







Tab^l May 2. 1796. by C. B. Trvc.

PLATE IV.

Is a representation of the left *os innominatum*, separated from its fellow, and from the *os sacrum*.

The lacerated condition of the capsular ligament arising from the edge of the *acetabulum* is very well shewn: across the *acetabulum* a new formed firm fleshy substance is extended, which, it is probable, would have effectually prevented the return of the head of the bone into its socket, supposing the patient had recovered from his other injuries, and submitted to the *taxis*.

A liberty has been taken with the third Plate, namely to represent the *acetabulum*, as it appeared after this fleshy substance was taken away and the bone denuded. In the original drawing that substance was depicted, but it rendered other parts of the subject less distinct; and therefore I made this alteration.

PLATE V.

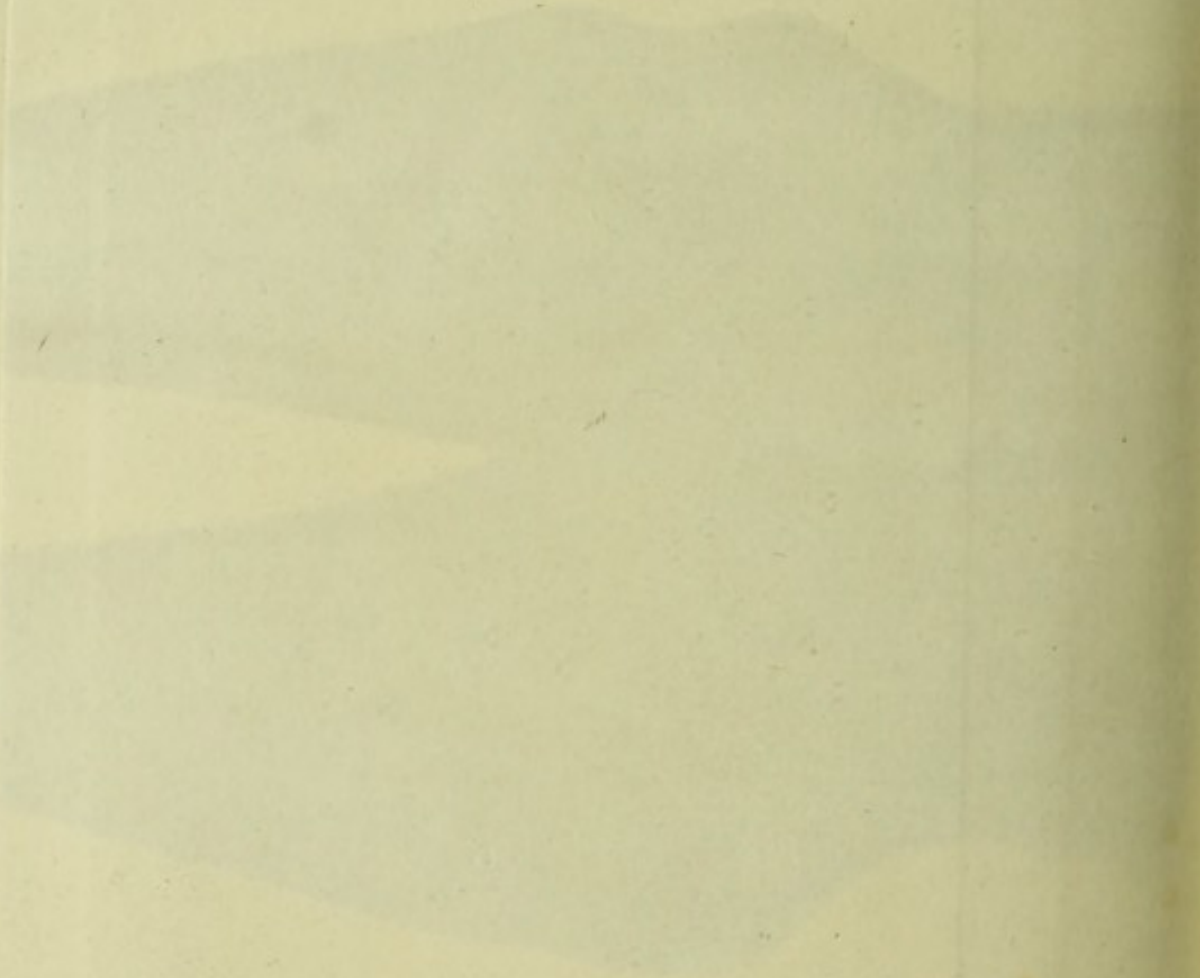
Represents a subject who had sustained a *fracture* of the *neck* of the thigh bone. She died of a *visceral* affection about six weeks after the injury.

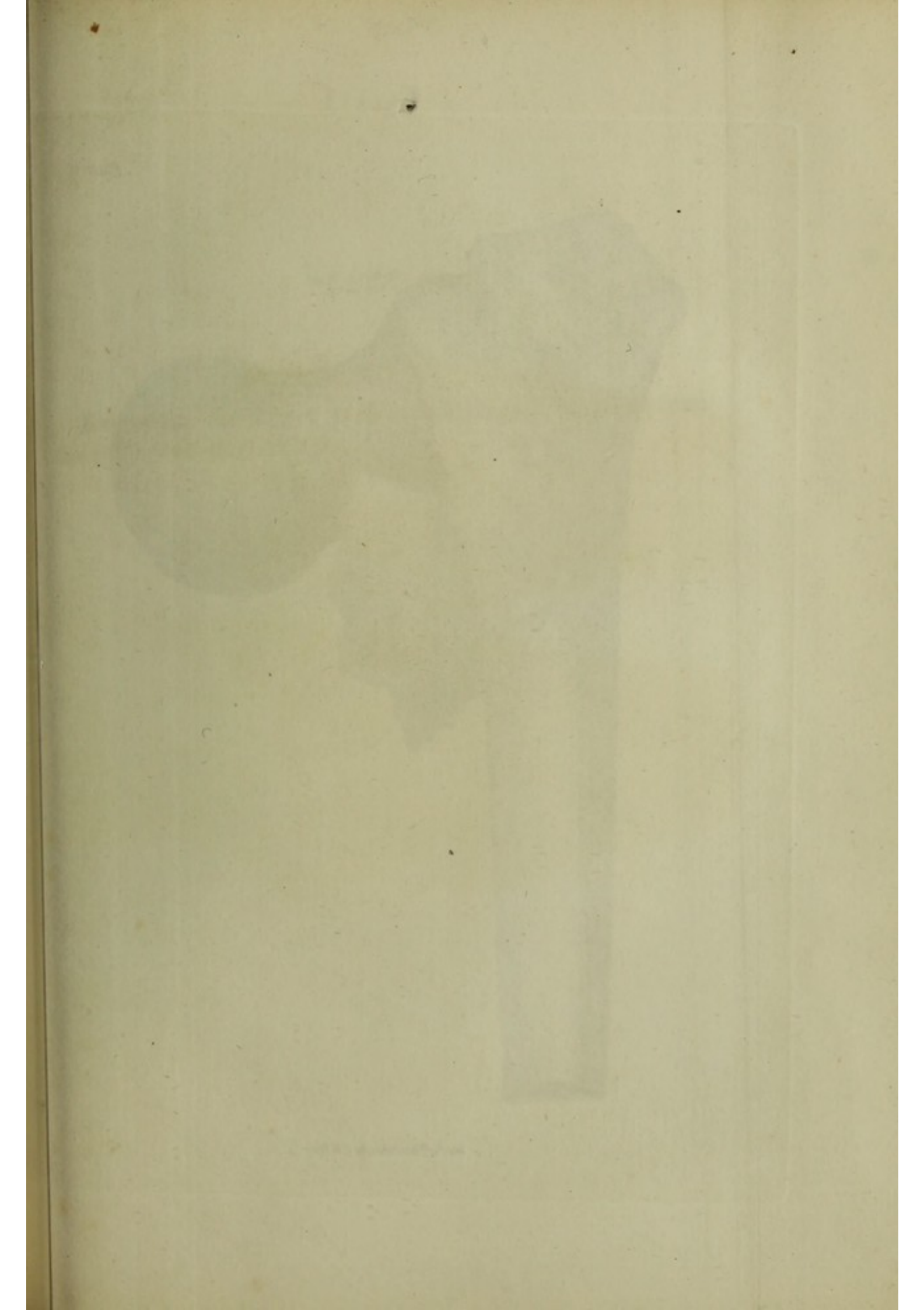
A front view only was thought necessary to be given. The subject lying supine on a platform.

