Surgical essays / By Astley Cooper and Benjamin Travers.

Contributors

Cooper, Astley, Sir, 1768-1841.
Travers, Benjamin, 1783-1858.

Publication/Creation

London : Printed for Cox and Son, [etc., etc.], 1818-1819.

Persistent URL

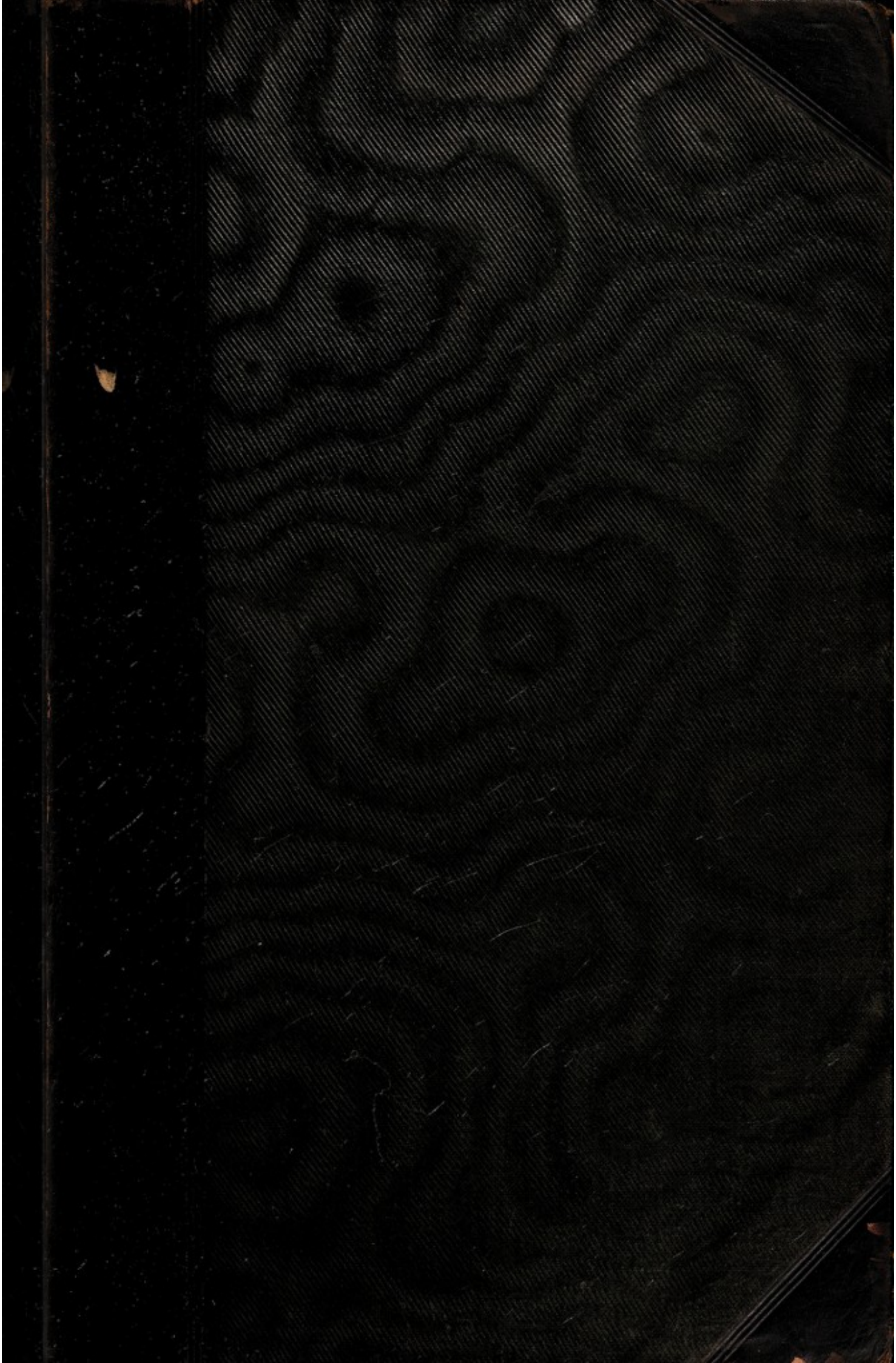
https://wellcomecollection.org/works/v6w2xmxc

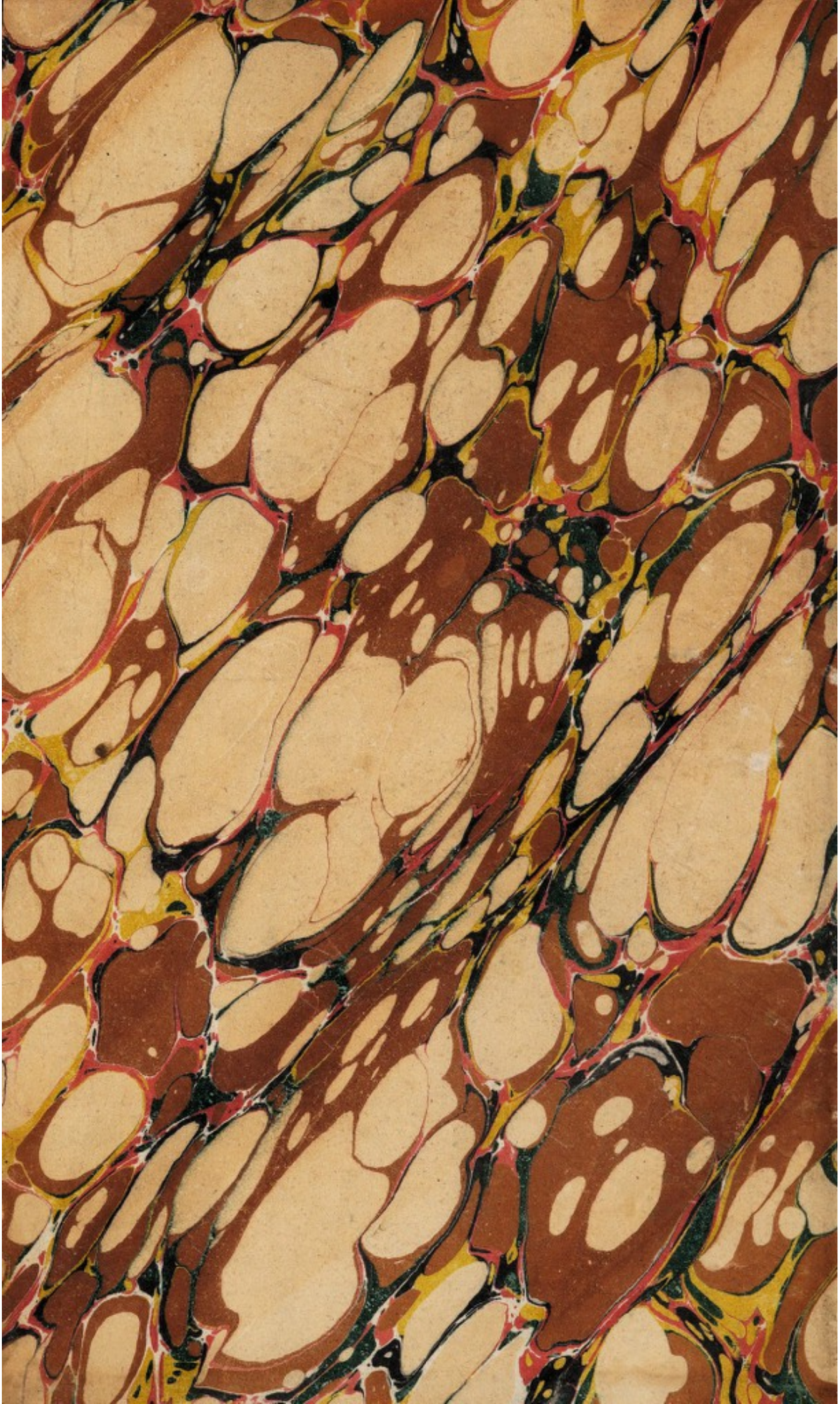
License and attribution

This work has been identified as being free of known restrictions under copyright law, including all related and neighbouring rights and is being made available under the Creative Commons, Public Domain Mark.

You can copy, modify, distribute and perform the work, even for commercial purposes, without asking permission.

Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
E library@wellcomecollection.org
https://wellcomecollection.org





18,716/B

H.I.P

COOPER 19

Digitized by the Internet Archive
in 2017 with funding from
Wellcome Library

https://archive.org/details/b2931902x

43921

SURGICAL ESSAYS.

BY

ASTLEY COOPER, F.R.S.

SURGEON TO GUY'S HOSPITAL;

AND

BENJAMIN TRAVERS, F.R.S.

SURGEON TO ST. THOMAS'S HOSPITAL.

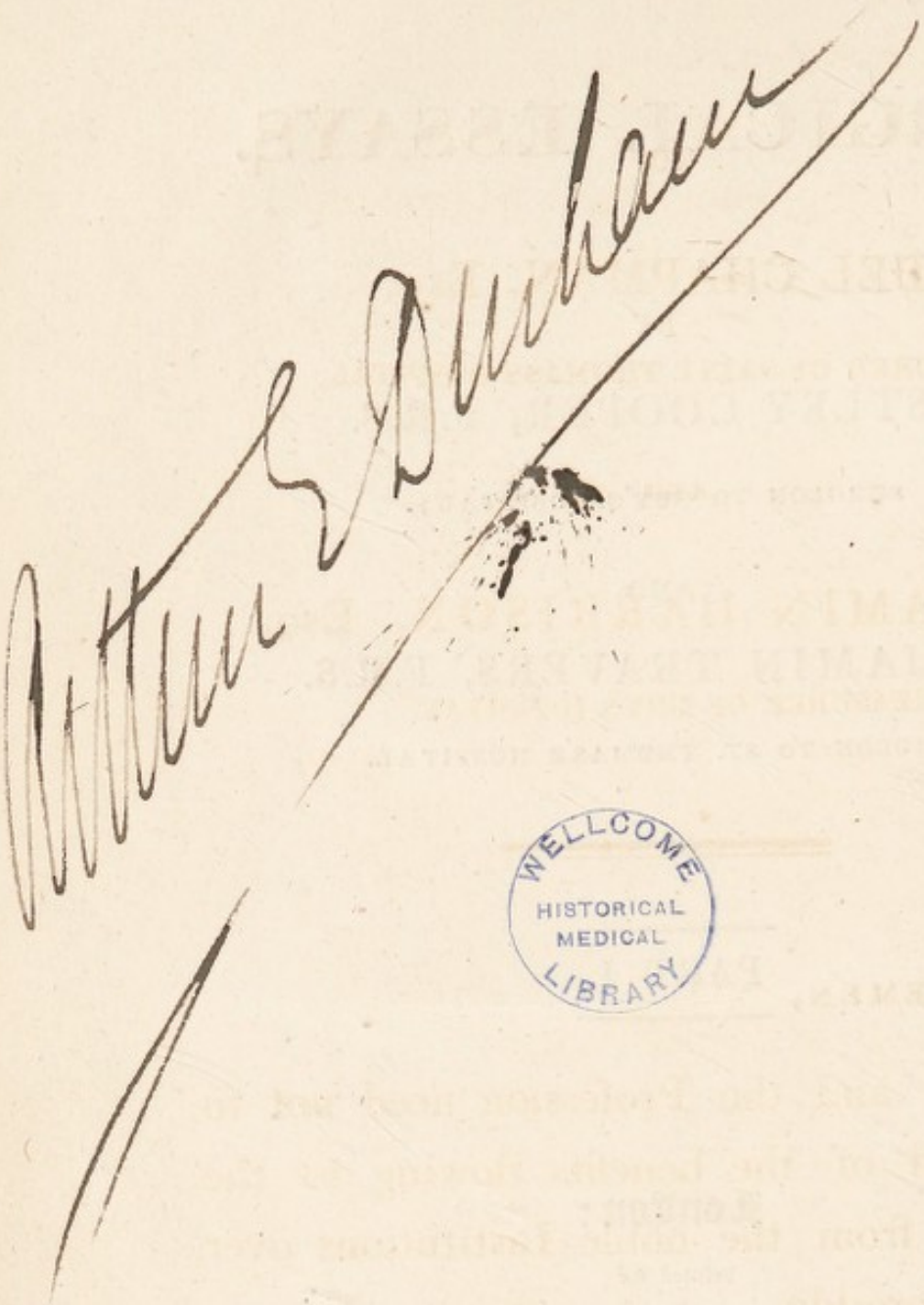
PART I.

London:

Printed for

COX AND SON, ST. THOMAS'S STREET, SOUTHWARK;
LONGMAN, HURST, REES, ORME AND BROWN, PATERNOSTER ROW;
A. CONSTABLE AND CO. EDINBURGH;
SMITH AND SON, GLASGOW; AND HODGES AND M'ARTHUR,
DUBLIN.

1818.



WELLCOME
HISTORICAL
MEDICAL
LIBRARY

TO

ABEL CHAPMAN, Esq.

TREASURER OF SAINT THOMAS'S HOSPITAL,

AND

BENJAMIN HARRISON, Esq.

TREASURER OF GUY'S HOSPITAL.

GENTLEMEN,

The Public and the Profession need not to be informed of the benefits flowing to the Community from the noble Institutions over which you preside.

But those only are fully competent to appreciate your merits, who are so connected with the Hospitals as to have witnessed your constant solicitude, that order, neatness and

comfort should every where prevail, and that all the provisions which humanity can suggest, should be made for the accommodation of those whom sickness or accident consigns to your protection. But your benevolence aspires to a wider range: the good which you are appointed to administer, has not been circumscribed within the Walls of your Hospitals: for under your auspices, Theatres have been erected, Museums have been founded, and Lectures have been established, which comprehend the whole circle of Medical Science.

That you may long continue to watch over these excellent Institutions, which you have governed with so much judgment and humanity, is the sincere and ardent wish of,

GENTLEMEN,

Your Friends and obedient Servants,

ASTLEY COOPER.
BENJAMIN TRAVERS.

London, Jan. 1, 1818.

PREFACE.

THE publication of a Work, upon the plan of that which is now submitted to the Public, has been for many years the intention of the Authors, and was only postponed until the junior should have succeeded to the situation of Surgeon to St. Thomas's or Guy's Hospital.

It would be impossible for any person to witness the abundant opportunities afforded by these munificent establishments, (which together accommodate more than eight hundred patients, besides numerous out-patients,) without participating in the anxious wish of the Authors, that they should be adequately improved.

The variety which of necessity occurs in the practice of the Surgeons—the facility afforded to them in their respective plans of treatment—the opportunities of improving the practice of

Medical Surgery—of observing the results, general and comparative, of Operations of every description—and especially of prosecuting inquiries into Morbid Anatomy, by prompt examination of the dead body, and of parts removed by operation—are advantages which, while they afford ample compensation for the labours of clinical research, would allow no pretext for indifference in those, who, conscious of their value, were not influenced by an ardent desire to improve and impart them.

It is from such impressions that the present undertaking has originated. Numerous as is the class of students attending the Hospitals of the Metropolis, and zealously as they are in general disposed to acquire knowledge in their profession, it falls to the lot of few to reside long at these schools of practice; and it is therefore especially desirable, that their attention during that period should be directed to the objects which are to them of greatest importance, and their judgments assisted in forming conclusions from the facts which fall under their daily observation. It is surely not less desirable when they are settled at a distance from the seats of education, and only the sphere of private practice, limited even in its greatest

extent, remains open to them ; that the suspension of professional intercourse should not chill and subdue the natural ardor of their minds; that they should be enabled to keep pace with the never-ceasing progress of observation, and not forfeit their interest in the pursuit of the noblest of all practical sciences.

It is from no presumptuous feeling that the Authors of this Work entertain a hope, that the publication of Practical Essays, conveying the best opinions they are able to form, may, in time, produce a beneficial influence upon the practice of their art, by exposing popular errors, and deciding some of the many points still involved in doubt and obscurity.

Neither the transactions of societies, nor the periodical journals, can be expected to afford space for the details of Hospital practice: seldom the narration of occurrences in one branch of the profession is interesting to more than one class of readers, and especially, such a narration as includes more of the common than the rare; for it is neither in the contemplation nor desire of the Editors to promulgate marvellous cases. The singularity of a case may be a good reason for its publication,

but its importance is a better; and, in general, the greater its singularity, the less its importance. They are therefore disposed to think that occurrences, which by reason of their frequency attract less notice than they deserve, may yet be found to contain important matter for consideration.

How much additional value the relation of an ordinary case acquires when supported and illustrated by others nearly resembling it, is too obvious to require exemplification. It is only in the assemblage and multiplication of facts that their proper bearing can be seen, and their real value ascertained; or that they can be admitted to form a safe groundwork for the superstructure of theory.

In the present undertaking, it is perhaps needless to say, that no attempt will be made improperly to bias the public judgment. The cases of failure will be as fully detailed as those of which the issue is fortunate—the errors will be as faithfully exposed as the merits of practice, and the progress of truth shall not be retarded by the disingenuous concealment of error. In pursuit of this main object, it is the determination of the Writers to avoid all invi-

tation to controversial discussion; and while they endeavour "studiis et rebus honestis" to deserve the goodwill of their professional brethren, they will rather submit to be the subjects than the authors of critical animadversion.

For the literary composition of the Work, its nature and their avocations will, they trust, render apology unnecessary—the value of the matter will be their more particular concern. The delineation of morbid parts will be given in the form of slight engraving, in the hope of rendering the Work less expensive and more extensively useful.

The motive which has induced the Authors to execute this Work conjointly, is, the opportunity which it furnished of giving to the public the more extended experience, derived from the practice of the two Hospitals; and they hope soon to be enabled to publish a second Part, but the period of publication must for the present be left undetermined.

TABLE

OF

CONTENTS.

PAGE

On Dislocations. By Mr. Astley Cooper..... 1

On Iritis. By Mr. Travers..... 59

Case of Ligature on the Aorta. By Mr. Astley Cooper..... 101

On Phymosis and Paraphymosis. By Mr. Travers..... 131

On Exostosis. By Mr. Astley Cooper..... 155

On Wounds and Ligatures of Veins. By Mr. Travers..... 209

ON

DISLOCATIONS,

BY

MR. ASTLEY COOPER.

A DISLOCATION is a displacement of the articulatory portion of a bone, from the surface on which it was naturally received. Definition.

Of the various accidents which happen to the body, there are few which require more prompt assistance, or upon which the reputation of the surgeon is more at stake, than cases of Luxation, for if much time be lost prior to the attempt at reduction, there is great additional difficulty in accomplishing it, and it is often entirely incapable of being effected. If it remains unknown, and consequently unreduced, the patient becomes a living memorial of the surgeon's ignorance or inattention.— "What is the matter with me?" said a patient who came to my house, placing himself before me, and directing my attention to his shoulder. "Why, Sir, your arm is dislocated."—"Do you say so? Mr. —— told me it was not out." "How long has it been dislocated?"—"Many weeks," he replied. "Oh then, you had better not have any attempt at reduction made." He said, "Well, I will take care that Mr. —— has Necessity for prompt assistance.

no more bones to set, for I will expose his ignorance in that part of the country in which I live."—He was a man of malevolent disposition, and did as he had promised, to the great injury of the surgeon, who was frequently reminded of his want of skill, by meeting his former patient in his rounds, and what was worse, by hearing frequently, that the following observation was made,—" Mr. —— is a good apothecary, but he knows nothing of surgery."

In a dislocation of the Os Femoris, which still remains unreduced, a consultation was held upon the nature of the injury, and after a long consideration, this report was made by one of the surgeons,—" Well, Sir, thank God, we are all agreed, that there is no dislocation."

Knowledge of anatomy necessary.

A considerable share of anatomical knowledge is required to detect the nature of these accidents, as well as to suggest the best means of reduction; and it is much to be lamented, that our students neglect to inform themselves sufficiently of the structure of the joints. They often dissect the muscles of a limb with great neatness and minuteness, and then throw it away, without any examination of the ligaments, the knowledge of which, in a surgical point of view, is of infinitely greater importance; and from hence arise the numerous errors of which they are guilty, when they embark in the practice of their profession, for the injuries of the hip, elbow, and shoulder, are scarcely to be detected, but by those who possess accurate anatomical information. Even our hospital surgeons who have neglected their anatomy, mis-

take these accidents, for I have known the pullies applied to an hospital patient, in a case of a fracture of the neck of the thigh-bone, which had been mistaken for a dislocation, and the patient cruelly exposed through the surgeon's ignorance, to a violent and protracted extension. It is therefore proper, that the form of the ends of the bones, their mode of articulation, the ligaments by which they are connected, and the direction in which the larger muscles act, should be well understood.

Symptoms.

The immediate effect of dislocation is to alter the form of the joint, often to produce a change in the length of the limb, and to occasion the almost entire loss of motion of the part, after the muscles have had time to contract. In the first moments of the accident, considerable motion remains. Thus I have seen a man brought into Guy's Hospital, who a few minutes before had the thigh-bone dislocated into the foramen ovale, and I was surprised to find, in a case otherwise so well marked, that a great mobility of the bone still existed at the dislocated part; but in less than three hours, it became firmly fixed in its new situation, by the contraction of the muscles.

Blood is often effused in considerable quantity around the joint, and prevents an easy detection of the accident, the swelling being sometimes so considerable as to conceal entirely the ends of the bones.

A severe but obtuse pain arises from the pressure of the head of the bone upon the muscles, and sometimes the pain is more acute from

its pressure upon a large nerve. From this cause a paralysis is produced of the parts below: as is sometimes seen in dislocations of the shoulder. At other times the bone presses upon important parts so as to produce effects dangerous to life. I have for many years mentioned in my Lectures, a case of which Mr. Davie, of Bungay, was so kind as to send me an account, of a dislocated clavicle, which pressed upon the œsophagus so as to endanger life, and of which I shall give a more detailed history hereafter.

The head of the bone can generally be felt in its new situation, excepting in some of the dislocations of the hip, and its rotation becomes often the best criterion of the accident. The natural prominences of bone near the joint, either disappear or become less conspicuous, as the trochanter at the hip-joint. Sometimes the reverse occurs; for, in dislocations of the shoulder, the acromion projects more than usual.

Crepitus.

The more remote effects of the accident are first, that there is often a sensation of crepitus produced by the effusion of adhesive (albumen) matter into the joint and bursæ, by which the synovia becomes inspissated, and crackles under motion, a circumstance which every practitioner should be aware of, as he may be induced to suspect the existence of fracture where none exists.

Inflammation.

The degree of inflammation produced is however generally only slight, but sometimes, after the reduction of dislocations suppuration ensues, and the patient dies. Mr. Howden, formerly one of our most intelligent apprentices at Guy's Hospital, and afterwards surgeon in the army, related

the following case. "A man had his thigh dislocated upwards and backwards on the ilium, which was soon after reduced; the next day, a considerable swelling was observed on the part, which continued to increase, accompanied with rigors, and in four days the patient died. On dissection, the capsular ligaments and ligamentum teres were found entirely torn away, and a considerable quantity of pus extravasated in the surrounding parts."—See Minutes of the Physical Society, Guy's Hospital, Nov. 12, 1791. I attended the master of a ship, who had dislocated his thigh upwards; an extension was made to all appearance successfully, but in a few days a large abscess formed on the thigh, which destroyed the man. Generally, however, the inflammation is but slight which follows these accidents, the limb, if unreduced, forms for itself a new bed, and some degree of motion is gradually recovered, although from neglected dislocations in the lower extremity, the patient is ever after lame, and in the upper, the motion and power of the limb are very much diminished.

Dissection.

On examination of the bodies of those who die from dislocations which arise from violence, the head of the bone is found completely removed from its socket. The ligament is torn to a great extent transversely; the particular ligaments of joints, as the ligamentum teres of the hip is torn through; but the tendon of the biceps in dislocations of the os humeri remains unbroken as far as I have had an opportunity of judging by dissection, although I should be

sorry to be understood to say, that it is universally the case.

The tendons which cover the ligaments are also torn, as the tendon of the subscapularis muscle, in the dislocation in the axilla, and according to the extent of this laceration, is the facility with which the bone afterwards slips from its socket. Some of the muscles are very much shortened, some put upon the stretch, as the psoas and iliacus internus in dislocations of the hip downwards, a considerable laceration of muscles now and then occurs, of the pectineus and adductor brevis, in the dislocation of the thigh downwards, and lastly, a quantity of blood is extravasated in the cellular membrane.

Dissection of old dislocations.

When a joint has been long dislocated, the head of the bone is found to have become embedded in the muscles; the articular cartilage remains, if it rests upon the muscles, but if it lies upon a bone, the articular cartilaginous surface becomes absorbed, and even a portion of the head of the bone is removed; the original socket becomes filled with a ligamentous secretion; its size is lessened, and form is changed, by a deposit of ossific matter influenced by the pressure of the head of the bone in its new situation. When the head of the dislocated bone rests on a thick bed of muscles, in the cellular membrane, a new ligament is formed around it, which does not adhere to its cartilaginous surface, and which, in dislocations of the hip, contains the broken ligamentum teres. See *Plate of Dislocation in the Ischiatic Notch.* But if the head be placed on the sur-

face of a bone or upon a thin muscle over it, that muscle becomes absorbed, and the bone undergoes a remarkable change; if the dislocation be not reduced, both the ball and the bone which receives it are changed in their form. The pressure of the ball, as from pressure in other cases, produces absorption of the periosteum and of the bone, and a smooth hollow surface is formed, and the ball becomes altered in its shape to adapt it to its new surface: but whilst this absorption proceeds, upon the part on which the head of the bone rests, an ossific deposit takes place around from the periosteum, irritated but not absorbed. This bony matter is deposited between the periosteum and the original bone, by which a deep cup is formed to receive the head of the bone; and perhaps no cases can be adduced, which more strongly mark the powers of nature in changing the form of parts to accommodate them to new circumstances, than these effects of dislocation. (See the accompanying plates.)

But in those cases, in which the muscles are thick which intervene between the head of the bone and that bone on which it rests, no change in either the recipient or dislocated bone is produced, as may be seen in dislocation of the thigh in the ischiatic notch. (See plate.)

The new cup which is thus formed, sometimes so completely surrounds the neck of the bone, as to prevent its being removed from it without fracture (see plate); and the socket

becomes smoothed upon its inner surface, to leave no projecting parts which can interrupt the motion of the bone in its new situation.

The muscles losing their action become contracted and greatly diminished in their size.

Dislocations from relaxation.

But although dislocations happening from violence are thus accompanied by the laceration of the ligament of the joint, yet they can occur from relaxation of the ligaments only.

A girl came to my house, who had the power of throwing her patella off the surfaces of the condyles of the os femoris. Her knees were bent considerably inwards, and when the rectus muscles acted upon the patella, it was drawn from the thigh-bone into a line with the tubercle of the tibia, and laid nearly flat upon the side of the external condyle of the femur. She came from the south of Europe, and said she had been brought up as a dancing girl from her earliest years, as we see children dancing upon elevated platforms in the streets of London; and she imputed to these continued exertions the weakness under which she laboured.

A relaxed state of ligaments is also produced by an accumulation of synovia in joints. Mr. Shillito, surgeon in the city, asked me to see the servant of a gentleman in my neighbourhood, who had a great enlargement of the knee-joint from an unnatural and abundant secretion of synovia; and when this was absorbed, the ligaments remained so much relaxed, that the efforts of the muscles in walking dislocated the patella. I ordered her into the hospital that the

students might observe this case, of which the following is the account.

CASE.

Ann Parish was admitted into Guy's Hospital in the autumn of 1810, for a dislocation of the left patella from relaxation of the ligaments. She had for four years previously a large accumulation of synovia in that knee, suffering some pain and much inconvenience in walking. Blisters had been applied without much effect, and other means tried about four months before her admission. When the knee had acquired considerable size, the swelling spontaneously subsided, and she then first discovered that the patella became dislocated when she extended the limb. She suffered some pain whenever this happened, and she lost the power of the limb in walking so as to fall when the patella slipped from its place, which it did whenever she attempted to walk without a bandage. The patella was placed upon the external condyle of the os femoris, when thrown from its natural situation, and did not return to it without considerable pressure of the hand. In other respects her health was good. Straps of adhesive plaister were ordered to be applied, and a roller to be worn, which succeeded in preventing the dislocation so long as they were used, but the bone again slipped from its place when they were removed. A knee-cap made to lace over the joint was ordered for her.

If muscles are kept extended for a length of Paralysis.

time, and their tone becomes destroyed, or if from a paralytic affection, they lose their action, a bone may be dislocated easily, and as easily replaced.

CASE.

Mr. ——, a gentleman now residing in the city, whilst in the East Indies, as a junior officer on board his ship, was placed under the orders of one of the mates when the captain was on shore—for some trifling offence this young gentleman was punished in the following manner: His foot was placed upon a small projection on the deck, and his arm was lashed tightly towards the yard of the ship, and thus kept extended for an hour. When he returned to England, he had the power of readily throwing that arm from its socket, merely by raising it towards his head; but a very slight extension reduced it: the muscles were wasted also, as in a case of paralysis. A prosecution was commenced for this act of tyranny, and I was subpœnaed to give evidence; but this petty tyrant chose to pay the forfeit for his misconduct prior to the commencement of the trial.

I was desired also to see a young gentleman who had one of those paralytic affections in his right side, which so frequently arises during dentition. The muscles of the shoulder were wasted, and he had the power of throwing his os humeri over the posterior edge of the glenoid cavity of the scapula, from whence it became easily re-

duced. In these cases no laceration of the ligaments can have occurred, and they shew the influence of the muscles in preventing dislocation from violence, and in impeding its reduction.

Dislocation from ulceration.

Dislocations frequently occur from ulceration, by which the ligaments are detached, and the bones become destroyed. We frequently see this state of parts in the hip-joint, the ligaments ulcerated, the edge of the acetabulum absorbed, and the head of the thigh-bone altered, both in its magnitude and figure, escaping from the acetabulum upon the ilium, and there forming for itself a new socket. We have in the Anatomical Collection at St. Thomas's Hospital a preparation of the knee dislocated by ulceration, anchylosed at right angles with the femur, and turned directly forwards.

Fracture and dislocation.

Dislocations are often accompanied with fracture. At the ancle-joint it rarely happens that dislocation occurs without a fracture of the fibula, and at the hip-joint the acetabulum is every now and then broken.

CASE.

Thomas Steers was admitted into Guy's Hospital on the 28th of October, 1805, with a dislocation of the os femoris into the ischiatic notch. The dislocation was reduced by a very slight extension, compared with that which is commonly required. This was imputed to his having vomited at the time of his admission, and to the depression of strength which a state of

nausea is known to produce. But he soon complained of severe pain extending over his abdomen, and he died the day following his admission. Upon inspecting his body, the jejunum was found ruptured; and upon examination of the hip-joint, a portion of the edge of the acetabulum was broken off.

Dislocations of the os humeri are also sometimes accompanied with fracture of the head of that bone, of which we have a specimen in the Museum at Saint Thomas's Hospital. The coronoid process is sometimes broken in dislocations of the ulna, producing a species of luxation, which does not admit of the bone being afterwards preserved in its natural situation. What have been called dislocations of the spine are really fractures of the vertebræ, and not true dislocations, if we except the first and second vertebræ of the neck.

Simple or compound.

Dislocations are either simple or compound; the simple dislocation is rarely dangerous, and those are considered as simple in which the skin remains unbroken, although the accident may be otherwise complicated; but these luxations, without wounds, may sometimes become compound, unless great care be taken to prevent the pressure of the bone, occasioning inflammation and ulceration.

Compound.

Compound dislocations are attended with great danger, and on the following account.

When a joint is opened, inflammation of the lacerated ligaments and synovial membrane speedily succeeds, in a few hours suppuration

begins, and granulations arise from the surface of the synovial membrane. But the same process does not immediately take place upon the extremities of the bone, because it is covered by the articular cartilage. This cartilage, before the cavity fills with granulations, becomes absorbed, by an ulcerative process instituted on the end of the bones. Numerous abscesses are generally formed, in different parts of the joint, and at length granulations spring from the extremities of the bone deprived of their cartilages, and fill up the cavity; generally these granulations become ossified, and anchylosis succeeds; but sometimes they remain of a softer texture, and some degree of motion in the joint is gradually regained.

This process of filling up joints, requires great general, as well as local efforts, high constitutional irritation is produced, and if the constitution be weak, the patient, to preserve his life, is sometimes obliged to submit to the operation of amputation.

Some joints dislocated easily.

Some joints dislocate easily, and frequently, others very rarely. Those which have naturally extensive motions are easily dislocated, and hence the luxation of the os humeri occurs much more frequently than any other, and when it has been once dislocated, it happens again easily in the natural upward motion of the joint. It has been wisely ordained that when a part has extensive motion, and great strength is required, it is effected by making numerous joints instead of one. Thus, in the spine in which great strength is necessary to protect the spinal mar-

row, numerous joints are formed, and the motion between any two bones is so small, that dislocations, except between the 1st and 2d vertebræ, hardly ever occur, although the bones are often displaced by fracture.

The carpus and the tarsus are constituted in the same manner, they allow of considerable motion, yet maintain great strength of union. For if the motion between two bones as in the spine, be multiplied by 24, and that at the carpus by 7, it will be seen that great latitude of motion is given, and the strength of the part preserved, whilst, if the spine had been formed of a single joint, dislocations might have easily happened, and death from this cause must have been a very frequent occurrence.

Partial. Bones are not always thrown entirely from the articulatory surface, on which they rested, so that dislocations may be partial only. This circumstance sometimes occurs at the ancle-joint.

An ancle was dissected at Guy's, and given to the Collection of Saint Thomas's, which was partially dislocated; the end of the tibia rested still in part upon the astragalus, but a larger portion of its surface was seated on the os naviculare, and the tibia altered by this change of place had formed two new articulatory surfaces, with their faces turned in opposite directions towards the two bones. The dislocation had not been reduced. The knee is I believe rarely dislocated in any other way. The os humeri sometimes rests upon the edge of the glenoid cavity, and readily returns into

its socket, and the elbow-joint is dislocated partially, both as regards the ulna and the radius.

The lower jaw is sometimes partially dislocated in a different manner; one of the joints being luxated, and the other remaining in its place.

Dislocations are generally occasioned by violence, and the force is applied, whilst the bone dislocated is forming an angle with its socket; but it is necessary that the muscles should be in a great degree unprepared for resistance, or the greatest force will hardly produce dislocations, but when they are unprepared, very slight accidents will often produce the effect. A slight fall in walking will sometimes dislocate the hip-joint, when the muscles have been prepared for a different exertion. Cause.