The toes are turned outwards; the thigh resting on its outer *condyle*; and the leg and foot on the *malleolus externus* and outside of the foot.

Near the right flank is shewn a considerable swelling—the *apex* of which was in a line with the tubercle of the *os pubis*. The toe lying considerably nearer the lower end of the platform than the heel, and the outer side of the foot projecting farther forwards than the inside, so as to shew a great part of the sole of the foot; the heel reaching no lower than the insertion of the *tendo achilles* of the opposite limb. The right *inguen* much more concave than the left.







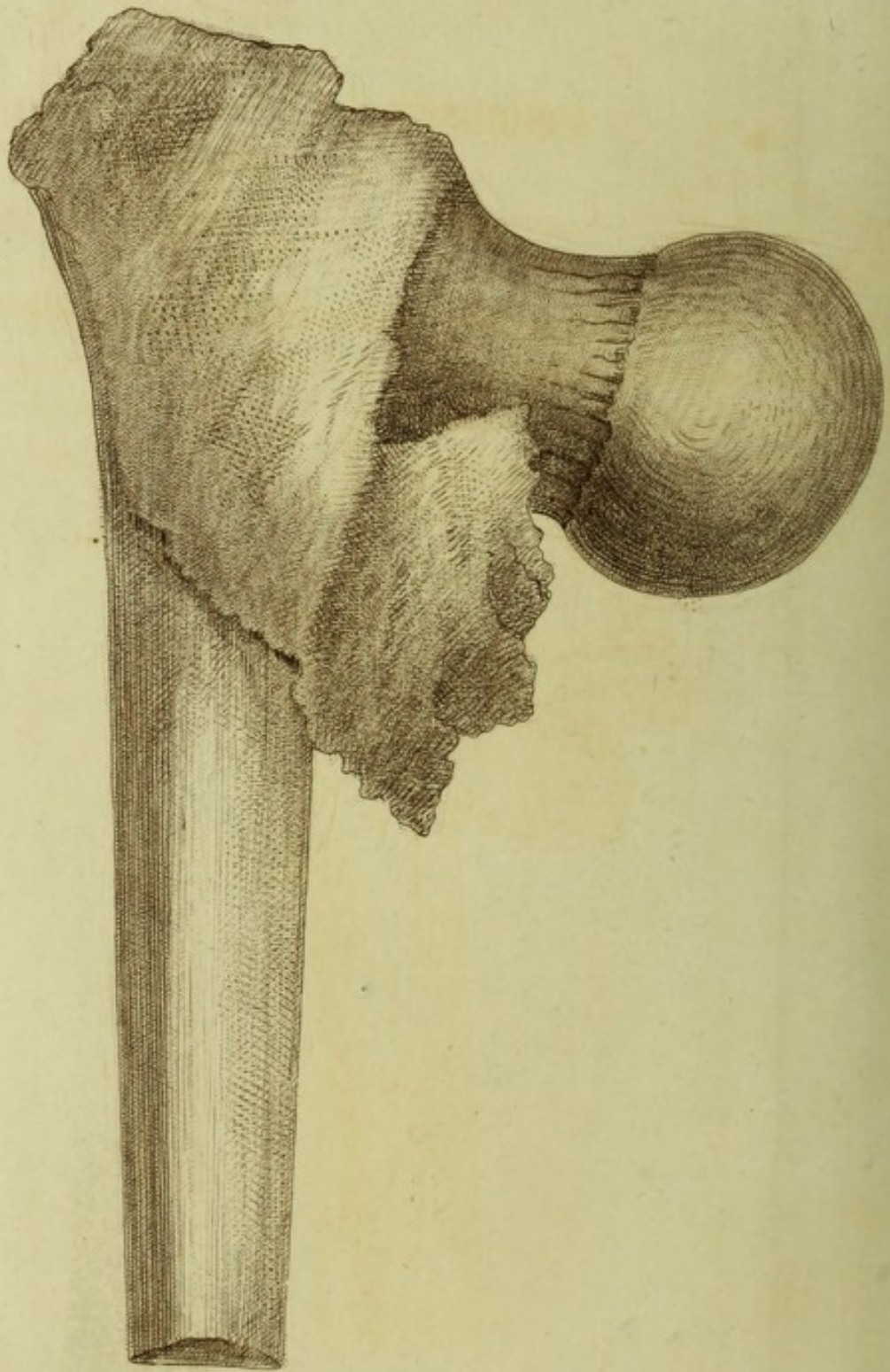
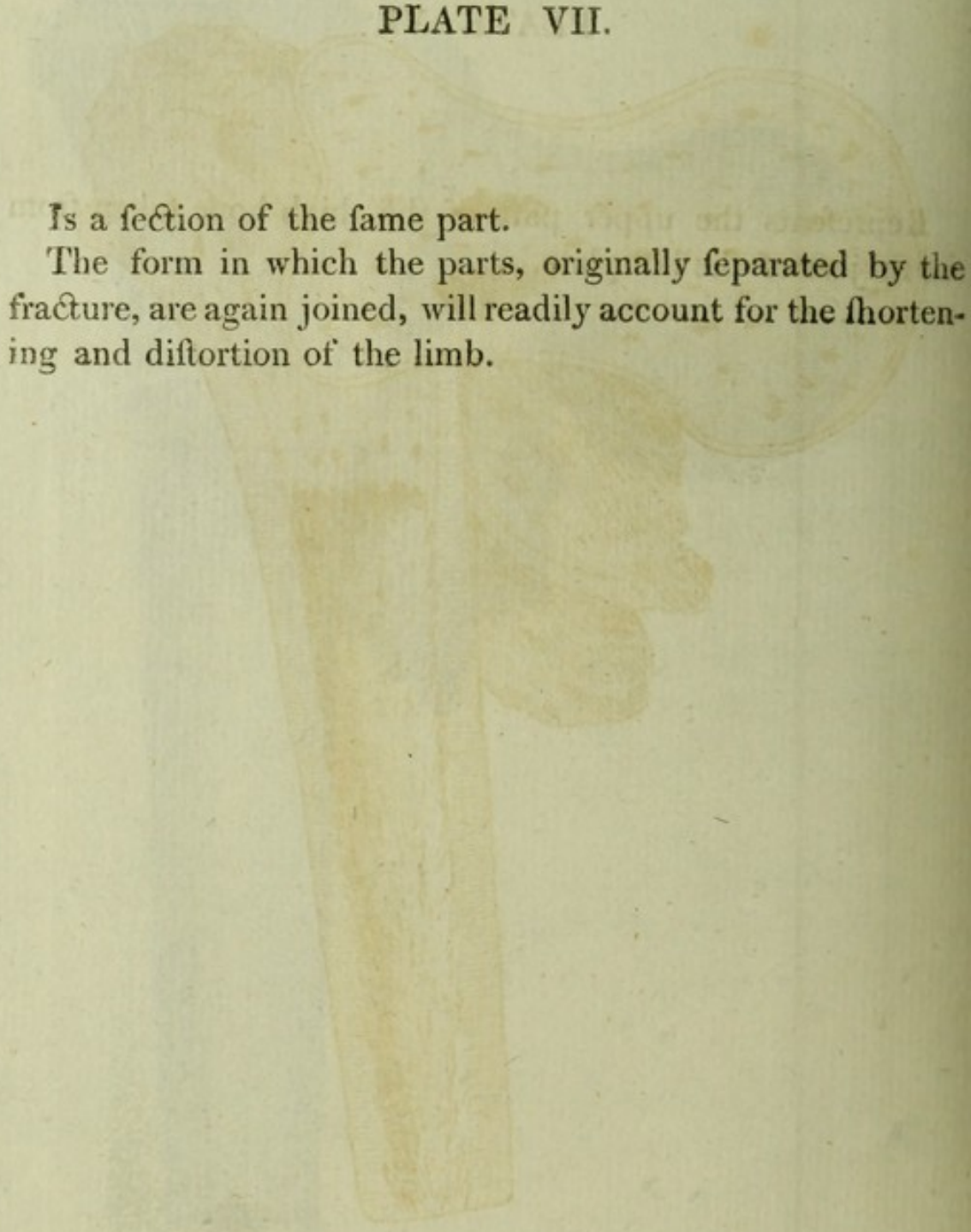