When dwelling on this subject in my Lectures, I have usually quoted the execution of Damien, as illustrative of this opinion.

"Damien was executed for the attempt to murder Lewis the XVth. Four young horses were fixed to his legs and arms, and were forced to make repeated efforts to tear his limbs from his body, but could not effect this intention; and after fifty minutes the executioners were obliged to cut the muscles and ligaments to effect his dismemberment."

The following is the French account of this execution:

"Il arriva a la place de Grève a trois heures et un quart, regardant d'un œil sec et ferme le lieu, et les instrumens de son supplice. On lui brula d'abord la main droite; ensuite on le

tenailla, et on versa sur ses plaies de l'huile, du plomb fondu, et de la poix-resine. On procéda ensuite a l'ecartellement. Les quatre chevaux firent pendant cinquante minutes des efforts inutiles pour demembrer ce monstre. Au bout de ce tems la, Damien etant encore plein de la vie, les boureaux lui couperent avec des bistouris, les chairs et les jointures nerveuses des cuisses, et des bras; ce qu'on avoit été obligé de faire en 1610 pour Ravaillac. Il respiroit encore aprés que les cuisses furent coupées, et il ne rendit l'ame que pendant qu'on lui coupoit les bras. Son supplice depuis l'instant qu'il fut mis sur l'echafaud, jusqu' au moment de sa mort, dura près d'une heure et demie. Il conserva toute sa connoissance, et releva sa tête sept ou huit fois, pour regarder les chevaux, et ses membres tenaillés et brulés. Au milieu des tourmens les plus affreux de la question il avoit laissé echapper des plaisanteries."—Dictionnaire Historique.

Dislocations rare in the young.

Young persons are very rarely the subjects of dislocations. Their bones break, or their epiphises give way rather than the parts displace. I read of dislocations of the hip in children, but their history is that of diseases of the hip-joint, and the dislocation arises from ulceration. A child was brought to me from one of the counties north of London, who had repeated extensions made by one of those people called *bone setters* (but who ought rather to be called *dislocators*,) for a supposed dislocation of the hip-joint. Upon examination, I found the case that disease of the hip, which is so common

in children, and for this only, was the child wantonly exposed to a most painful extension. That in this enlightened country, men without education should be with impunity suffered to degrade a most useful profession, and put to the torture those who have the folly to apply to them, is a disgrace to our laws, and calls loudly for prevention.

Dislocations of the elbow-joint in children are said to be of frequent occurrence.—Surgeons say, "I have a child under my care with luxation of its elbow, and I can easily return the bone into its place, but it directly dislocates again." Such a case is an oblique fracture of the condyles of the os humeri, which produces the appearance of dislocation, by allowing the radius and ulna, or the ulna alone, to be drawn back with the fractured condyle, so as to produce a considerable projection at the posterior part of the joint.

Reduction.

The impediments to the reduction of dislocation are often imputed to causes which do not exist. In some joints the form of the bone gives rise to difficulty, but in a much less degree than is generally supposed. When the socket is surrounded by a lip of bone, as in the hip-joint, the head of the bone in its reduction stops at this projection, and it requires to be lifted over it. Also when the head of a bone is much larger than its cervix, a difficulty arises from this cause, as for example, in the dislocation of

Difficulty in bone.

the head of the radius, but still these causes are slight, in comparison with others which we have to detail.

The ligaments.

The capsular ligaments are supposed to resist reduction. But those who are of that opinion, must forget their inelastic structure, and cannot have had opportunities of witnessing by dissection the extended laceration which they sustain in dislocations from violence; the idea of the neck of the bone being girt or confined by the ligament is quite untrue. The capsular ligaments in truth possess but little strength either to prevent dislocation, or to resist the means of reduction: if the tendons with which they are covered, and the peculiar ligaments of the joints did not exist, dislocation must be of very frequent occurrence.

Tendons.

The joint of the shoulder, and that of the knee and elbow, are strongly protected by tendons; the shoulder by the tendons of the spinati, subscapularis and teres minor muscles; the elbow by the triceps and brachialis; the knee by the tendinous expansion of the vasti; but still it is an error to suppose that some ligaments do not powerfully resist dislocations; but these are the peculiar—not the capsular ligaments.

Peculiar ligaments.

The wrist and the elbow have their peculiar ligaments, to give strength to the structure of these joints. The shoulder, instead of a peculiar ligament, has the tendon of the biceps received into it to render dislocation forwards more difficult; the hip-joint possesses its ligamentum teres, to prevent a ready dislocation downwards; the knee has its lateral and crucial ligaments;

and the ankle is provided with ligaments of the same kind, and of very extraordinary strength, to prevent a dislocation, exposed as it is to the most severe injuries; and the bones of this joint rather break than their ligaments give way: however, in many of the joints, as these ligaments are torn, they afford no resistance to the reduction of dislocation, as in the hip, elbow, and wrist; but if one of them remains, it produces some difficulty in the reduction, as I have seen in the knee-joint.

The difficulty in reducing dislocation principally arises from the resistance which the muscles give by their contraction, and which is proportioned to the length of time which has elapsed since the injury; and therefore it is desirable that the attempt at reduction should not be long delayed. Muscles.

The common actions of the muscles are voluntary or involuntary, but they have a power of contraction independent of either state.

A muscle soon fatigues, when excited to action by volition, and it requires rest. The arm can only be extended for a few minutes at right angles with the body, before it feels a fatigue, which requires suspension of action. The heart also has its contraction and relaxation.

But when a muscle is divided, its parts contract, or when the antagonist muscle is cut, the undivided muscle draws the parts into which it is inserted into a fixed situation. Thus, if the biceps muscle be divided, the

triceps keeps the arm constantly extended; if the muscles on one side of the face are paralytic, the opposing muscles draw the face to that side. This contraction is not succeeded by fatigue or relaxation, but will continue an indefinite time, even until the structure of the muscle becomes changed, and its contraction increases daily in its power of resistance from the first occurrence of the accident. Thus it is that when a bone is dislocated, the muscles draw it as far from the joint as the surrounding parts will allow, and there by their contraction they fix it. It is this resistance from muscles, aided by their voluntary contraction, which it is the business of the surgeon to counteract. If an extension be made almost immediately after a dislocation has happened, the resistance produced by the muscles is easily overcome; but if the operation is protracted for a few days only, the utmost difficulty occurs in effecting it.

That the muscles are the chief cause of resistance is strongly evinced, by those cases in which the dislocation is accompanied by injury to any vital organ; for it is then found, that a very slight force is sufficient to return the bone to its situation. Thus in the man who had an injury to his jejunum, and a dislocation of the hip, in the case already mentioned, the bone was restored to its place most easily.

With respect to the means to be employed, for reducing dislocations, it is now generally agreed amongst the most eminent surgeons,

that force should be only gradually applied. Violence is as likely to tear sound parts as to reduce those which are luxated; it calls up all the powers of resistance to oppose the efforts making by the surgeon. But it is the surgeon's duty to produce gradually that state of fatigue and relaxation which is sure to follow continued extension, and not to attempt at once to overpower the action of the muscles.

Force gradual.

When a dislocation has long happened, difficulties arise from three other circumstances: the extremity of the bone contracts adhesion to the surrounding parts, so that even when in dissection the muscles are removed, the bone can not be reduced. In this state I found the head of a radius, which had been long dislocated upon the external condyle of the os humeri, and which is preserved in the Collection at Saint Thomas's Hospital, and in this state I have also seen the os humeri when dislocated. The socket is also sometimes filled with adhesive matter, that if the bone was reduced it could not remain in its original situation. Lastly, a new bony socket is sometimes formed in which the head of the bone is so completely confined, that nothing but its fracture could allow it to escape from its new situation. See Plate I.

Other difficulties.

The means employed for the reduction of dislocations are either constitutional or mechanical; it is generally wrong to employ force only, as it becomes necessary to use it in such a degree as to occasion violence and injury, and it will in the sequel be shewn that the most powerful mechanical means fail when unaided

Means of reduction.

by constitutional. The power of the muscles in the first instance, is to be duly appreciated, which forms the principal cause of resistance. The means to be employed for the purpose, are to produce a tendency to syncope and sometimes fainting itself, by the abstraction of a quantity of blood, and by placing the patient in a warm-bath to occasion a similar feeling. If the blood be removed quickly, by a large orifice, it is known that fainting is more readily produced, and a hot-bath from 100° to 110° will often not produce syncope, unless blood has been previously drawn.

Constitutional.

But of late years I have practised another mode of lowering the action of the muscles, by exhibiting nauseating doses of tartarized antimony. This given in repeated doses, produces sickness but not vomiting; emetics have been recommended, and there is no doubt but the state of nausea which they produce is useful; but the vomiting is in itself of no use, for as soon as the nauseating effect is produced, the muscles lose their tone, and dislocations can be reduced, with comparatively less effort, and at a more distant time from the accident, than can be effected in any other way. Two cases are related in the following pages. One from Mr. Norwood, surgeon, Hertford, the other from Mr. Thomas, apothecary to Saint Luke's Hospital, in which, by the combination of bleeding, warm-bath, and nauseating doses of tartarized antimony, dislocations were reduced at a period from the accident, greater than I have ever known in any other example. One of these

Nausea.

cases occurred at Guy's and the other at Saint Thomas's Hospital, at the time these gentlemen were officiating as dressers. (See cases of dislocation on the ilium.)

Opium.

The effect of opium I have never tried, but it would probably be useful from its power of diminishing the nervous influence.

Mechanical means.

The reduction of the bone is to be attempted after lessening the powers of the muscles, by making an extension of the limb, by fixing one bone, and drawing the other towards its socket. One great cause of failure, in the attempt to reduce dislocations, arises from insufficient attention to not fixing that bone in which the socket is placed. As for example, in attempting to reduce a dislocation of the shoulder, if the scapula be not fixed, or one person pulls at the scapula and two at the arm, the scapula is necessarily drawn with the os humeri, and the extension is very imperfectly made; the one bone therefore must be as firmly fixed as the other is extended.

Compound pulley.

The force may be applied either by the exertion of assistants or by a compound pulley, but the object is to extend the muscles by gradual, regular, and continued force; the pulley in cases of difficulty should always be resorted to; its force may be directed by the surgeon's mind; but when assistants are employed, their exertions are sudden, violent, and often ill-directed, and the force is more likely to produce laceration of parts, than to restore the bone to its situation. Their efforts are also often uncombined, and their

muscles necessarily fatigue, as those of the patient whose resistance they are employed to overcome.

In dislocation of the hip-joint, pullies should always be employed, and in those dislocations of the shoulder which have remained long unreduced, they should always be resorted to. I do not mean to doubt of the possibility of reducing dislocation of the hip by the aid of men, but to point out the inferiority of this mode to the pullies. Most writers on surgery have hinted at the use of pullies, but they have not duly appreciated them: my good master, Mr. Cline, whose professional judgment no man can deny, always strongly recommended them.

During the attempt to reduce luxations, the surgeon should always endeavour to obtain a relaxation of the stronger muscles. The limb should therefore be kept in a position between flexion and extension, as far as it can be. Who has not seen in the attempt to reduce a compound fracture in the extended position of a limb, the bone incapable of being brought in apposition under the most violent efforts, quickly replaced by an intelligent surgeon, who immediately directed the limb to be bent, and the muscles to be placed in a comparative state of relaxation?

A difference of opinion prevails, of whether it is best to apply the extension on the dislocated bone or on the limb below. M. Boyer, who has long taken the lead in surgery in Paris, prefers the latter mode. As far as I have had an opportunity of observing, it is generally best to apply the extension to the bone

which is dislocated. There are exceptions to this however, in the dislocation of the shoulder, which I generally reduce by placing the heel in the axilla, and by drawing the arm at the wrist in a line with the side of the body, as when the arm is placed close to the side, the pectoral muscle and the latissimus dorsi are brought into a state of relaxation, and they form a powerful opposition when the arm is carried far from the side.

Great advantage is derived in the reduction of dislocations, from attending to the patient's mind; the muscles opposing the efforts of the surgeon, by acting in obedience to the will, may have that action suspended by directing the mind to other muscles. Several years ago a surgeon in Blackfriars Road, asked me to see a patient of his with a dislocated shoulder, which had resisted the various attempts he had made at reduction. I found the patient in bed with his right arm dislocated; I sat down on the bed by his side, placed my heel in the axilla, and drew the arm at the wrist; the dislocated bone remained unmoved. I said, Rise from your bed, Sir; he made an effort to do so, whilst I continued my extension, and the bone snapped into its socket; for the same reason, a slight effort, when the muscles are unprepared, will succeed in reduction of dislocation, after violent measures have failed.

Influence of the mind.

When a bone has been reduced by the pullies, it will not remain in its situation without the aid of bandages, which a rerequired to support it till muscular action returns. The hip,

Second dislocation

however, is rarely dislocated a second time, but the shoulder and the lower jaw very frequently slip from their sockets, owing to the difference of the depth of the socket in these joints, and therefore they require bandages for some time subsequent to reduction.

On the Dislocations of the Hip-Joint.

The acetabulum of the hip-joint is deepened by a cartilaginous edge, which surrounds its brim, and it is made a complete cup in the recent subject by another cartilage which fills up a depression in the bone, in the inferior and anterior part of the cavity.

The ligaments are two: the capsular arises from the edge of the acetabulum, and passing over the head and neck of the bone is inserted into the cervix at the root of the trochanter major it is thick at its fore part, and thin posteriorly. Strong portions of ligament are extended over it, from the ilium near its anterior and inferior spinous process. The ligamentum teres, which is contained within the capsular ligament, proceeds from a depression in the lower and inner part of the acetabulum to be fixed in a hollow upon the inner side of the head of the thigh-bone.

The synovial membrane lines the capsular ligament, and is reflected upon the neck of the thigh-bone, and on the ligamentum teres. The round ligament has a tendency to prevent dislocations in all directions, but particularly the dislocation downwards.

The thigh-bone I have seen dislocated in

four directions only. First, upwards or upon the dorsum of the ilium. Secondly, downwards, or into the foramen ovale. Thirdly, backwards and upwards, or into the ischiatic notch: and, Fourthly, forwards and upwards, or upon the body of the pubis. No dislocation downwards and backwards has occurred at St. Thomas's or Guy's Hospital, in the last thirty years, or in my private practice; and I doubt its existence, although I would not deny the possibility of its recurrence, being disposed to believe some mistake has arisen upon this subject.

Of the Dislocation upwards, or on the Dorsum of the Ilium.

This dislocation is the most frequent of those which happen to the hip-joint, and the following are the signs by which its existence is known.

Symptoms.

The limb on the dislocated side is from one inch and an half to two inches and an half shorter than the other, and this is well seen by comparing the malleoli interni. On the dislocated side the toe rests against the tarsus of the other foot. The knee and the foot are turned inwards, and the knee is a little advanced upon the other. When the leg is attempted to be separated from the other it cannot be accomplished, for the limb is firmly fixed in its new situation, so far as regards its relation outwards; but the thigh can be slightly bent across the other. If so much blood has not been effused, as to conceal the bones, the

head of the thigh-bone can be perceived under rotation of the knee inwards, moving upon the dorsum of the ilium, and the trochanter major advances towards the spinous process of the ilium, so as to be felt much nearer to it than usual. The trochanter is less prominent than that on the opposite side, for the neck of the bone and the trochanter are resting in the line of the surface of the dorsum ilii: upon a comparison of the two hips, the roundness of the dislocated side has disappeared. A surgeon then, called to a severe and recent injury of the hip-joint, looks for a difference in length, change of position inwards, diminution of motion, and decreased projection of the trochanter. The accident with which the dislocation upwards is liable to be confounded, is the fracture of the neck of the thigh-bone, within the capsular ligament. Yet the marks of distinction are generally sufficiently strong to prevent an error in a person commonly attentive. In a fracture of the neck of the thigh-bone, the knee and foot are generally turned outwards: the trochanter is drawn backwards: the limb can be readily bent towards the abdomen, although with some pain: but above all, the limb which is shortened from one to two inches, by the contraction of the muscles, can be made of the length of the other by a slight extension, and when the extension is abandoned, the leg is again shortened. If when extended the limb is rotated, a crepitus can often be felt, which ceases when rotation is performed under a shortened state of the

limb. The fractured neck of the thigh-bone within the capsular ligament, rarely occurs but in advanced age, and it is the effect of the most trifling accidents, owing to the absorption which this part of the bone undergoes at advanced periods of life. Fractures externally to the capsular ligament occur at any age, but generally in the middle periods of life; and these are easily distinguished by the crepitus which attends them, if the limb is rotated, and the trochanter is compressed with the hand. The position is the same as in fractures within the ligament. The proportion of fractures of the neck of the thigh-bone, which I have seen, is at least four cases to one of dislocation. See the Plate for the positions of the limb in dislocations.

Diseases of the hip-joint can scarcely be confounded with dislocations from violence, but by those who are not anatomists, and are incapable of observation. The gradual growth of the symptoms, the pain in the knee, the apparent elongation at first, and real shortening afterwards, the capacity for motion, yet the pain given under extremes of rotation, as well as of flexion and extension, are marks of difference which would strike the most careless observer. In diseases of this kind, when they have existed a great length of time, ulceration of the ligaments, acetabulum, and head of the bone, allow of such a change of situation of parts, as to give to the limb the position of dislocation; but the history of the case at once informs the medical attendant of the nature of the disease.

In the dislocation upwards, the pyriformis and the glutei muscles are all shortened, as are also the triceps and pectineus, the psoas magnus and iliacus internus, the rectus, the semitendinosus and semimembranosus, and one head of the biceps. The obturator externus is shortened, but the obturator internus, gemini and quad-

Muscles. ratus are put upon the stretch. The muscles which, more than others, resist the reduction, are the glutei and triceps.

Cause. The cause of this dislocation is, that the patient falls when the knee and foot are turned inwards, or he receives a blow whilst the limb is in that position, and the head of the bone is then dislocated upwards, and turned backwards.

Reduction. In the reduction of this dislocation the following plan is to be adopted: take from the patient from twelve to twenty ounces of blood, or even more, if he be a very strong man; and then place him in a warm-bath at the heat of 100°, and gradually increase it to 110°, until he feels faint. During the time he is in the warm-bath, give him a grain of tartarized antimony every ten minutes until he feels some nausea, then remove him from the baths and put him in blankets, and place him between two strong posts about ten feet from each other, in which two staples are fixed; or rings may be screwed into the floor, and the patient be placed upon it. The patient is to be placed on a table covered with a thick blanket, upon his back; then a strong girt is passed between his pudendum and thigh, and this is fixed to one of

the staples. (See Plate.) A wetted linen roller is then tightly applied just above the knee, and upon this a leather strap is buckled, having two straps with rings at right angles with the circular part. The knee is to be slightly bent, but not quite to a right angle, and brought across the other thigh a little above the knee. The pullies are fixed in the other staple, and in the strap above the knee. The patient being thus adjusted, the surgeon slightly draws the string of the pulley, and when he sees that every part of the bandage is upon the stretch, and the patient begins to complain, he waits a little to give the muscles time to fatigue; he then draws again, and when the patient complains much, again rests, until the muscles yield. Thus he gradually proceeds until he feels the head of the bone descend. When it reaches the lip of the acetabulum, he gives the pulley to an assistant, and desires him to preserve the same state of extension, and the surgeon then rotates the knee and foot gently outwards, doing it not with a violence to excite opposition in the muscles, and in this act the bone slips into its place. In general it does not return with a snap into its socket when the pullies are employed, because the muscles are so much relaxed, that they have not sufficient tone remaining to permit them to act with violence, and the surgeon only knows of the reduction by loosening the bandages. It often happens that the bandages get loose before the extension is completed, which should be guarded against as much as possible, by having them well secured

at first, but if they are obliged to be renewed, as little time as possible should elapse in their re-application, to prevent the muscles having time to recover their tone.

It is sometimes necessary to lift the bone by placing the arm under it near the joint, when there is difficulty in bringing it over the lip of the acetabulum.

After the reduction, in consequence of the relaxed state of muscles, great care is required in returning the patient to his bed.

The two cases which follow, shew the advantage derived from the employment of constitutional as well as mechanical means. I am indebted to Mr. Norwood, surgeon at Hertford, for the detail of the following

CASE.

William Newman, a strong, muscular man, near 30 years of age, was admitted into Guy's Hospital, on Wednesday, December 4th, 1812, under the care of Mr. Astley Cooper, for a dislocation of the hip-joint. In springing from the shafts of a waggon, on Thursday, November 7th, his foot slipped and his hip was driven against the wheel with considerable force. He immediately fell, and being found to be unable to walk, was carried to Kingston Workhouse, which was near the place at which the accident happened. On the evening of that day, he was examined by a medical man, but the nature of the accident was not ascertained. He remained at Kingston until the 31st of Novem-

ber, and was then removed to Guilford, his place of residence, and from thence was sent on the 4th of December, to Guy's Hospital. On examination, the head of the thigh-bone was found resting on the dorsum ilii, the trochanter was thrown forwards, towards the anterior superior spinous process of the ilium. The knee and foot were turned inwards, and the limb shortened one inch and an half; the great toe rested upon the metatarsal bone of the other foot, and there was but little motion in the limb.

On Saturday, December the 7th, being thirty days after the accident, he had an extension made to reduce the limb, and previously to the application of the bandages, he was bled to twenty-four ounces from his arm; in about ten minutes after this he was put into a warm bath where he remained until he became faint, which happened in fifteen minutes; he then had a grain of tartarized antimony given him, which was repeated in sixteen minutes, as the first dose did not produce nausea. The most distressing nausea was now quickly produced, but he did not vomit, and under the influence of this debilitating cause, he was carried into the operating theatre in a state of great exhaustion. He was placed on a table on his left side. The bandage was applied in the usual manner to fix the pelvis, and the pullies were fastened to a strap around the knee. The thigh was drawn obliquely across the other, not quite two-thirds of its length downwards, and the extension was continued for ten minutes, when the bone slipped into its socket. The man was discharged from

the hospital in three weeks from the period of his admission, making a rapid progress towards a recovery of the perfect use and strength of the limb.

CASE II.

For these details I am indebted to Mr. Thomas, who is now apothecary to St. Luke's Hospital, but who attended this case as dresser, at St. Thomas's Hospital.

William Chapman, aged 50 years, was admitted into St. Thomas's Hospital, on Thursday, September 10th, 1812, with a dislocation of the hip, upon the left dorsum ilii, which was occasioned by the mast of a ship falling upon the part, and throwing him down on the Wednesday *six weeks* prior to his admission into the hospital. It was reduced on Friday the 11th of September, in the following manner. The patient was bled by opening a vein in each arm, and thirty-four ounces of blood were taken away. He was then put in a warm-bath, and a grain of tartarized antimony given him, and was repeated every ten minutes, which, with the previous means, produced fainting and nausea.

The patient was then placed on a table on his right side, and a girt was carried between his thighs and over his pelvis, so as to completely confine it; a wetted roller was applied above the knee, and upon it a leathern belt, with rings for the pullies. The extension was then made in a direction so that the dislocated thigh crossed

the other below its middle, which in half an hour succeeded in reducing it.

Contrast this case with the following

CASE III.

I was desired to visit a man aged 28 years, who, by the overturn of a coach, had dislocated his left hip more than five weeks before, and who had been declared not to have a dislocation, although the case was extremely well marked. His leg was full two inches shorter than the other; his knee and foot turned inwards; and the inner side of the foot rested opposite to the malleolus internus of the other leg. The thigh was slightly bent towards the abdomen, and the knee was advanced over the other thigh. The head of the thigh-bone could be distinctly felt upon the dorsum of the ilium; and when the two hips were compared, the natural roundness of the dislocated side had disappeared. I used only mechanical means in my attempts at reduction, and although I employed the pullies, and varied the direction of repeated extensions, I could not succeed in replacing the bone, and this person returned to the country with the dislocation unreduced.

In the following case, the extensions were made by men without the aid of pullies.

CASE IV.

William Piper, aged 25 years, had the wheel of a cart laden with hay pass between his legs

and over the upper part of his right thigh. Mr. Holt, surgeon at Tottenham, was sent for to him, who found the thigh dislocated, but not until so much time had elapsed as to leave little probability of a successful extension. The limb Mr. Holt found shorter than the other; the head of the bone was seated upon the dorsum ilii; the knee and foot were turned inwards. As I visited Tottenham frequently at that time, Mr. Holt asked me to see the man with him, and we agreed to the propriety of making a trial to reduce it. Mr. Holt and myself, assisted by five strong men, exerted our best endeavours to put the bone in its socket. Repeatedly fatigued, we were several times obliged to relax and renew our attempts. At length, exhausted, we were about to abandon any further trial, but agreed to make one last effort, when at fifty-two minutes after the commencement of the attempt, the bone slipped into its socket.

I also, in a case which I attended with Mr. Dyson in Fore Street, succeeded in reducing the limb without the pullies; but the violence used was so great, the extension so unequal, and our fatigue was nearly as severe as that of the patient, that I am confident no person who had used pullies in dislocation of the hip, would have recourse to any other mode, excepting in the dislocation into the foramen ovale.

On the Dislocation downwards, or in the Foramen Ovale.

Mode of the accident

This accident happens when the thighs are widely separated from each other. The ligamentum teres and the lower part of the capsular ligament are torn through, and the head of the bone becomes situated in the posterior and inner part of the thigh upon the obturator externus muscle. The limb is in this case from two to three inches longer than the other. The head of the bone can be felt by pressure of the hand, upon the inner and upper part of the thigh towards the perineum. The trochanter major is less prominent than on the opposite side. The body is bent forwards, owing to the psoas and iliacus internus muscles being put upon the stretch. The thigh is considerably advanced if the body be erect; the knee is widely separated from the other, and cannot be brought without great difficulty near the axis of the body to touch the other knee, owing to the extension of the glutei and pyriformis muscles. The foot, though widely separated from the other, is neither turned outwards or inwards generally, although I have seen it varying a little in this respect in different instances; but the position of the foot does not in this case mark the accident. It is the bent position of the body, the separated knees, and the increased length of the limb, which are the diagnostic symptoms.

Signs of.

Dissection. We have an excellent preparation of this accident in the collection at St. Thomas's Hospital, which I dissected many years ago. The head of the thigh-bone was found resting in the foramen ovale, but the obturator externus muscle was entirely absorbed, and the ligament naturally occupying the foramen, was entirely converted into bone. Around the foramen ovale bony matter was deposited, so as to form a deep cup, in which the head of the thigh-bone was inclosed, but in such a manner as to allow of considerable motion; and the cup thus formed surrounded the neck of the thigh-bone without touching it, so as to inclose the head, that it could not be removed from its new socket without breaking its edges. The inner side of this new cup was extremely smooth, having not the least ossific projection at any part of it to impede the motion of the head of the bone, which was only restrained by the muscles from its usual movements. The original acetabulum was half filled by bone, so that it could not have received the ball of the thigh-bone if it had been put back into its natural situation. The head of the thigh-bone was very little altered; its articular cartilage still remained; the ligamentum teres was entirely broken, and the capsular ligament partially torn through; the pectinalis muscle and adductor brevis had been lacerated, but were united by tendon; the psoas muscle and iliacus internus, the glutei and pyriformis were all upon the stretch. Nothing can be more curious, or to the surgeon and physiologist more beautiful, than the changes produced by this

neglected accident in shewing the resources of nature in producing restoration.

The reduction of this dislocation is generally very easily effected. If the accident has happened recently, all that is required is to place the patient upon his back, to separate the thighs as widely as possible, and to place a girt between the pudendum and upper part of the thigh, fixing it to a staple in the wall. The surgeon then puts his hand upon the ancle of the dislocated side, and draws it over the sound leg, and thus it slips into its socket. Thus I saw a dislocation reduced, which had happened very recently, and which was subjected to an extension in St. Thomas's Hospital almost immediately after the man's admission. In this case the patient might have the thigh fixed by the bed-post, received between the pudendum and the upper part of the limb, and the leg be carried inwards across the other. But in general it is required to fix the pelvis by a girt passed around it, and crossed under that which passes around the thigh, otherwise the pelvis moves in the same direction with the head of the bone. (See Plate.) And in those cases in which the dislocation has existed for three or four weeks, it is best to place the patient upon his side, to fix the pelvis by one bandage, and to carry another under the thigh to which the pullies are affixed, and to draw the thigh upwards; whilst the surgeon presses down the foot, to prevent the lower part of the limb being drawn with the thigh-bone. Thus the limb is used as a lever with very considerable power. Great care must be taken not to advance the leg in any considerable degree, other-

Reduction.

wise the head of the thigh-bone will be forced behind the acetabulum into the ischiatic notch, from whence it cannot be afterwards reduced.

Of the Dislocation backwards, or in the Ischiatic Notch.

Nature of the accident.

In this dislocation the head of the thigh-bone is placed on the pyriformis muscle, between the edge of the bone which forms the upper part of the ischiatic notch, and the sacro-sciatic ligaments. The head of the bone is placed behind the acetabulum, and a little above the level of the middle of that cavity.

Detection difficult.

It is the dislocation most difficult both to detect and to reduce:—to detect, because the length of the limb differs but little, and its position is not so much changed as regards the knee and foot, as in the dislocation upwards: to reduce, because the head of the bone is placed deep behind the acetabulum, and it therefore requires to be lifted over its edge, as well as to be drawn towards its socket.

Signs.

The signs of this dislocation are, that the limb is about half an inch to one inch shorter than the other, but generally not more than half an inch; that the trochanter major is behind its usual place, but is still remaining nearly at right angles with the ilium, with a slight inclination towards the acetabulum. The head of the bone is so buried in the ischiatic notch, that it cannot be distinctly felt but in thin persons, and then only by rolling the thigh-bone forwards as far as the comparatively fixed state

of the limb will allow. The knee and the foot are turned inwards, but not nearly so much as in the dislocation upwards, and the toe rests against the ball of the great toe of the other foot. When the patient is standing, the toe touches the ground; but the heel does not quite reach it. The knee is not so much advanced as in the dislocation upwards, but is still brought a little more forward than the other, and is slightly bent. The limb is fixed, so that both flexion and rotation are in a great degree prevented. Signs.

We have a good specimen in the collection at St. Thomas's Hospital, which I met with accidentally in a subject brought for dissection. The original acetabulum is entirely filled with a ligamentous substance, so that the head of the bone could not have been received into it. The capsular ligament is torn from its connection with the acetabulum. The ligamentum teres is broken, and an inch of it adheres still to the head of the bone. The head of the bone rests behind the acetabulum on the pyriformis muscle, at the edge of the notch above the sacro-sciatic ligaments. The muscle on which it rests is diminished, but there has been no attempt made to form a new socket in bone for the head of the os femoris. Dissection.

Around the head of the thigh-bone a new capsular ligament is formed; it does not adhere to the articulatory cartilage of the ball of the bone which it surrounds, but could, when opened, be turned back to the neck of the thigh-bone, so as to leave its head completely

exposed. Within this new capsular ligament which is formed of the surrounding cellular membrane, the broken ligamentum teres is found. (See Plate.) The trochanter major is rather behind the acetabulum, but a little inclined towards it. This dislocation must have happened, from the appearances of the parts, a length of time; the adhesions were too strong to have admitted of any reduction, and, if reduced, the bone could not have remained in its original socket.

Cause. This dislocation is produced by force, being applied when the body is bent forward upon the thigh, or when the thigh is bent towards the abdomen; when, if the knee be pressed inward, the head of the bone is thrown behind the acetabulum.

Reduction. The reduction of the dislocation in the ischiatic notch is generally extremely difficult, and is best effected in the following manner: The patient lies on a table upon his side, and a girt is to be placed between the pudendum and the inner part of the thigh to fix the pelvis. Then the leather strap for the pullies is applied above the knee, upon which a wetted roller is tightly applied. A napkin is to be carried under the upper part of the thigh. The thigh-bone is then brought across the middle of the other thigh, measuring from the pubis to the knee, and the extension is to be made with the pullies. Whilst this is conducting, an assistant pulls the napkin at the upper part of the thigh with one hand, and rests the other upon the brim of the pelvis, and thus lifts the bone as it is drawn towards the aceta-

bulum over its lip. For the napkin I have seen a round towel very conveniently substituted, and this was carried under the upper part of the thigh, and over the shoulders of an assistant, who then rested his hands on the pelvis, as he raised his body and lifted the thigh.

Although the above is the mode in which this dislocation is most easily reduced, yet I have seen a different mode practised, and I shall mention it here, as it shews how the muscles, opposing the pullies, will draw the head of the bone to its socket, when it is lifted from the cavity into which it has fallen.

CASE.

A man, aged 25, was admitted into Guy's Hospital, under the care of Mr. Lucas; upon examination the thigh was found dislocated backwards; the limb scarcely differed in length from the other, not being more than half an inch shorter; the groin appeared depressed; the trochanter was resting a little behind the acetabulum, but inclined upon it; the knee and foot were turned inwards, and the head of the bone could in this case be felt behind the acetabulum. An extension was made by pullies in a right line with the body; and at the time this extension was made, the trochanter major was thrust forwards with the hand, and the bone returned in about two minutes into its socket with a violent snap.

I have already mentioned, that I have seen no instance of a dislocation downwards and

backwards; and when I state that I have been an attentive observer of the practice of our hospitals for thirty years, was also for many years in the habit of daily seeing the poor of London at my house early in the morning, and have had a considerable share of private practice, if such a case does ever occur, it must be extremely rare. I cannot help thinking also, that some anatomical error must have happened, as in the dislocation downwards and backwards it is described as being received still in the ischiatic notch, but this notch is in the natural position of the pelvis, above the level of the line, drawn through the middle of the acetabulum, and therefore it is that the leg is shorter, not longer, when the bone is dislocated into the ischiatic notch.

Of the Dislocation on the Pubis.

Cause. This dislocation is more easy of detection than any other of the thigh. It happens from a person in walking putting his foot into some unexpected hollow in the ground, and his body at the moment is bent backwards; the head of the bone is thrown forwards upon the pubis. A gentleman who had met with this dislocation in his own person, told me that it happened whilst he was walking across a paved yard in the dark, and he did not know that one of the stones had been taken up: his foot suddenly sunk into the hollow, and he fell backwards; and when his limb was examined, the head of the thigh-bone was found upon the pubis.