PLATE VI.

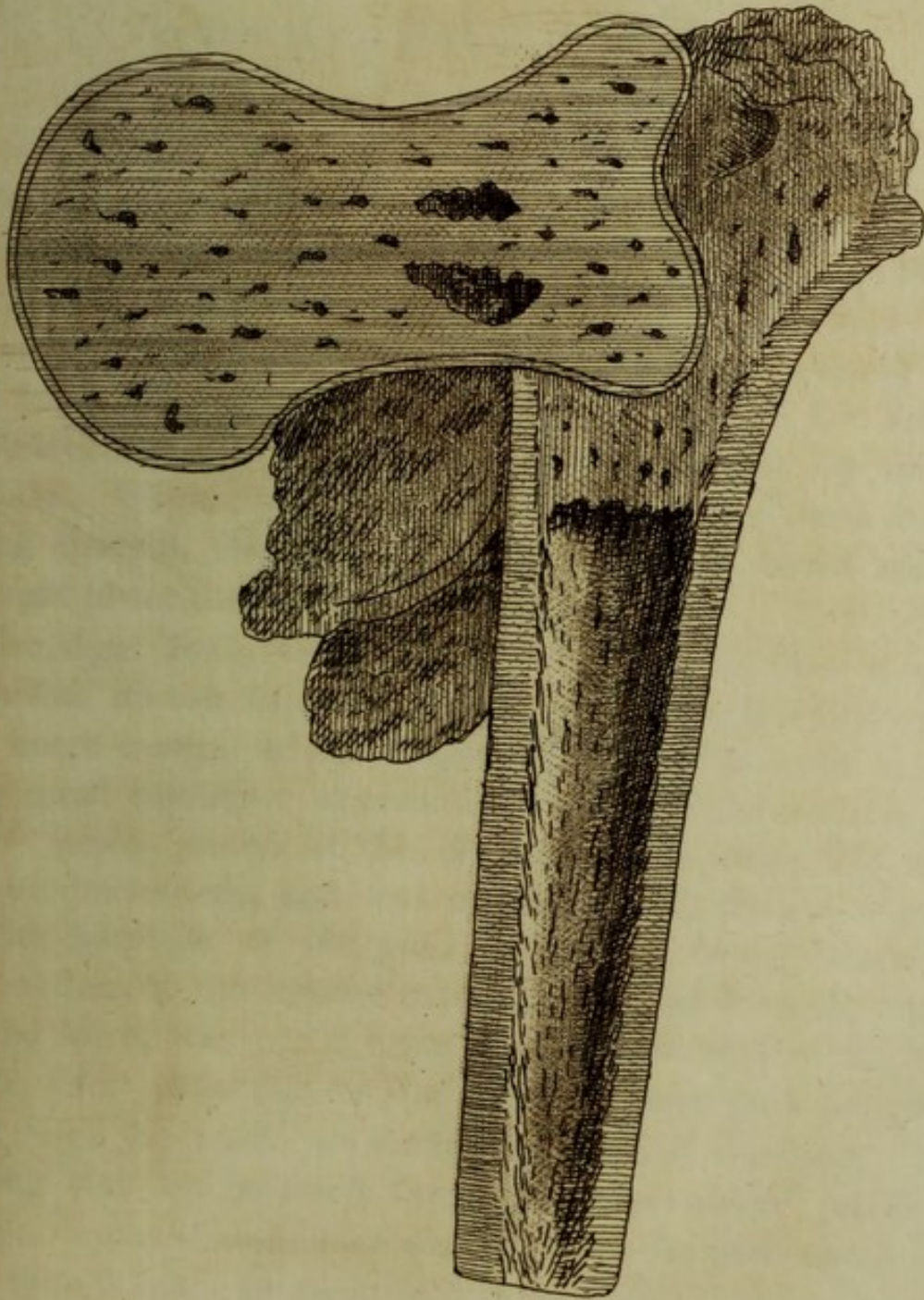
Represents the upper part of the thigh bone taken from
the subject of the last plate.

PLATE VII.

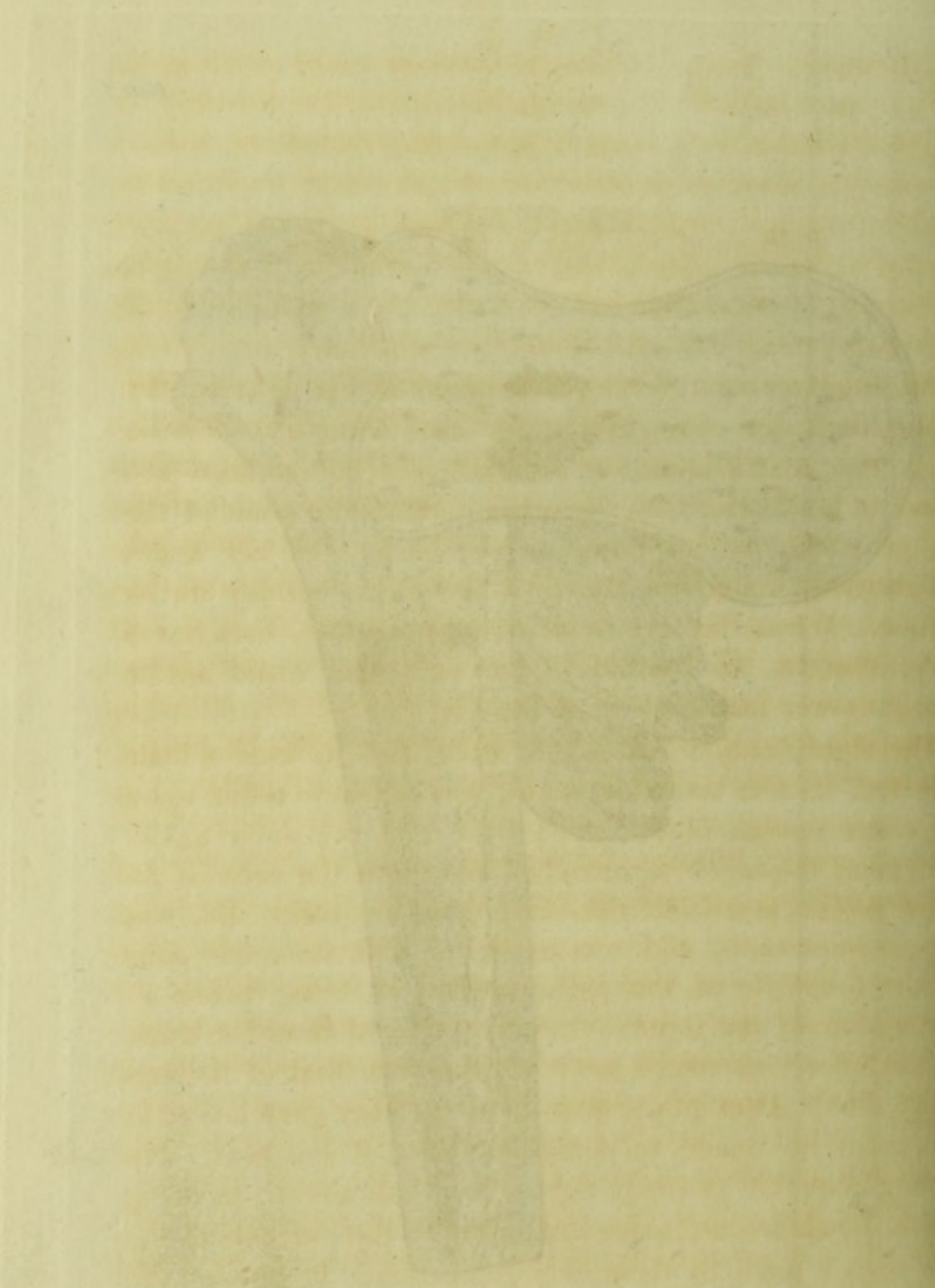


Is a section of the same part.
The form in which the parts, originally separated by the fracture, are again joined, will readily account for the shortening and distortion of the limb.

Plate 7.



Pub.^d 27th Nov. 1801, by C.B. Tye.



Fraçture of the Neck of the Thigh Bone.

An elderly woman received an injury of her right hip, by falling from her chair to the ground. In an examination made two weeks after the accident, the injured limb was found to be shorter than the other. When the point of the left heel (the patient lying on her back, with her knees straightened,) rested on the bed, the right foot lay on its outside. When the feet were brought together, both knees being straight, the bottom of the right heel could not be brought lower than the top of the left.

The right limb, when left to itself, had its knee a little inflected, its toes turned outward, and of course rested upon the outer *condyle* of the thigh bone and the outer ankle. The great *trochanter* approached nearer to the *anterior superior spinous process* of the *ilium* than the other did, was thrown backwards, and was on a line with the upper edge of the *symphysis* of the *pubis*, instead of being below it. The outline of the injured extremity, traced from the trunk to the knee, was much more convex than that of the opposite side. Attempts to straighten the knee gave her great pain; but she made no complaint when it was bent. No grating was felt in freely turning the limb about; in doing which, much less resistance was given by the parts about the hip, than is made by them in a dislocation. Pressure on the groin created great pain.

She died about six weeks after the accident.

The body being laid supine on a plane, a drawing was made of its appearances, as far as could be represented in a front view. A description of them is given with Plate the fifth. It is necessary also to describe, what could not be represented without a back view,—that there was a considerable depression or hollow on the buttock, owing to the derangement of the parts, as well as to the emaciation of the *glutæi* muscles. On taking out the thigh bone the *capsular* ligament was found entire and sound. The fractured parts were united, but not firmly. The neck of the bone was twisted; the great *trochanter* being thrown backwards, and the neck of the bone of course forwards, so that the little *trochanter* lay very near to the head of the bone. The callus was very luxuriant, (see Plate VI.,) and had pushed itself forwards, making the protuberance near the groin, which has been described above, and which is represented in the plate. The *trochanter* had risen above the head of the bone. Several little spines were shot from the callus.

The bone being sawed through longitudinally, the place of union of the fracture could be distinctly traced. This is evident in the seventh Plate.

Opportunities of dissecting this case in a recent state must be unusual; the accident of itself being scarcely ever fatal.

In another woman, who died a month or six weeks after fracturing the neck of the thigh bone, no union of the fractured ends had taken place, but matter had been formed between them—it was not in a large quantity, nor had it been suspected during her life. In both these cases, the fracture was exterior to, and beyond the capsular ligament, which incloses the *acetabulum* and part of the neck of the thigh

thigh bone. It was evidently the same in Mr. Cheselden's case. See Cheselden on the Bones. Table L. Fig. III.

It, doubtless, sometimes happens that the bone is broken within the *capsular* ligament; but I apprehend it will be generally difficult to ascertain the actual existence of such injury when the case is recent; for then the limb will be neither much shortened nor distorted, because the parts will be retained in their proper situation by the ligament, supposing it to be entire, and in this case it probably is never otherwise. However, in process of time, the shortening and distortion will both take place, as the absorption of the fractured ends goes on, and the *capsular* ligament stretches and yields to the action of the muscles of the *pelvis*. I have met with accidents in which it was suspected at the first instant that the neck of the bone had been broken, but the fact could not be ascertained by the most diligent and patient examination; however, in process of time, that is to say, several weeks after the receiving of the hurt, the limb has become shortened, the toes turned outwards, and the *trochanter* raised higher than its natural situation.