The limb is in this case an inch shorter than the other; the knee and the foot are turned outwards, and cannot be rotated inwards, but there is a slight flexion forwards and outwards; and in a dislocation which had been long unreduced, the motion at the knee backwards and forwards was full twelve inches; but the striking criterion of this dislocation is, that the head of the thigh-bone may be distinctly felt upon the pubis, above the level of Poupart's ligament, to the outer side of the femoral artery and vein. It feels as a hard ball there, which is readily perceived to move by bending the thigh-bone. Yet although this case is apparently so easy of detection, I have known three instances, in which it was overlooked, until it was too late for reduction. One, of which we have now a preparation at St. Thomas's Hospital; one in a gentleman from the country, in whom it was not discovered until some weeks after the accident. He then submitted to an extension which did not succeed, and came to London to ask my opinion, when I advised him against a further extension, and, indeed, he was himself averse to any other trial. The third was a patient in Guy's Hospital, who was admitted for an ulcerated leg, and was found to have a dislocation upon the pubis, which had happened some years before. It really must be great carelessness which leads to this error, as the case is so strikingly marked.

Symptoms.

Not detected.

I dissected one of these dislocations, and we have it preserved in our Anatomical Collection. It shews changes of parts nearly, but not quite

Dissection.

equal to those in the dislocation into the foramen ovale. The original acetabulum was partially filled by bone, and in part occupied by the trochanter major, and both were much altered in their form. The capsular ligament was extensively lacerated, and the ligamentum teres was broken. The head of the thigh-bone had torn up Poupart's ligament, so as to be admitted between it and the pubis. The head and neck of the thigh-bone were flattened and much changed in their form. Upon the pubis a new acetabulum was formed from the neck of the thigh-bone, for the head of the bone was above the level of the pubis. The new acetabulum extended upon each side of the neck of the bone, so as to lock it upon the pubis. (See Plate.) Poupart's ligament confined it on the forepart; on the inner side of the neck of the bone, passed the artery vein and nerve, so that the head of the bone was between the crural sheath and the anterior and inferior spinous process of the ilium.

This accident might, by an inattentive observer, be mistaken for a fracture of the neck of the thigh-bone, but the head of the bone felt upon the pubis, will at once decide its nature.

Reduction. In the reduction of this dislocation, the patient is placed upon his side on a table; the girt is to be carried between the pudendum and inner part of the thigh, and is to be fixed in a staple, a little before the line of the body. The pullies are fixed above the knee, as in the dislocation upwards, and then the extension is

to be made in a line behind the axis of the body, the thigh-bone being drawn backwards. After this extension has been for some time continued, a napkin is to be carried under the upper part of the thigh, and an assistant pressing with one hand on the pelvis, lifts the head of the bone over the pubis and edge of the acetabulum. The following case which occurred in Guy's Hospital, at the time my friend Mr. now Dr. Gaitskill, was a dresser to Mr. Forster, will best exemplify the mode of reduction. He was a dresser in the years 1803 and 1804.

Bath, August 13, 1817.

DEAR SIR,

The report of the case of dislocated thigh, which I have sent you, contains every material circumstance within my recollection; it will afford me much pleasure if you can extract any thing from it useful, or conducive to your purpose.

I remain your's, most sincerely,

JOSEPH A. GAITSKILL.

CASE.

A. B. with a dislocation of the os femoris, upon the pubis, was admitted into Guy's Hospital, under Mr. Forster, during the time I was one of his dressers.

The length of the limb was somewhat diminished; the foot and knee turned outwards; but the circumstance which more clearly evinced the nature of the accident was, that the head

of the thigh-bone could be distinctly perceived under the integuments near the groin, where its shape could be ascertained, as well as its motion felt when the thigh was moved. The accident had happened from a slip or fall, he had sustained about three hours before.

With respect to the reduction; as the man was brought into the hospital in the evening, when Mr. Forster was absent, I considered it my duty to attempt to replace the bone immediately. I therefore ordered the patient to be carried into the operating theatre; whilst this was doing, I invited my three brother dressers into the surgery, informed them of the accident, and to avoid confusion, requested each to take some particular part in the process of reduction. The patient was placed on his sound side upon a table, the pullies applied to the thigh in the usual manner, and extension began in a straight line, with the design of raising the head of the bone into its socket, but without success. Reflecting then a moment on the mechanism of the bones, and their new relative situation, I changed the line of extension to a little backwards and downwards, and passing a towel over my own shoulders, and under the superior part of the man's thigh, raised it by extending my body.

The leg being kept bent, as from the beginning of the operation, nearly to a right angle with the thigh, I requested one of the dressers to take hold of the ankle, and raise it, keeping the knee at the same time depressed, by which means, the thigh was turned over inwards, and

in a very short time, the head of the bone snapped into its acetabulum.

Dr. Dorsey, a most intelligent surgeon in America, who, I sincerely hope, may continue his professional career with the same ardour and good sense which he has hitherto manifested, mentions a case of dislocation on the pubis, in which the head of the thigh-bone was placed below Poupart's ligament, and the leg was longer, but this was an exception to a general rule.

Of Fractures of the Os Innominatum.

Mistaken.

As these accidents are liable to be mistaken for dislocations, and as any extension made for them adds extremely to the patient's sufferings, and is in danger of producing fatal consequences if there was previously a probability of recovery, I am anxious to say a few words upon them at this moment.

Symptoms.

When a fracture of the os innominatum happens through the acetabulum, the head of the bone is drawn upwards, and the trochanter somewhat forwards, so that the leg is shortened, and the knee and foot are turned inwards: such a case then may be readily mistaken for dislocation. If the os innominatum is disjointed from the sacrum, and the pubis and ischium are broken, the limb is slightly shorter than the other; but in this case the knee and foot are not turned inwards. Of the first of these accidents I have seen two examples; of the latter only one.

Detection. These accidents are generally to be detected by a crepitus being perceived in the motion of the thigh, if the hand be placed upon the crista of the ilium; and they are attended with more motion than occurs in dislocations.

With respect to the appearances on dissection, they will be seen in the Plates.

CASE.

A man was brought into St. Thomas's Hospital in January 1791, on whom a hogshead of sugar had fallen. Upon examination, the right leg was found about two inches shorter than the left, and the knee and foot were turned inwards. These circumstances induced the surgeon under whose care he fell, to think the case a dislocation, although as he stated the limb appeared to be more moveable than usually happens in such accidents, and there was a great contusion and considerable extravasation of blood. The surgeon used the utmost caution in making a very slight extension, but which did not succeed; and whilst it was performing, a crepitus was discovered in the os innominatum. The man had a remarkable depression of strength and paleness of countenance, and appeared to be sinking. In the evening he died.

Upon examination of the body the following appearances were observed:

The posterior part of the acetabulum was broken off, and the head of the thigh-bone had slipped from its socket; the tendon of the ob-

turator internus and the gemini tightly embraced the neck of the bone; the fracture extended from the acetabulum across the os innominatum to the pubis; the pubes were separated at the symphysis nearly an inch asunder, and a portion of the cartilage was torn from the right pubis and adhered to that on the left side; the ilia were separated on each side, and the pubis, ischium and ilium broken on the left side; the abdomen contained about a pint of blood, and the left kidney was greatly bruised; the integuments were stripped off the patella and knee on one side, so as to expose the capsular ligament.

In a second case of this kind which was admitted into St. Thomas's Hospital, having at its admission the appearance of the dislocation backwards, the patient lived four days. On examination, the fracture was found passing through the acetabulum dividing the bone into three parts, and the head of the thigh-bone was deeply sunken into the cavity of the pelvis. (See plate.)

The following case of fracture and dislocation of the bones of the pelvis, lately occurred in Guy's Hospital, and I am obliged for the particulars to Mr. Sandford, who attended to this woman as dresser.

CASE.

Mary Griffiths, aged 30 years, was admitted into Guy's Hospital at 5 o'clock in the afternoon of the 8th of August, 1817. Her pelvis

had sustained a severe injury from her body being pressed by the wheel of a cart against a lamp-post.

A small quantity of blood had been taken from her arm previous to her admission, and as she was very pale, her pulse was extremely weak, and her fæces passed involuntarily, no more blood was drawn.

Soon after her admission, she was examined by placing her on the face, and one of my hands on the back of the right ilium, and the other on the pubis of the same side, a distinct motion and crepitus could be perceived. The posterior spine of the ilium projected upwards, above its usual junction with the sacrum, and it was thought that the ilium was dislocated from the sacrum, with some fracture either of the ilium or sacrum. When she was turned on the back, and examined per vaginam, the pubes were found passing more into the cavity of the pelvis than usual. A large quantity of blood was effused from the last rib to the upper part of the thigh, on the right side.

It was now a question, whether this extravasated blood should not be discharged by making an opening through the integuments, as it appeared to be fluid; but upon consideration, it was thought that the vessels would still bleed, that she could not bear the loss of blood in her weakened state, and that the blood, when coagulated, would form the best security against further effusion. All that was done therefore was, to roll a broad bandage round the pelvis to fix it firmly; to give Tinct. Opii. Gt. xxx. and to draw off the

urine from her bladder, which contained about a pint.

In the evening, the extravasation of blood was somewhat increased, and she complained of a pricking sensation in the right thigh and leg, which induced her to loosen the bandage. She had vomited; her feet were cold; she had severe pain and great thirst; her pulse was 90 and small.

On the 9th, she complained of a sensation of one side tearing from the other, and upon examination of the lower extremities, that on the right side, was found shorter than the other; there was numbness also on that side; her tongue was furred, but her pain and thirst somewhat less, and she had not the same coldness in her feet as she had last night.

As her bowels had not been relieved since her admission, aperient medicine was given her, and the bladder being incapable of emptying itself, a catheter was employed. The ecchymosis was of great extent, and it was doubtful if it could be absorbed. A pillow was placed against the right side, to support the pelvis, and another was put under the knee, to preserve the limb in an easy position.

In the evening of this day her pulse was 112; she complained much of pain in the right side and groin, the catheter was again obliged to be used, and aperient medicine to be repeated.

On the morning of the 10th she complained of the bones of the pelvis moving upon each other, even more than at any former period,

and that she had suffered severe pain; her tongue was now furred, her pulse fuller, but her bowels had been relieved, and she had made water without assistance. At one o'clock this day, her pulse being fuller, and 120 in a minute, with great heat of skin, I bled her to the amount of ten ounces, but the blood did not exhibit any signs of inflammation, nor did the loss of blood produce any apparent effect in relieving her symptoms.

In the evening, her pain and fever had increased, and as she complained of the tightness of the bandage which still surrounded the pelvis, it was removed. The catheter was again obliged to be employed. Some saline medicine with opium, was directed for her.

On the 11th, she stated that she had passed a good night; her pulse was 120 and softer; her tongue furred, and she was directed to continue her medicines.

A stimulating lotion was directed for her on the 12th, to produce an absorption of the extravasated blood. Some spots appeared of a very dark colour, where the ecchymosis had been most severe, and the cuticle was abraded upon those parts.

On the 13th her report was more favourable; her bowels were open, and her bladder did not require the assistance of the catheter. However she still complained of severe pain in the hip.

14th. As the excoriated parts seemed disposed to slough, a puncture was made through the integuments, nearly opposite to the tro-

chanter major, and a quart of serum mixed with the red particles of blood, and with a substance which appeared adipose, was discharged.

On the 15th her fæces and urine had passed into her bed, and she requested to be removed to another; her pulse was 112. The puncture made yesterday does not seem disposed to heal, and a poultice was directed for it.

16th. She expressed herself relieved by her removal into another bed; her pain is less severe; her pulse but 108. She was now directed a diet to support her strength, and some porter was given her; but on the 27th, as she had been observed to be slightly delirious last night, the quantity of porter was lessened.

On the 18th, the sloughing of the part which had been excessively bruised, had considerably increased; yet her tongue was cleaner, and her skin of its natural heat.

On the following day she appeared better; had a good night; she was ordered a poultice of stale beer grounds to the hip, and as she strongly requested it, she was turned on her left side, as her impression was, it would relieve the pain she felt on the right side.

The sloughing of the superior and posterior part of the thigh had increased upon the 20th; and she was ordered the decoction and tincture of bark, with saline medicine if her thirst became urgent, and a more nutritious diet.

On the 21st the sloughing had increased; the tongue was now furred; her pulse was 120;

on the 22d she was worse, and on the 23d her stomach rejected every thing; she had a strong impression that she could not recover; she refused her medicine, and the slough had increased.

In the evening of the 24th she died.

Examination.

On the 25th the body was examined.

A fracture was found passing through the body of the pubis on the left side, and through the ramus of the left ischium.

The right os innominatum was separated from the sacrum at the sacro-iliac symphysis, and a part of the transverse processes of the sacrum was broken off, and torn from the sacrum with the ligaments. The cartilage and ligaments of the symphysis pubis were torn, and the left sacro-iliac symphysis had given way; the ligament over it being torn, and the bones separated sufficiently to admit of the handle of a scalpel being received between them.

Blood was found extravasated in the pelvis behind the peritoneum.

JONATHAN SANDFORD.

These fractures sometimes do well.

I have known three instances of fracture of the os innominatum recover: two of these were fractures of the ilium, and the nature of the accidents was easily detected by the crepitus which was perceived upon moving the

crista of the ilium; the third was a fracture of the junction of the ramus of the ischium, and pubis. In the two first a circular roller was applied upon the pelvis, and the patient freely bled; but in the latter no bandage was employed.

(To be continued.)

PLATE . 1 .

Fig . 1 .



Fig . 2 .



Fig . 5 .



Fig. 3.





Fig. 4.



London Published Jan.ʸ 1.ˢᵗ 1818 by E. Cox & Son, St.ᵗ Thomas's Street Boro.ʰ & Longman & Co.ˢ Paternoster Row.

EXPLANATION OF THE PLATES.

PLATE I

Shews the position of the limb in the different species of injury to the hip.

Fig. 1. The dislocation upwards on the dorsum ilii, the leg is shortened; the knee and foot turned inwards.

Fig. 2. Dislocation downwards in the foramen ovale; the limb is longer than the other; the body bent forwards, and the knee advanced.

Fig. 3. Dislocation backwards, or in the ischiatic notch; the leg is from half an inch to an inch shorter than the other; the knee and foot turned inwards.

Fig. 4. Dislocation forwards on the pubes; the leg is shorter; the knee and foot turned outwards; there is a prominence at the groin.

Fig. 5. Fracture of the neck of the thigh bone; the leg is shorter; knee and foot turned outwards; the fracture within the capsular ligament generally occurs in persons considerably advanced in years; the leg in this case is capable of being pulled down to the length of the other; but is immediately drawn back by the action of the muscles.

EXPLANATION OF

PLATE II.

Views of Preparations of the different Dislocations.

Fig. 1. Dislocation in the foramen ovale; *a*,*a*, ilia; *b*, ischium; *c*, pubes; *d*, foramen ovale; *e*, acetabulum; *f*, sacrum; *g*, thigh bone; *h*, new acetabulum receiving the head of the thigh bone; *i*, old acetabulum.

Fig. 2. Another view of the same preparation; *a*, ilium; *b*, old acetabulum much diminished; *c*, new acetabulum; *d*,*d*, thigh bone, with a portion of the new acetabulum upon it, which was obliged to be broken to remove the thigh bone from its new cup.

Fig. 3. Dislocation in the ischiatic notch; *a*, ilium; *b*, tuberosity of the ischium; *c*, thigh bone; *d*, trochanter major; *f*, head of the bone; *g*, new capsular ligament; *h*, torn ligamentum teres.

Fig. 4. Dislocation on the pubes; *a*,*a*, ilia; *b*,*b*, pubes; *c*,*c*, ischia; *d*, thigh bone; *e*, trochanter major in the acetabulum; *f*, head of the thigh bone; *g*,*g*, new acetabulum.

Fig. 5. The same preparation of dislocation on the pubes with the thigh bone removed; *a*, ilia; *b*, pubes; *c*, ischia; *d*, old acetabulum; *e*, new acetabulum upon the os pubis.

Fig. 6. Fracture of the acetabulum; *a*, broken pubes; *b*, ilium broken; *c*, fractured ischium.

Fig. 1.