Fracture
within the
capsular liga-
ment.

When the hip has sustained a hurt by a fall or blow, it is of great importance both to the surgeon and patient to ascertain its nature as far as it is possible while it is recent. If a dislocation be overlooked, or mistaken for a fracture, the patient will be unnecessarily lamed for life. If, on the contrary, a fracture be mistaken for a dislocation, he will be exposed to useless torture. And lastly, if a fracture be entirely undiscovered, or unnoticed though the oversight will, it is true, be little injurious to the patient, the surgeon will nevertheless be sure to suffer in his reputation; and the future lameness and deformity, though in general not to be prevented by the earliest detection of the

C

nature

nature of the injury, nor by the greatest subsequent care, will be imputed to his negligence and ignorance.

Points to be attended to in an injury of the hip.

There are three points to which our attention should be directed when we are about to examine an injured hip. The *symphysis pubis*, the *anterior superior spinous process* of the *ilium*, and the *great trochanter*. These, when in their natural state, form a triangle, two of whose sides are nearly equal, to wit, the side extending from the anterior superior spinous process of the ilium to the pubis, is nearly equal to that which reaches from the latter to the great trochanter; but the distance from the trochanter to the anterior superior spinous process of the ilium is somewhat shorter. If these points preserve their proper relative bearings, we may in a manner determine that no fracture without the capsular ligament, nor any dislocation, can exist. Sometimes when a blow has been received on the hip, the muscles arising from the pelvis will be so affected by spasm, as to throw a shade of obscurity on the case. The thigh bone will appear to be pulled upwards, and the knee bent rigidly, the toes turned inwards or outwards, according to the particular muscles at that time contracting themselves. But in a little while, either spontaneously, or by the use of proper remedies, as fomentation, cupping, &c. the spasms will cease; and then, if our opinion, formed at first sight, be wavering or erroneous, it may easily be fixed or corrected.

Of the treatment of the fracture.

In our treatment of fractures of the neck of the thigh bone, we can do little beside obviating inflammation, and promoting the ease of the patient by anodyne remedies, and by placing him in the most favourable position.

As to the bone, splints and bandages are scarcely of use; they can neither act upon the fractured ends, nor upon those muscles which are most likely to create irregularity. The *pyriformis*,

riformis, the *psoas*, the *pectineus*, the *glutæi*, and indeed all which arise from the *pelvis*, and have their insertions near the *trochanters*, are beyond our reach; and the transverse position of the neck, (which naturally makes almost a right angle with the head) and its being so very thickly covered with muscle, puts the application of splints out of the question. I will not say what may possibly be done by a mechanical contrivance, which shall keep the whole injured limb in a continual and uniform state of extension; but I doubt if the benefit to be derived from it will be equivalent to the pain and trouble of the experiment. In these cases I have taken great pains myself, and I have seen great pains taken by others; but I cannot recollect an adult patient who did not halt for ever after fracturing the neck of the thigh bone.

I do not write this to encourage practitioners to relax in their attention to those who suffer in this way; but I think it right to state thus far the result of my own observation, as it may hereafter have an influence in protecting some practitioner from unmerited reproach.

A broad flannel bandage rolled about the thigh and the corresponding *os innominatum*, has appeared to conduce to the ease of the patient.

Dislocation of the Thigh Bone.

The thigh bone is liable to be dislocated outwards and upwards, and inwards and downwards. Other modes of dislocation are mentioned by authors, but having seen only these two, I cannot speak of the rest from my own knowledge.

Dislocation
upwards and
outwards.

The dislocation made upwards and outwards does not seem so rare as * Mr. Bell and other writers would induce us to believe. In this case the knee and toes will be turned inwards, the limb will be shortened, the knee more or less inflected, the thigh will appear rounder; there will be a hollowness in the groin, a fulness of the buttock, and there the head of the bone may be plainly felt, higher than, and at a greater or less distance from, the tuberosity of the *ischium*. Continual pain is perceived by the patient in the groin and buttock: He complains violently if we attempt to streighten the knee, and likewise if we much increase its inflection.

Dislocation
inwards and
downwards.

Of the dislocation of the thigh bone made inwards and downwards, I do not apprehend that any description will excel the one which is given by Mr. Travis in the second volume of the London Medical Observations and Inquiries; and I say this in consequence of having carefully compared his account with the facts which have presented themselves to my own eyes and fingers. He observes, that the knee and toe were not so much turned outwards, as from some descriptions of cases he was led to expect. It may be pertinent to remark, that in this

* Mr. Bell says that this mode of dislocation, compared with the other, is not more than once in twenty cases. Bell's System of Surgery, vol. vi. p. 96.

dislocation,

dislocation, in which the head of the bone is thrown into the *foramen ovale*, the toes cannot be turned very much outwards, because the *trochanter*, resting upon the *ramus* of the *ischium* will prevent that degree of distortion. I therefore take, as its principal characteristics, a hard tumour immediately over the foramen ovale, that is, somewhat more forwards than the tuberosity of the *ischium*, and at the bottom of the groin, (which tumour being sometimes visible to the eye, and always perceptible to the touch, is produced by the displaced head) the notable lengthening of the limb; its straddling, and its incapability of being brought close to the other thigh, its hollow-ness, especially near the usual scite of the great *trochanter*, the absence of the *trochanter* from its proper situation; and lastly, an inability in the patient to lay his body straight, and flat upon the back. Mr. Travis writes (Medical Observations and Inquiries, vol. ii. p. 100, 101):

“ Just below the right groin, immediately over the foramen
 “ ovale of the pubis, was a round hard tumour, which I
 “ plainly perceived to be the head of the thigh bone; this,
 “ by its pressure on the crural nerve, occasioned a numbness
 “ downwards. On the outside from the knee upwards, the
 “ bone could not be felt higher than the middle of the thigh;
 “ from thence it sunk in the muscles, and left a hollow-ness,
 “ which increased gradually to the place distinguished in the
 “ sound state by the protuberance of the great *trochanter*.
 “ There the cavity was large enough to have contained a man’s
 “ fist. The limb was evidently two inches longer than the
 “ other, but straddled outwards and forwards, so that it could
 “ neither be brought near the other knee, nor into the direc-
 “ tion of the trunk; it admitted, however, of being raised to-
 “ wards,

“wards his body, but not without increasing his pain. The
 “knee and great toe were turned outwards, but not so much
 “as from some descriptions of such cases I had room to
 expect.” This description corresponded exactly with a case
 of fourteen days standing; except that, in the latter, the
 hollowness on the outside of the thigh was a less pro-
 minent feature; that there was a roundness on the inside
 of the thigh, the outline of which was pretty convex; that
 there was no *visible* round tumour in the groin, but a *palpable*
 great tension, and fulness somewhat more forwards than the
 tuberosity of the ischium, and there the head of the bone was
 certainly, though somewhat difficultly, perceived by the finger.
 After an effort or two had been made without accomplishing
 the reduction, the head of the bone was found to be moved,
 and then the trochanter could be felt, though very much lower
 than its proper situation; by the next extension the re-
 duction was effected.