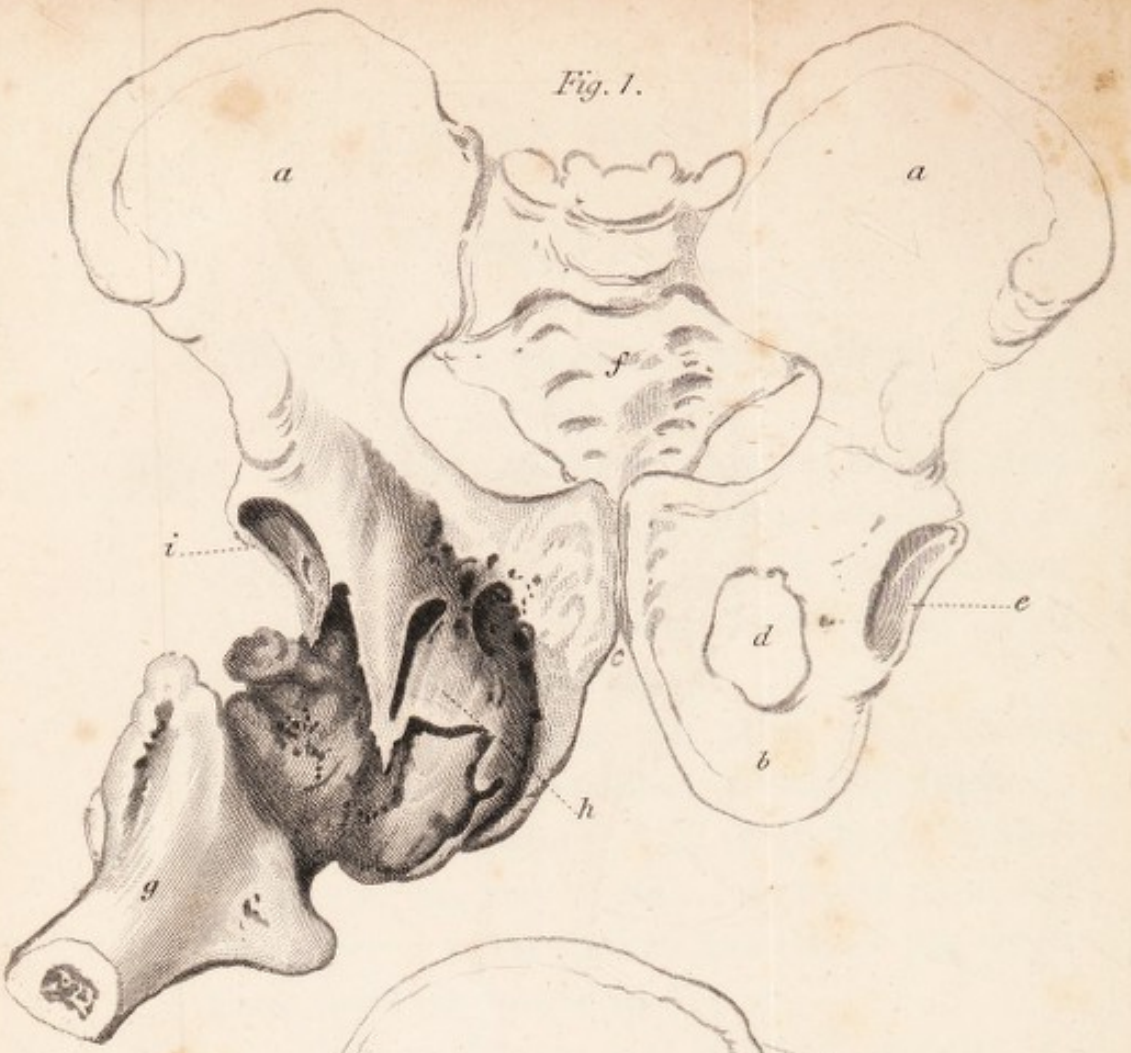
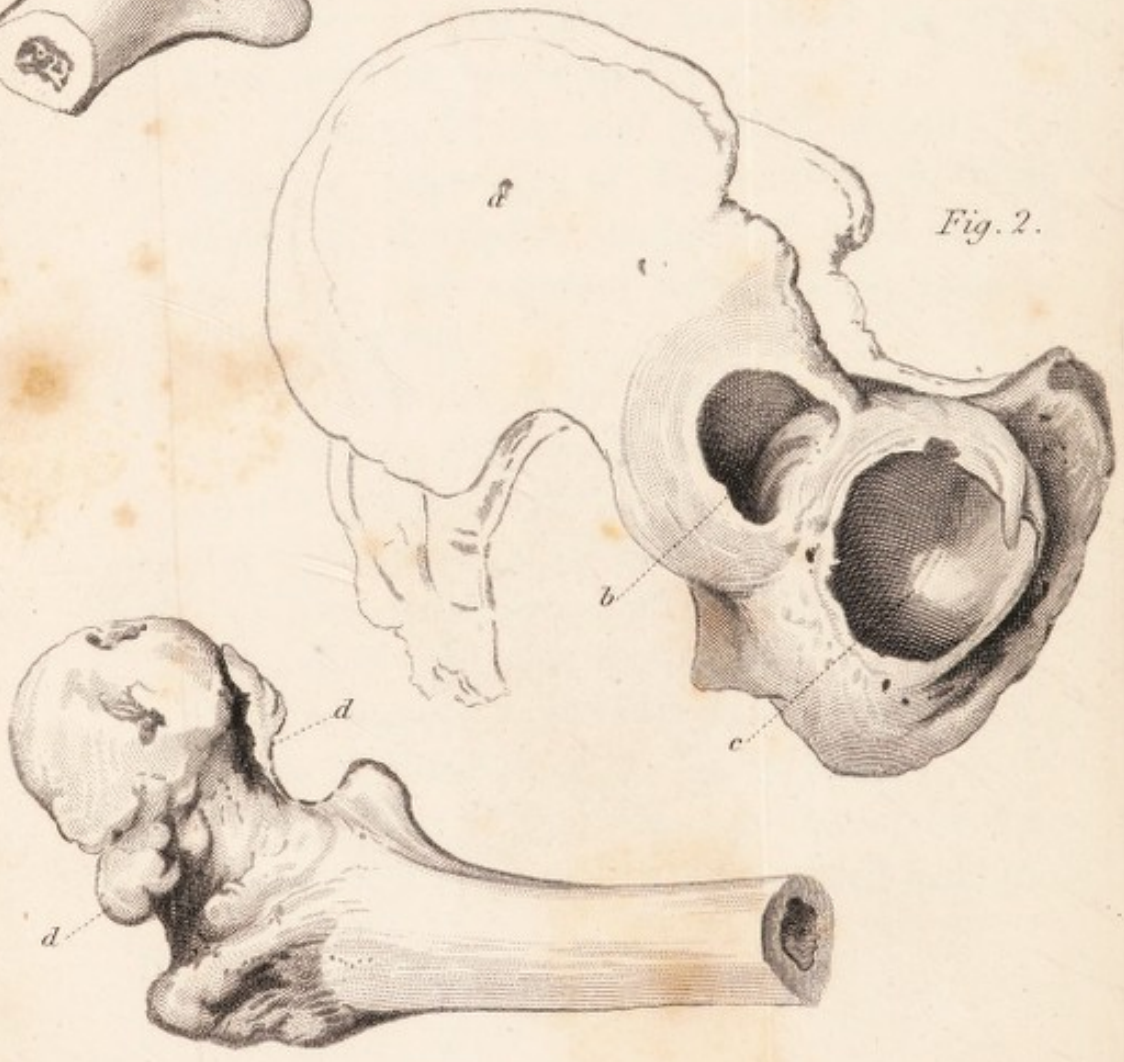


Fig. 2.



H. Thomson. Del.t

PLATE. 2.

Fig. 3.



Fig. 4.

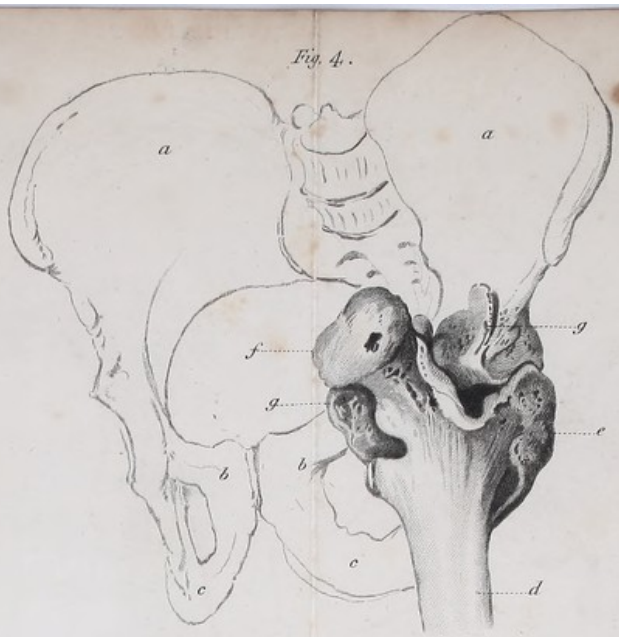


Fig. 5.

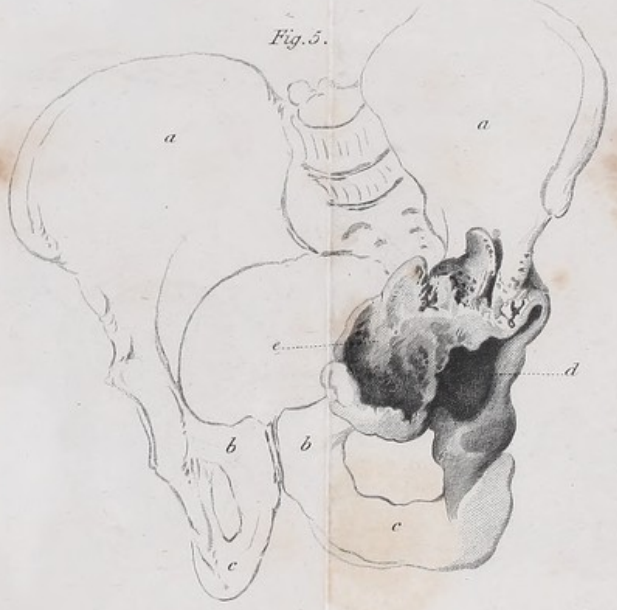


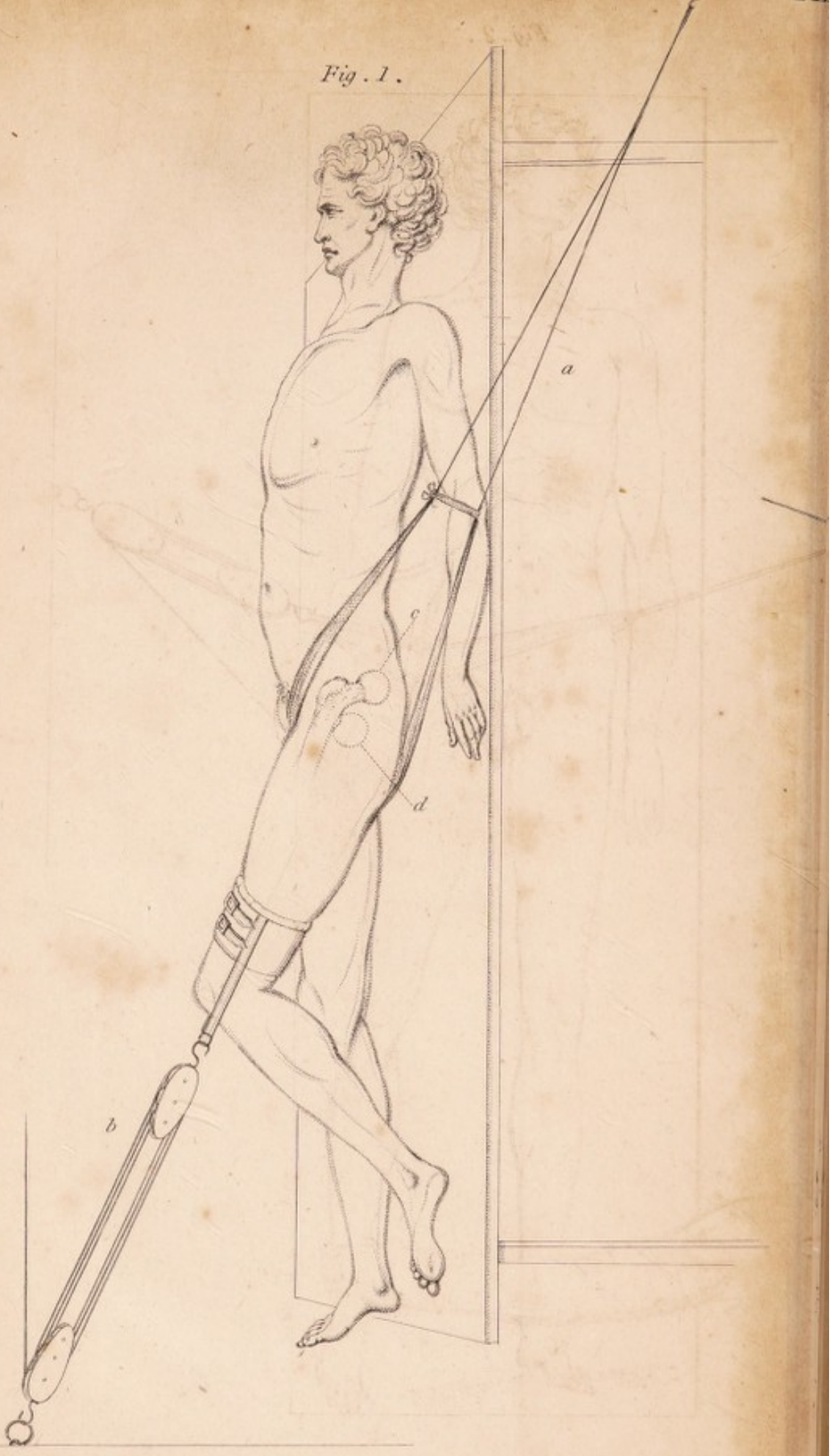
Fig. 6.



Ja.s Mitchell

London Published Jan.y 1.st 1818 by E.Cox & Son St.Thomas's Street Borough.

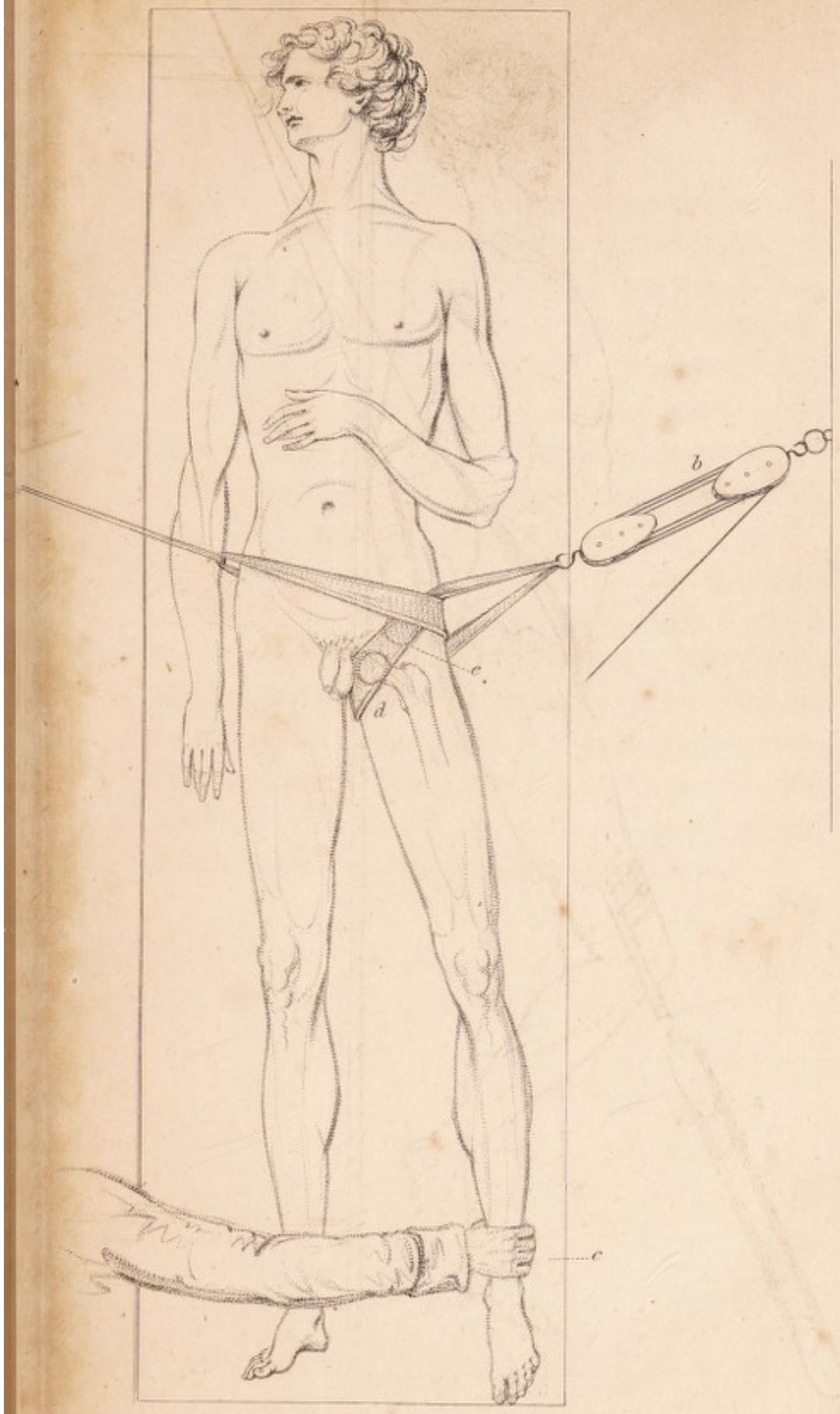
Fig. 1.



H. Thomson Del.r

London Published Jan.y 1.st 1818. by E. Cox & Co.

Fig. 2.



Ja.s Mitchell Sculp.t

Street Boro.h & Longman & Co.y Paternoster Row.

EXPLANATION OF

PLATE III.

Fig. 1. Shews the dislocation upwards on the dorsum ilii, and the position of the bandages required for its reduction; *a*, the belt which fixes the pelvis, and which passing between the thighs is tied above the ilium and fixed to some immoveable body; *b*, the pulley fixed above the knee and to a screw on some fixed body; *c*, head of the thigh bone on the dorsum ilii; *d*, acetabulum.

Fig. 2. Dislocation downwards in the foramen ovale; *a*, the belt to fix the pelvis; *b*, the belt for the pulley which passes between the thighs and between the belt *a*, and the body so as to fix both; *c*, the hand of the surgeon grasping the leg to bring it across the other as the extension is made at *b*; *d*, the head of the thigh bone; *e*, the acetabulum.

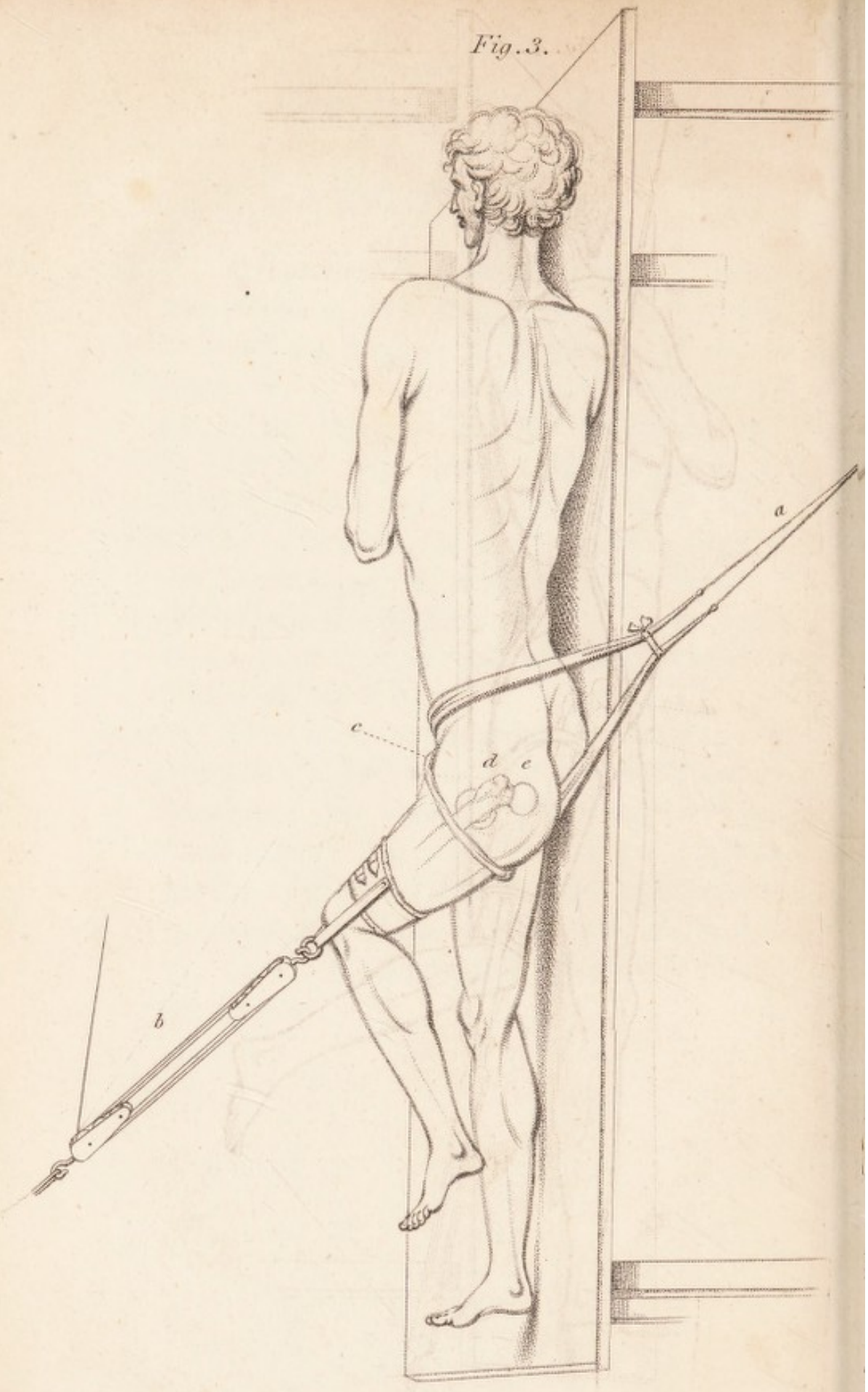
EXPLANATION OF

PLATE IV.

Fig. 3. Dislocation backwards or in the ischiatic notch; *a*, belt fixing the pelvis carried between the thighs; *b*, pullies fixed above the knee; *c*, a belt fixed around the upper part of the thigh to place the hand under and to raise the thigh bone from the pelvis, as the extension is making with the pulley, so as to lift the head of the bone over the edge of the acetabulum; *d*, acetabulum; *e*, head of the bone in the ischiatic notch above the level of the centre of the acetabulum; patient is placed on his side.

Fig. 4. Dislocation on the pubes, or forwards and upwards; *a*, belt to fix the pelvis; *b*, pulley fixed above the knee; *c*, belt or handkerchief fixed around the upper part of the thigh to lift the head of the bone during the extension over the edge of the acetabulum; *d*, head of the bone; *e*, acetabulum; patient is placed on his side.

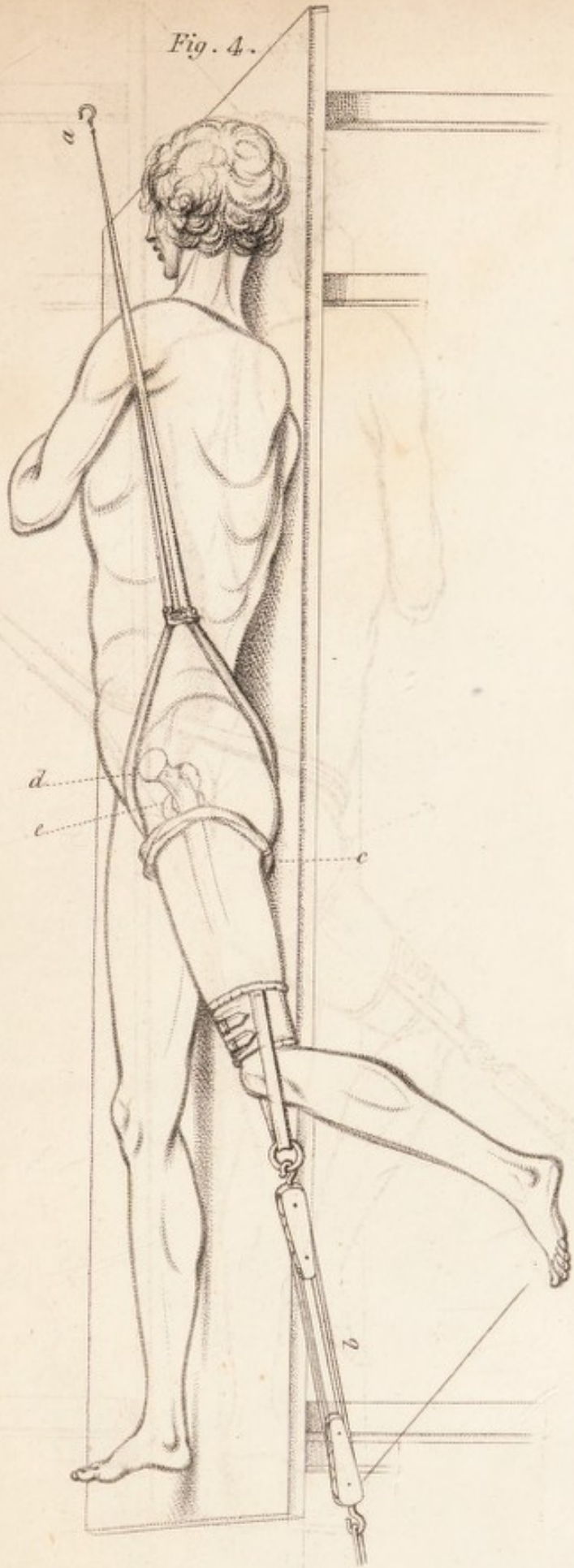
Fig. 3.



H. Thomson Del.t

London Published Jan.y 1.st 1818 by E. Cox & Son

Fig. 4.



Ja.s Mitchell Sculp.t

Struc.Boro.& Longman & Co.Paternoster Row.



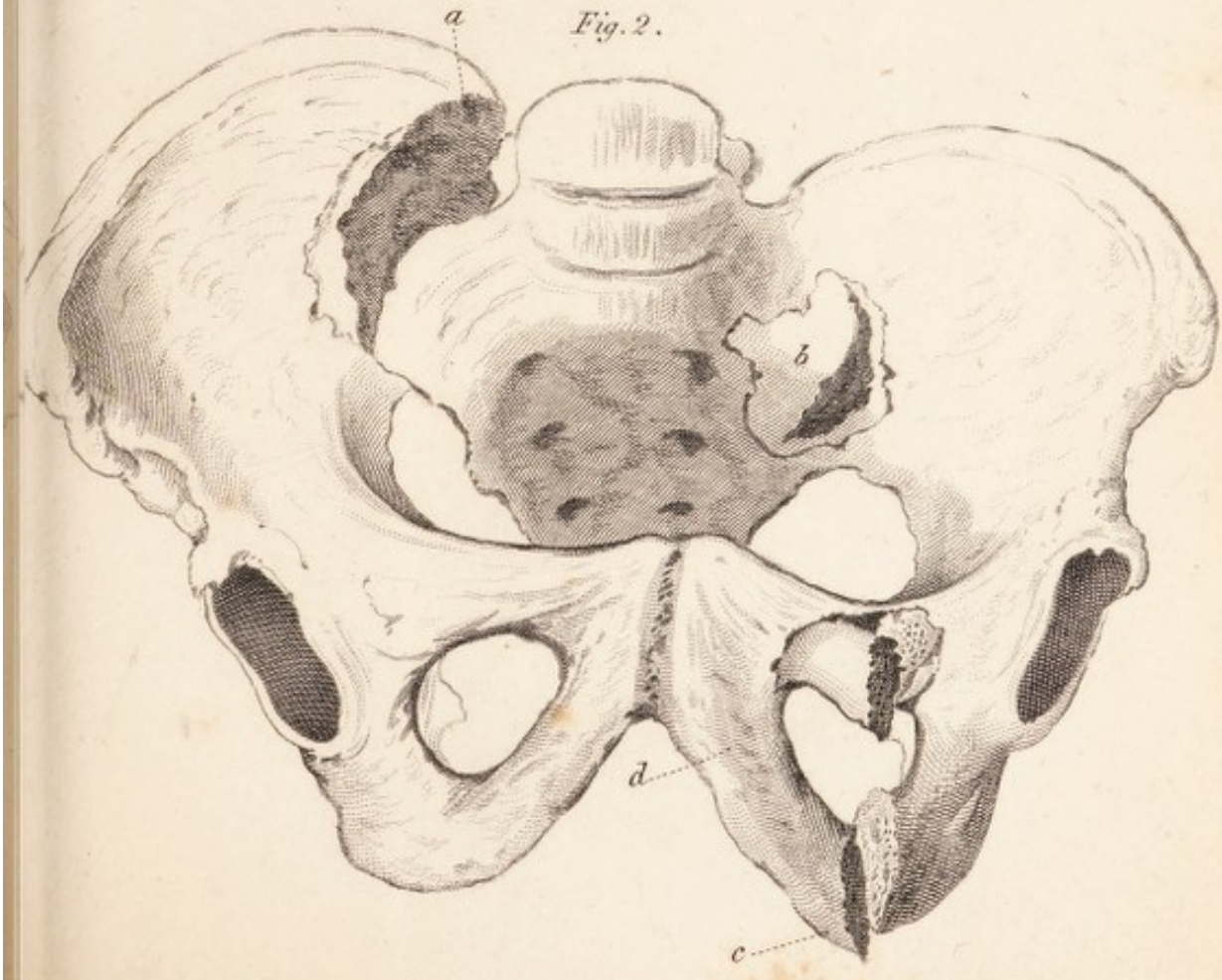


PLATE. 5.

Fig. 1.



Fig. 2.



H. Thomson del.

Jos. Mitchell sculp.

EXPLANATION OF

PLATE V.

Fig. 1. Shews the effects of a disease in the hip joint, as producing absorption of the acetabulum, and a new socket for the head of the thigh bone; the head of the bone is in these cases also partially absorbed and altered in its figure.

Fig. 2. Fracture of the pelvis and laceration of the sacro-iliac symphisis, as described in the case given me by Mr. Sandford; the os pubis is broken and the branch of the ischium; the right sacro-iliac ligament is torn away, and the ilium rises upon the sacrum; the left sacro-iliac symphysis is also torn.

ON

IRITIS.

By Mr. TRAVERS.

The interior tunics of the eye are subject to inflammation, arising either as an idiopathic affection, or from the extension of protracted inflammation of the superficial tunic. The effects of this inflammation are conspicuous in the iris, and by the term "Iritis" I mean to express the deep seated inflammation of the eye.

It appears in company with rheumatism of the chronic form, sometimes with gout; with the constitutional signs of the lues venerea; and during or following the action of mercury upon the system.

It is in reference to the two latter associations of the iritis, that I propose principally to consider the disease in this essay.

Although the cases of iritis co-existing with sore throat, cutaneous eruptions, and nodes, which are regarded and successfully treated as venereal, are too frequent to escape observation, the eye is not mentioned by Mr. Hunter and other pathologists as a part subject to be affected by the syphilitic poison.

Combination of iritis with mercury in the system.

I have met with cases in which the mercurial action had been set up for primary lues, and the iritis was present, unaccompanied by any secondary symptom of that disease. I have also met with cases of iritis in which pains

confined to the joints have been accompanied by eruptions widely differing from those which have been commonly considered venereal. Its occurrence, indeed, during the use of mercury is so well established and familiar a fact, among persons who see much of ophthalmic diseases, that their first inquiry of a patient labouring under inflammation of the iris is, not whether he has recently contracted syphilis, but whether he has been taking mercury. For although the iritis is frequently met with where no mercury has been taken, it is scarcely ever seen as a sequela of syphilis, where mercury has not been exhibited so as to affect the system; and I think it is more frequent as a consequent upon the use of mercury, than occurring as an idiopathic disease. Under this denomination I do not include those frequent affections of the choroid and iris, which are plainly depending upon the duration and extension of superficial ophthalmia.

Under these circumstances, it is not surprising, that some surgeons of reputation should be disposed to deny, that the inflammation of the iris is a venereal inflammation, and should consider it as belonging to that class of symptoms which resemble, or are grafted upon, the syphilitic, and that others should regard it as an inflammation produced by the poison of mercury.

It appears to me at present impossible to pronounce whether the iritis, so frequently presented after sores on the genitals, and accompanied by eruptions, is the effect of a morbid poison, or of the mercurial poison; or thirdly,

the casual effect of exposure to an exciting cause in a state of predisposition from the mercurial impregnation of the system.

Course of a secreted poison indefineable.

We have no means of tracing the *course* of a morbid poison, beyond the absorbent system of the part in which it is secreted. The sore, the inflamed absorbent, and the gland in which it terminates, comprise the extent of our observation of its progress. Having passed this barrier and entered the circulation, the circumstances by which its re-appearance here or there is determined, are as much hidden from us as the cause of its re-appearance. But having entered the system, and extending to the skin, throat, and even bones, it would be difficult to assign a reason why the eye, or any other organ, should be out of the pale of its operation. And although we speak of venereal inflammation, we are not in possession of any means whereby to demonstrate and distinguish this from common inflammation. The lymph effused upon the iris is as probable an effect of venereal inflammation, as when it is deposited upon the periosteum.

Apparently influenced by sympathy.

The sympathy or consent which obtains between certain parts, appears to influence the course of their diseased actions, whether simple or sui generis. The throat, skin, and bones, are observed to be affected by the poison of mercury as well as of lues, and also by that which resembles lues, except in its curableness by other means than the use of mercury. It is remarkable that the eye frequently forms a link of this chain, or in other words, that the inflammation of the choroid and iris, coexists with

affections of the throat*, skin, and bones; whether these are referred to syphilis, pseudo-syphilis, mercury, or rheumatism. It is also remarkable, that the remedy which exerts the most powerful and obvious effect upon the inflamed periosteum and skin, acts with the same remarkable efficacy upon the inflamed tunics of the eye and *vice versâ*. Depositions beneath the periosteum, resembling nodes, and eruptions on the skin, are not less certainly induced, by the poison of mercury, than is the deposition upon the choroid, ending in incurable amaurosis.

The two following cases afford a brief explanation of the statement, that the consent between certain parts probably influences the course of diseased actions, simple or specific; and I am inclined to believe, that this is the explanation of some at least of the cases resembling syphilis, which are occasionally cured without the use of mercury.

CASE.

A young gentleman of particularly correct conduct, and retired habits, while upon his voyage from the West Indies to this country, for the purpose of education, was troubled with a sore upon the penis, which occasioned him much anxiety, as he had never yet indulged in sexual intercourse, and was wholly unable to account for it. On his arrival he applied to a confidential friend, stating the circumstance.

* "There is in fact a general tendency to sore throat, and even to affections of the eyes in all the varieties of cutaneous eruptions, which are accompanied with any degree of fever." Bateman's Synopsis, Note, p. 333.

His skin was shortly afterwards covered with an eruption, which yielded only to a course of mercury.

CASE.

A married gentleman of character, whom I well knew, applied to me with a paraphymosis and superficial ulceration behind the corona glandis; in which case I know that no venereal commerce had taken place, nor had any mercurial medicine been employed to affect the system. It began in consequence of a hair having accidentally applied itself around that part. Six weeks after the healing of the sore, the whole cutaneous surface exhibited a plentiful crop of pustular eruptions. There were present at the same time, an inflammation and soreness of the membrane of the fauces, severe pains in the bones and joints, and enlargement of the bursæ upon the olecrana of the elbows.