I do not apprehend that any thing is necessary here to explain
 the mode of reduction. Mr. Travis and Dr. Kirkland ap-
 pear to have said every thing which can require to be added
 to the directions given by systematic writers.

Why are the knee and the toes turned inwards in the first
 kind of dislocation, outwards in the second, and still more out-
 wards in the fracture of the neck?

That we may answer this question, it is necessary to con-
 sider what are the powers by which the knee is turned out-
 wards, what are those which turn it inwards, and also the
 manner in which those powers are affected in the several ac-
 cidents? Mr. Cowper, in his splendid and elaborate work on
 the muscles, does not attribute to any of the muscles of the
 pelvis and thigh the office of turning the knee inwards. Nor
 do

do I recollect any anatomist who has differed from him on this subject. It is not to be questioned that all the muscles which are inserted into or about the great trochanter, and all which arise from the *dorsum* and spine of the *ilium*, or from the *ischium*, must turn the knee outwards. But as turning the knee inwards is a voluntary motion, there must be some muscles provided to effect it. Mr. Cowper observes, that in consequence of the oblique position of the head of the bone, there is a constant tendency in the toes to turn inwards. This observation may be just; but there is moreover a voluntary power which can rotate the limb much further than what would be the consequence of simple quiescence in the muscles turning the limb outwards, and of the mechanical disposition of the bone to turn inwards. This power resides principally in the *psoas*, the *iliacus internus*, and the *pectineus*, and these are occasionally assisted by one of the *adductors*, the *rectus cruris*, and the *gracilis*.

When the head of the bone falls out of its socket, all the muscles inserted in or about the great *trochanter* are in the condition of a pulley rope, which has slipped out of its groove, and therefore they lose their power as rotators. If, in the luxation, the force be so applied as to drive the bone upwards, the tendon of the *psoas* and *iliacus internus* being still in its groove beneath the anterior superior spine of the *ilium*, those muscles having now no antagonist to oppose, will draw the lesser trochanter nearer to the pubis, and of course turn the knee inwards; besides, if the bone be driven upwards, it must be absolutely turned almost round before the knee can be turned outwards. When the neck of the bone is fractured, the operation of all the principal muscles will be to draw the bone upwards and backwards.

Now

Now drawing the bone backwards will have the effect of turning the knee outwards, as will be evident to any one who will consider the operation and insertion of the *pyriformis* and the *gemelli*.

Of necessity then the toes will be turned outwards.—They have been so invariably in every instance which I have seen or heard of, and therefore I cannot but express myself surprized, that in a publication* designed as a classical work, and a depository of chirurgical knowledge, the knee and toes † turning inwards should be given as a peculiarity of the fracture of the neck of the thigh bone, and a diagnostic distinguishing it from the dislocation, when made forwards and downwards.

Reduction.

The taxis or reduction of the dislocated thigh bone is often a difficult operation.—I know of no mode which invariably promises success. Much must be left to the ingenuity of the surgeon, who will vary the posture of the patient, and the application of his own efforts to reduce the bone, as his judgment shall direct him in the instance before him.

One principle, however, I think may be laid down, viz. to fix the pelvis firmly, whenever extension of the limb is to be made.—In a strong muscular man, whose thigh had been dislocated upwards and outwards, after fruitlessly trying other methods the following process succeeded. He was laid prone upon a bed; a sheet was passed between his thighs, and held firmly by two assistants.—I then *knelt upon the pelvis*, in order to keep it steady, and resist it's being raised up

* Bell's Surgery.

† Since this paper was prepared for the press, I have been persuaded that examples of the toes turning inwards in fractures of the neck of the thigh bone, though extremely rare, may occur; but only in cases in which uncommon violence has torn the attachments, or otherwise destroyed the actions, of the muscles inserted into the great trochanter. Such a case may impose itself upon even an experienced surgeon, if hastily judging, for a dislocation.

when the extension should be made.—Three men then pulled at a towel, fastened round the thigh, above the knee, and drew it in such a direction as to carry the thigh upwards, that is, in relation to the trunk, backwards.—I then rested my two hands on the head of the bone, and pushed it downwards and forwards with all my strength; and, after a short exertion of our powers in this manner, I directed a Gentleman who held the leg, to twist the toes suddenly outwards, upon which the head rushed into the acetabulum with a loud noise.

I tried the same, and a variety of other methods in a very muscular middle aged woman unsuccessfully, within six hours after her accident. She took half a drachm of Dover's powder at bed-time the succeeding night, and the next morning used the warm bath, and was well sweated for two hours before the intended time of repeating the taxis.—She was laid upon a bed, on the sound side. I then pressed my left hand against the head of the bone, one of my knees against its body, a little higher than the middle, and with the other hand I drew her knee outwards. The leg was supported by an assistant, the knee bent to a right angle.

Three persons made steady the pelvis, by holding a sheet passed between the thighs, and three others made the extension. In this manner our strength was exerted for some time, and I plainly felt the head of the bone move, but the reduction was not completed. We renewed our attempts in the same manner, except that a Gentleman, who became one of the extenders, placed his foot firmly against the arch of the pubis, (properly defended,) and thereby both increased his power of extension, and at the same time rendered the pelvis more steady and fixed. The force being continued for some time,

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and

and my hands and knee being applied in the manner already described, I directed the assistant, who supported the bent leg, suddenly to carry the internal ankle towards the other leg, and to twist the toes outwards, and then the head slipped into the acetabulum. The day on which the accident took place, there was uncommon rigidity and hardness of the muscles; but after the operation of the sudorific and the bath, the tension and resistance were greatly diminished.

I believe that the suffering parts in the dislocation of the thigh recover themselves much sooner after a reduction has been effected, than the parts about the shoulder do, when that joint has undergone the same violence.

Comparison
of the luxa-
tion of the
thigh with
that of the
humerus.

The thigh, when dislocated, has an advantage over the dislocated humerus, in as much as it is far more difficult to make a fixed point of the scapula, than of the pelvis. In pulling the arm the scapula is always dragged forwards with it, which must be a great mechanical disadvantage to the surgeon, and renders the direction of his force less certain.

Of all the methods which I know of reducing the dislocated humerus, that, which I am going to describe, gives the surgeon the greatest opportunities of applying his powers with mechanical advantage; and I think it will rarely fail, if the dislocated head of the bone be in or near the axilla.

The patient must be seated on the ground, and properly fixed by a sheet surrounding his body, and fastened to some post or other fixture, or firmly held by assistants. The operator then places a flattish ball or pad in the axilla, and over that a towel, which he ties over one of his own shoulders, the length of the towel being so diminished that he must stoop considerably in order that it may include in the loop both the ball in the axilla and the surgeon's
shoulder,

shoulder, but still so as to leave him at liberty freely to use his hands. An extension being made by assistants in such direction as he shall judge most expedient, standing with his face to the patient, let him push with his left hand the processus acromion of the scapula backwards and downwards, and with his right hand pull the humerus forwards and upwards, and by erecting his body he will be able to apply the entire sum of his muscular strength in elevating or bringing forwards the head of the bone*.

I know no other way of reducing the humerus which allows the surgeon to employ his hands in any appropriate manœuvre, and at the same time gives him an opportunity of applying his whole muscular strength in aid of his co-operators. I believe I have tried every method which either books or the practice and communication of several surgeons have taught me, or my own ingenuity has suggested, and I give a preference to the mode which I have described. I am aware of the common objection to elevating the head of the bone; I mean its pressing against the neck of the *scapula*, and there meeting with an impediment to its replacement.

But I think that, whoever will take the pains to examine the figure and situation of the human *scapula*, will see that this objection is raised upon no very solid grounds. For the anterior margin or inferior *costa* of the scapula, which lies over the dislocated head when seated in the axilla, is continued immediately from the *glenoid* cavity, and is bevelled all the way till it comes to the inferior angle. So that this bone will present little or no resistance to the ascent of a segment of a sphere (the head of the humerus), even if it be elevated in a perpendicular direction; but if the surgeon, as he erects his body, recedes a little

* Or he may apply both hands to the scapula if one be not sufficient to act upon that bone.

from the patient (which he should always do), the elevation will be made in an oblique direction, and adapted to the inclined plane of the scapula. As for the cartilaginous lip, which increases the depth of the articular cavity, its elasticity will prevent its proving any great obstacle to the return of the head.

The fracture of the neck of the scapula, when made in attempting reduction, by hanging the arm of a patient over a door or ladder, or the top of a chair, is, I imagine, always produced independent of the pressure of the head of the humerus, for in all such attempts the scapula is brought much more forwards than it lies naturally, and the inferior angle is somewhat elevated—so that when the arm is drawn as far as possible over the edge of the door, or the round of the ladder, and firmly retained in that situation, the whole weight of the body, when the support of the patient's feet is taken away, must be thrown with a jerk upon the *cervix* of the scapula. Besides, in most of these obstinate cases, the head of the humerus will have been thrown forwards under the pectoral muscle, and be out of way of doing immediate mischief by striking against the neck of the scapula.

If the extension be made in a proper direction, so as to bring the head of the bone to a level with the edge of the articular cavity, I believe that, in general, “the muscles will do the rest for the surgeon*,” but if the extension do not bring it to that level, though by less than the tenth of an inch, the muscles will not then do their work in the way the surgeon wishes them; for if they act at all, it will be in retracting the bone towards its former unnatural situation. Whereas if, beside the extension, the bone be assisted by a lever acting in a proper direction, it will be easily lifted over a small ascent,

* Pott's Works.

and then the aid of the muscles will become efficient. In the luxations of all the ginglymus joints, and of the patella, it is necessary, in order to reduce them, to do something more than merely making an extension: and the principles of their treatment are applicable to the injuries of the articulation, called *enarthrosis* and *arthrodia*.

Where the humerus was fractured in its middle at the same time that its head was displaced, I found nothing necessary more than slightly to draw the head of the bone forwards, and then lift it into its socket. Here the muscles were altogether passive, and the bone of course met with no resistance when it was lifted into its cavity.

There is another injury to which a part of the lower extremity is subject, and which is of a very serious nature, in as much as it must always threaten a permanent lameness to the patient, I mean the dislocation of the *astragalus* or instep. A complete dislocation of this bone is a very rare occurrence; a partial displacement is, however, by no means uncommon. Of the former I met with a distressing instance, which I will describe, and afterwards I shall take the liberty of making a few remarks on the latter circumstance.

Dislocation
of the astragalus.

Compound Dislocation of the Astragalus.

Mrs. Palmer, aged 60, about seven in the evening, March 24th, 1789, was thrown from her horse, and her foot hanging in the stirrup, she was dragged some yards—and when disengaged, was found with a large wound in her left foot, and, as it was supposed, with the ankle joint displaced.

I saw her the next morning in company with her son, a neighbouring practitioner in medicine. A careful examination of the case demonstrated it to be a dislocation not of the ankle joint, but of the *tarsus*.

The following were the appearances.

The foot greatly misshapen, and in respect of the leg, turned inwards, and downwards; on the upper part of the instep, and mostly to the outside, was a large lacerated wound, through which a bone with two processes was protruded at least two inches. This was the *astragalus*. The *os calcis* was also displaced from its articulation with the *os cuboides*, but not from its articulation with the *astragalus*, and did not protrude itself. Some of the articular cartilage was abraded from the projected apophysis, which was dry and black. The tendon of the *tibialis anticus* was bare to the view. The wound was freely enlarged by incision, but I could not by any means replace the luxated bones, the parts were so jammed together.

There was now nothing to be thought of but the alternative of amputating the leg, or of removing the *astragalus*, which last appeared a bold and precarious remedy, altogether unprecedented as far as I knew; and to be an experiment, of which the event must be doubtful; since, although it should preserve
both

both the life and the limb of the patient, still it must be a question whether that limb would not be useless and incapable of supporting the body in standing, and still more in walking, it's tibia and fibula having lost their base. However, the trial, seemed justifiable; first, as immediate amputation was not unobjectionable, because a considerable degree of tension of the leg was already come on; and secondly, as it might be a means of averting instant danger, since it would give general freedom to all the parts, and thus relieve tension, and at any rate afford a probability of postponing amputation till it could be performed with safety, and an assurance of success.

Accordingly I cut out the astragalus, which was done without much difficulty. I laid the leg on its outside, with the knee bent. A considerable discharge of synovia continued for some days. Pain, and inflammation of the leg and foot, succeeded the operation, and an abscess was formed on the inside of the leg, a little above the ankle. Nothing besides worth noticing occurred in the course of the cure, which was effected in eighteen weeks. In six months she walked very well with the assistance of one stick, and with wearing an iron, which reached from the hip, had a joint at the knee, and was fixed into the sole of a high heeled shoe; the limb was not much shorter than the other, and there was a little vertical motion between the leg and the foot; so that a new articulation must have been formed, between the extremity of the *tibia*, and its new supporters, the *os calcis*, and *os cuboides*.

This compound luxation of the astragalus may be spoken of as a very rare and unusual case. Even a perfect luxation, without a wound, is by no means frequent. But there is another affection of these parts which is very common, and productive of a great deal of misery. This is a subluxation

Subluxation
of the astragalus.

of the astragalus. Sudden violence often produces it; but it very frequently, and indeed most commonly, arises from a weakness of the ligaments in the foot, and then a deformity of the part *gradually* increases. Young persons, who grow tall and thin, and have occasion to carry heavy weights, or whose occupation requires them to be standing the greater part of the day, are the most subject to it: in some the dislocation is inwards, and then the toes turn out; these are said to walk upon their inner ankle; in others it is outwards, and in these the toes turn inward, and the patient walks almost upon the outward ankle. I suspect the muscles to be partly in fault in these spontaneous subluxations, the *peronci* acting in excess in the one case, the *tibiales* in the other. I have observed to a certainty that it has been so in the latter case, though whether the inordinate action of the *tibiales* was the primary cause, or whether it was in the first instance an effect of the giving way of the ligaments, I cannot decide.

Luxation in-
wards most
common.

The more common of the two is the subluxation inwards; it has been often mistaken for a dislocation of the ankle joint, and extension has been ineffectually employed to restore the parts to their original situation. Bandages and plasters, with confinement to bed, have been tediously and uselessly had recourse to, and as a great deal of dull pain is felt by many*, rheumatism comes in for its share of blame, and antirheumatics have in vain been prescribed. Sometimes one, often both, feet suffer deformity and the concomitant pain.

The cure.

The cure, if the disease be not very inveterate, and the subject be young, is not difficult. It is only requisite to

* Rheumatism, however, is sometimes the original cause of it, by having inflamed and weakened the ligaments of the foot.

forbid the patient's continuing long at a time in a standing posture, and to restrain him from immoderate walking, and especially under the weight of a burden. To these injunctions it is necessary to add the use of a shoe, made in the following manner: The sole must be thicker on the inside than on the outside, and this in a greater degree in proportion to the greater deformity of the foot. The sole must also on the inside have its bottom projecting some space (from half an inch to an inch) beyond the upper leather; and in order to preserve the sole from twisting or bending, a thin plate of iron may be introduced between its lamellæ. The quarter of the upper leather should reach and be laced some little at least higher than the ankle, and the inside quarter should be stiffened. By the assistance of such a shoe, I have known some who were extremely lame, enabled almost immediately to walk with ease and freedom. I have not known many who have not in the space of a few weeks obtained a restoration of the shape and use of the foot, and none who have not received very ample relief. In this case there is a subluxation of the *astragalus* and *os naviculare* from their respective articulations with the *os calcis*, the *cuboides*, and the *cuneiform* bones. Whoever will attentively consider the mechanism of the human foot, will readily account for the inconveniency which must be experienced by a patient labouring under the injury which I have been describing, and comprehend the advantages which must necessarily follow the assistance which I have recommended.

The opposite deviation from the natural position of the bones is much more rare, I mean where the foot is turned inward, and the patient treads almost on the outer ankle, All which seems necessary, or indeed which can be done, is to form the sole and quarter of a shoe on the outer side as I

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have

have directed them to be formed on the inner side, and to comply with the before given injunction, especially in respect of motion and rest; and I can assert from experience this may be done with success. The turning in of the toes may be greatly counteracted by sitting with the feet often in the stocks, which are in use in dancing schools.

Deformity of
the knees and
legs.

In weakly children a deformity of the knees, or of the legs, frequently accompanies the deformity of the tarsus; however it always arises spontaneously. The deformities of these parts are what are vulgarly called the knock'd knee, and the bandy leg. Often, indeed, they exist without any deformity of the foot or ankle. It will be easily understood that when the hard parts of the inferior extremities are too weak to duly support the weight of the body in standing and in walking, (and especially if heavy burthens be carried by the individual,) either the bones will bend, or the joints give way. In the latter case, (which is the knock'd knee,) instead of the leg and thigh forming nearly a straight line, the body being erect, they will make a less or greater angle whose sides will meet in the knee joint, which will now bulge on the inside, and be rather hollow on the outside. Whatever may be the appearance, there is in fact no dislocation for the *condyles* of the *os femoris* continue to be applied to their respective *concave articular surfaces* of the tibia; but then the connection is new modified, and the outer condyle acquires a more spacious resting-place on the head of the tibia, while the inner condyle has its bearing place lessened. Now this situation of the bones must be extremely inconvenient to the muscles of the limb; for which reason, those who are very much knock-kneed, do not either walk gracefully or run with facility and speed; nor are they fitted, however

robust

robust in other respects, for carrying heavy burthens. Bandy legs, on the contrary, if the general strength be sufficient, produce little inconveniency, except shortening in a right line, the length of the limb, and thus lessening the stride in progression.

Both these kinds of deformity are always to be lessened, and generally to be fully corrected in early life, and while the powers of growth and absorption are active.

This is to be done by the judicious use of irons. I think <sup>Irons recom-
mended.</sup> it unnecessary to inquire into the objections which may be made to these instruments, because I believe that, when I have explained the principles upon which they ought to be made and applied, objections will cease.

First, the irons should support the weight of the trunk, <sup>How to be
constructed.</sup> and remove that weight from bearing upon the knees and legs.

Secondly, the irons should not impede any of the movements of the joints.

And thirdly, they should neither press upon nor incumber the muscles.

I shall preface the commenting on these principles by remarking, that the action of the muscles during childhood and early youth has a constant tendency to correct the deformity, and that they will correct it, if the effect of pressure from above on the bones and joints be not greater than the power of the muscles can overcome. In confirmation of this remark, let us recollect the several individuals whom we saw with knock'd knees and crooked legs in their infancy, whose limbs, without any mechanical assistance, became perfectly straight as they grew up.

“First, they should support the weight of the limb.”

For this purpose the iron should have one end fixed in a broad and strong girdle, firmly embracing the body, and the other end rivetted in the sole of the shoe.

“ Secondly, they should not impede any of the movements of the joints.”

This can be effected only by making their joints to correspond both in situation and movement with the joints of the body.

The hip is a ball and socket joint, and therefore has *mobility* in every direction. Now a ball and socket joint is not easily constructed in iron, and besides would take up too much room; therefore, two joints are to be substituted in its place, the one a rule joint, the other a swivel joint, by the combination of which two, every motion may be obtained.

The knee is a *ginglimus*, and has a vertical motion only, a rule joint or hinge is sufficient in this part of the iron, but like the knee should have no motion forwards beyond the perpendicular line, and therefore should be furnished with a stop.

The ankle is a *ginglimus* joint with some lateral motion, notwithstanding which it is only necessary there to make the iron with a joint similar to that recommended at the knee; for the little lateral motion of the ankle joint will not be at all impeded by the iron joint being confined to move in only one direction that is backwards and forwards, because the iron will, in consequence of its length, yield a little to a lateral impulse.

“ Thirdly, the iron should neither press upon, nor incumber the muscles.”

The irons, therefore, should be as light as it is possible to make them, consistent with a sufficiency of strength; indeed they should be composed in part, if not entirely, of steel. And as they must be connected by leather belts to the thigh and to the leg, those belts should be broad, well padded, and buckled on loosely, the purpose of them being nothing more than to keep the iron in one situation, in respect of the limb.

The club foot is the last deformity of the lower extremity Club foot. which I take occasion to notice. If attended to in early infancy, it may in general be corrected. The method proposed in Mr. Cheselden's Observations, annexed to Gataker's Translation of Le Dran's Surgery, has this inconveniency, that the time required for sufficiently drying the paste which he recommends, is very long; and the application requires to be frequently changed, if wetted by the child's urine. Fine Plaster may be substituted for wheat flour, and used in the manner of making moulds for casts; and will be free from these objections. I have used it, however, only in one instance.

Steel springs may certainly be applied with still better effect by an ingenious mechanic; but surgeons will rarely find workmen capable of executing their plans with neatness and efficacy in these instances.

Mr. Sheldrake, of the Strand, London, appears to have conceived very clear ideas of these cases, and to render all the assistance of which his art is capable.

FINIS.