Not influenced by relations of texture.

The analogy which has been observed in the morbid actions of parts possessing similar texture, does not appear to influence the course of these actions, otherwise than by continuity. The morbid affections of the skin, mucous, serous, synovial membranes, are of this description; the similarity of their diseases respectively, is, with reason, referred to the similarity of their textures; but the principle of consent, which determines the election of parts in the progress of disease, or in other words, the course of the disease, defies the relations of texture, and is referrible to some other cause. There is

little anatomical resemblance between the skin, periosteum and choroid, and at all events we may conclude, that the course of a morbid poison is not restricted by relations of texture.

Perplexity of the subject arising from the use of mercury.

It appears then, that the difficulty of deciding the question, whether the iris is inflamed by the poison of syphilis, arises, not from any theoretical objection, but from the complication of the cases, which are presented to us, by the employment of another powerful agent on the constitution; and that, until we see the course of the syphilitic poison, genuine and unsophisticated, we shall be unable to determine the point. This, in truth, is the cause of the obscurity that overhangs the whole subject of the venereal disease. It is perhaps impossible to say to which, of two agents, the effects belong, which manifest themselves at a period, subsequent to their successive introduction, as we presume, into the system. Both, we are taught to believe, cannot be at the same time active; but both may be present, or one only may in fact have entered the system. When mercury is exhibited, as it almost constantly is, before the constitutional signs of lues appear, what demonstration can be had of the existence of syphilis in a secondary form? or, on the other hand, who in his own case would, *a priori*, abandon the operation of mercury, in confidence that the symptoms which are occasionally referred to its operation, are wholly independent of the poison of syphilis?

Origin of iritis from mercury.

In considering whether mercury acting as a poison upon the system can be a cause of the iritis which so often follows its use, we should bear in mind that although we rarely see the

disease unpreceded by mercury, we as rarely see it unpreceded by primary symptoms of lues. It would be unfair to refer it to one rather than the other as far as this evidence goes. But I have satisfied myself of the frequent origin of the disease, while the system has been fully charged with mercury; the sore on the penis for which it was exhibited having long since healed, and no after symptoms of lues being to be discovered. I have also seen it where the system had been mercurialized for gonorrhœa. During the free exhibition of calomel in strumous inflammation, I have repeatedly seen the iris take on the inflammatory action, and while the cure of the iritis was daily accomplishing by the action of mercury in one eye, it has been common to observe the inflammation beginning in the other, as if the action produced effects diametrically opposite upon the sound and the inflamed part. When a person is attacked with ophthalmia, whose system is charged with mercury, the inflammation is never confined to the conjunctiva, but invariably affects the deeper tunics, so far as my observation goes. Yet I have never seen the iris affected in cases of eczema mercuriale, but always the conjunctiva of the eyelids. With what I have considered to be the mercurial sore throat, very unlike the venereal, and mercurial eruptions, and nodes, I have repeatedly seen it in conjunction. But, with one exception, I do not call to mind a well ascertained case of inflamed iris, during the constitutional action of mercury for a disease in which the genitals had had no concern, as en-

largement of the liver, &c. Were it not for this observation, one would be led to conclude that mercury in certain habits affected the highly organized membranes of the eye, as we occasionally see it affect the skin, and as other substances, by whatever channel they enter the system, attack certain organs and parts; as cantharides and turpentine the neck of the bladder, arsenic the stomach, and lead the intestinal canal.

Or predisposition from mercury.

Whether the iritis following the use of mercury is simply an effect of accidental exposure to cold, and other exciting causes in a state peculiarly susceptible of inflammation, or whether it be due to a cachexia, which the poison of syphilis or of mercury or both have engendered, is a remaining ground of inquiry.

The pains, I have repeatedly observed, which accompany this inflammation, are of a rheumatic character, exclusively affecting the joints and muscles; in general an interval or intervals have elapsed, in the progress of an ill conducted or protracted course, in which the patient has been exposed to cold and damp before the appearance of the disease, and hence it is least frequent in the better class of patients. And although I have sometimes found sores on the penis and buboes in company with the iritis, the pains, or eruptions, or both have usually been present, and the patient has been more or less under the influence of mercury before the eye was inflamed. The inflammation of the eye and eruptions, which yield eventually to the same remedy, are subject to relapse, and make their reappearance together; the pains are sometimes

relieved, often aggravated, and seldom if ever removed by its use. The two former yield in a marked degree to the nitric acid, but the ophthalmia recurs and requires mercury for its cure. The sublimate given in very small doses as a tonic, is likewise inadequate to its cure.

Common appearances of iritis.

Before I enter upon the subject of the treatment, it may be right shortly to describe the appearances of this disease, although I have little to add on this subject to the very accurate observations of the late Mr. Saunders, now well known to the profession. In the recently inflamed iris the inflammation is characterised by diffused vascularity of the conjunctiva, and the sensibility of the organ is in proportion acute. The fine hair-like vessels of the iris are injected with red blood, and although the pupil undergoes less alteration than is natural from the changes of light upon the eye, it is not misshapen, or very slightly deviates from the circle; nor is there in an early stage of the disease any visible lymphatic deposition within the chamber or upon the face of the iris. Sometimes specks of extravasated blood are perceptible upon this membrane. The pain is chiefly affecting the eyeball, and is accompanied with a sense of pressure as if the globe was too large for its socket. In that which is more advanced, as in the primary iritis, the fibres of the iris are agglutinated, its pupillar edge is thickened and immoveable, a boss or a layer of lymph is discerned upon it, the vascularity of the conjunctiva is less, the bright florid colour of the blood-vessels being exchanged for one of a deeper and

more purple cast. The vessels on the sclerotic run in converging lines from all sides of the visible hemisphere of the globe, and form a remarkable vascular zone at the circumference of the cornea. This appearance is probably increased by the turgescence of the vessels of the ciliary plexus, and the preternatural communication between the superficial and deeper seated orders. The pupil is square, oblong, rhomboidal or octagonal, and a boss or tubercle of lymph is deposited upon one or each of the angles which are formed in its margin. Sometimes one large projecting lump is seen; in other cases the whole rim of the pupil is fantastically fringed or tufted. The lymph is sometimes deposited upon the centre of the iris, sometimes on the verge of the pupil, seldom on its ciliary border. In this state the pain is that of hemicrania, and most intolerable at night.

Chronic form of the disease.

There is a slow inflammation of the iris which differs from the acute form, chiefly in its very gradual access, its comparatively moderate pain, and that affecting only the ball and region of the orbit; its very slight degree of superficial vascularity; the membranous form and sparing quantity of lymph effused, or its actual imperceptibleness; the frequent concomitant affection of the cornea with minute and superficial herpetic ulcers, of a brown colour. The iris loses its colour more or less under inflammation, and where lymph has been deposited and organized upon the uvea, never recovers it; the pigmentum nigrum, upon which it depends, being defective or no longer secreted.

Peculiarities after syphilis.

The inflammation of the eye after syphilis is not, so far as I have observed, characterised by any peculiarities, so much as the shade of colour of the inflamed conjunctiva and sclerotic, and the appearance assumed by the deposited lymph. The former have a brickdust or dusky red, instead of a bright scarlet hue, and the lymph is compact and brown, and intimately adhering to the iris, instead of curd-like, loose, and of a yellowish white colour. When the conjunctiva is highly vascular and florid, as in common ophthalmia, and the lymph is diffused, white, loose in texture, and puriform in appearance, especially where the cornea is at the same time clouded, and the eye very irritable to light, I have considered the case to be essentially unconnected with syphilis. I do not however feel quite confident of the accuracy of this opinion. The irritability of the eye to the light has been considered as diagnostic, and it certainly is so, between the primary iritis and that which ensues upon or is accompanied by acute inflammation of the conjunctiva. In the latter case the cornea is hazy, and the aqueous humour turbid; yet the vision is not more affected than in the inflamed iris, which has proceeded to the deposition of lymph.

Treatment not a legitimate clue to the disease.

The treatment of the disease, which is fortunately one of the best ascertained points in pathology, would seem to throw light upon its origin; but the habit of reference to the remedy in order to ascertain and class the disease, appears to me a proceeding altogether unscientific and erroneous. To consider that the symptoms which mercury cures are *therefore* syphilitic, and

that those which it does not cure are not so, is to abandon altogether the analytical investigation of disease. How many diseases essentially different are cured by the same remedy! How confused and useless for the purpose of diagnosis, which is the sum and substance of rational practice, would be a nosology framed upon such a basis! That the effect of remedies is important as an adjuvant to the study of nosology, may be admitted, but it can never be allowed to form a part of the *historia morbi*, much less to assume the importance of a diagnostic.

Heads of cases.

The following are the heads of a few of the cases cured under my observation of the iritis regarded as venereal, which I introduce merely to shew the combination of symptoms.

1. *Holton.*—Syphilitic eruptions.

2. *Vallence.*—Copper-coloured, elevated, and scaly eruptions on the back and limbs; had primary sores followed by buboes six months ago.

3. *Younger.*—Tubercular eruptions on the face, arms, and legs, of a copper colour, with desquamation of the cuticle. Had sores on the integument of the penis a year ago. The sores healed, and broke out afresh three or four times successively. Had no bubo, and reports that no remedies had been employed.

4. *Neale.*—Secondary symptoms of lues.

5. *Glover.*—Venereal eruptions and pains.

6. *Riddington.*—Syphilitic ulcer of the throat. Nocturnal pains.

7. *Topham.*—The same.

8. *Brown.*—Chancre followed by bubo six weeks ago. Nocturnal pains.

9. *Wyatt.*—Syphilitic eruptions and pains.

10. *Dudley.*—Pains and node of the os frontis; first the left, and afterwards the right eye affected.

11. *Poole.*—Eruptions. Ulcerated throat. Nocturnal pains.

I have selected the following for detail.

CASE.

Iritis during salivation for ulcer of the throat.

Feb. 8, 1816.—Joseph Wade, aged 30, was attacked some weeks since with inflammation of the left eye, while under salivation for a venereal ulcer of the velum palati, by which the ulcer was healed. The eye has the following appearances. The conjunctiva is generally vascular, but especially so around the cornea, where the vessels form a distinct zone. The iris, not altered in colour, has little if any motion, and the pupil, though not much contracted, is irregular in its circle from adhesive inflammation. Vision dim.

Ordered: Hydrarg. submur. gr. ii. opii gr. ss. f. pil. noc. maneq. sumend.: H. aper. p. r. n.

20.—Mouth moderately sore. Inflammation of the eye subsiding rapidly. Contin. pilulæ.

March 7.—Discharged cured.

Note.—After his discharge Wade returned to his business as a groom, and was attacked with chronic rheumatism, and a relapse of the ophthalmia; the latter was superficial, and readily yielded to leeches and purgatives. His pains were relieved by a course of the pulv. ipecac. comp. in small doses, and the decoct. sarsap. He attributed these complaints to cold caught in washing his horses' feet.

CASE.

Iritis, with eruptions, after sore on the penis.

March 23, 1816.—James Basnell, aged 40, had a sore on the lips of the urethra five months ago. He is not certain whether the medicine he took was mercurial; his mouth was not affected. Three months afterwards an eruption appeared on his breast; this is now generally diffused over the body; it is small, elevated, scaly, and of a pale brown colour. About a month after the appearance of the eruption, the left eye became inflamed. Topical means were chiefly employed, and the inflammation gradually subsided, but the vision was lost. At present the iris adheres to the opaque capsule of the lens, the pupil is mis-shapen and fixed, and whitish radii are perceptible upon the iris converging to the pupil. Three weeks since the right eye inflamed. The conjunctiva is red, and the vessels are most condensed around the cornea. Upon the iris, which is very vascular, they are seen passing, like rays to a centre, to the contracted pupil. Flakes of lymph appear upon the iris, and there is one remarkable lump which nearly reaches the cornea, and is reddened around its base, as if beginning to be organized. Although the cornea is clear, the humours appear thick, and the vision is much impaired. He has little if any pain from exposure to light, but much at night.

Ordered: Hyd. submur. gr. i. opii gr. $\frac{1}{4}$. f. pil. quater indies sumend.

April 1.—Mouth slightly sore. Eruption fa-

ding. Inflammation of conjunctiva has subsided, the aqueous humour has recovered transparency, and the lymph is much diminished in bulk. Sight greatly improved. Contin. pilul. et applic. extr. belladonnæ per noctem region. supra-orbitali.

20.—The eruption and lymph on the iris have disappeared. The pupil is still irregular, but the eye clear and sound, and vision restored. Discharged.

CASE.

Iritis, with eruptions, after salivation.

Sept. 26, 1816.—Thomas Edmonds, aged 17, had sores on the penis about ten months ago, which healed under mercurial dressings and pills, his mouth being gently affected for about a month. At this time he had a slight inflammation of the right eye, attributed to a cold, which was succeeded by eruptions in various parts of his body. The ophthalmia increased, attended by dimness of vision and pain in the head, and a crop of warts made its appearance on the glans penis. For these complaints he took a full course of mercury at Guy's Hospital, and was discharged free from complaint. After leaving the hospital, he was frequently exposed to the vicissitudes of the weather, and the ophthalmia and eruption recurred. At present he has phymosis from warts. The conjunctiva of the left eye is very vascular, and on the lids granulated. The iris is much discoloured, and adhering to the capsule of the lens, which is partially opaque; the pupil is contracted and irregular, and several lumps of

lymph effused in the anterior chamber, are undergoing vascularization; one in particular, pendulous from the upper border of the pupil, is distinctly organized. The eruptions are herpetic, in circumscribed clusters on the arms, shoulders, and back; on the face more diffused, but of the same character. They incline to scurf, do not itch, and are of a copper colour.

Ordered: Arteriotomia ad ℥xvj.: Ung. hydr.

Oct. 5.—Mouth has been affected two days. Eruptions are altered in appearance. Conjunctiva has lost its excessive vascularity. Lymph reduced in bulk, but more coloured. Applic. belladonna.

9.—The lymph nearly absorbed. Capsule completely opaque, and vision extinct. Eruptions faded.

16.—Lymph absorbed. The belladonna has had no effect upon the pupil.

23.—Eruptions have disappeared. The phymosis is reduced by an injection of the lot. nigra. Warts to be excised, and the surface washed with the lot. sulphat. cupri.

26.—Slight relapse of inflammation of the conjunctiva. Applicentur hirud. palpebris. Ordered to wash up.

30.—The eye free from inflammation. Opaque capsule becoming vascular. Discharged.

CASE.

Iritis, with pains, after long and irregular course of mercury.

November 7, 1816.—Robert Hughes, aged 23, had a chancre last March, which was healed under a course of mercurial pills and an application of the lot. nigra. A bubo existing at

the same time disappeared. Two months after the healing of the chancre, he was attacked with pains in his joints, which have continued till this time. He has been taking mercury irregularly since March, and his mouth has been frequently affected, notwithstanding his habitual exposure to the weather. Three weeks since, his right eye became inflamed, and the inflammation still exists. Besides unusual, diffused, and excessive redness of the conjunctiva, a copious deposit of soft flocculent lymph has taken place in the anterior chamber, and appears mixed with the aqueous humour. The iris is clouded, and there is also a slight nebula of the cornea. He complains of violent deep-seated pain in the eyeball, orbit, forehead and temples. Light falling on the eye gives much pain. He has eruptions on his arms, back and breast, but no pains in his bones.

Ordered: Arteriotomia ad ℥xvi.: Ung. hydr.

12.—Mouth slightly affected. Pain abated.

20.—Mouth very sore. Eye much improved in all respects; pain of the eye and joints has left him; sees much better. Eruptions fading.

Dec. 4.—Continues improving.

11.—Ordered to wash up. Vision good. Pupil irregular, notwithstanding the use of belladonna.

CASE.

Iritis with pains and eruptions after salivation.

January 30, 1817.—Elizabeth Scarlett, aged 18, had sores on the pudendum and a bubo in each groin fourteen months ago, for which she rubbed

in mercurial ointment for five and thirty successive days. She continued free from complaint until three months since, when she was attacked with pain in the joints, exacerbating at night, and eruptions in various parts of her body. Shortly after the eyes inflamed, with the left of which she has been unable to see for several weeks. The iris of this eye is deeply inflamed, a zone of chocolate-colored lymph surrounding the pupil; and eruptions of a dingy red colour are sparingly diffused over the face, arms, back, thighs, and legs, commencing in small white vesicles, which break, and are succeeded by reddish brown laminæ of cuticle.

Ordered: Ung. hydrarg.

Applicentur hirud: vj palpeb. Plumb. superacet. ℈j. aquæ ʒvi. M. f. collyrium.

Feb. 10.—Mouth sore. Ophthalmia and eruptions declining.

19.—Mouth very sore during the last week. Pains much relieved and eruptions faded. Vision of the affected eye is permanently impaired, but the lymph is taken up, and it is quite free from inflammation.

March 12.—Discharged cured.

CASE.

Iritis with pains and eruptions after a course of mercury.

January 30, 1817.—William Warren, aged 26, eighteen months ago had primary sores, which healed under mercury taken for seven weeks, and were succeeded by pains in the elbow and knee joints. Two months since contracted a second infection, for which he again took pills

for several weeks; the sores healed, but he was exposed to cold, and his present complaints appeared, ushered in by febrile symptoms. His face, hairy scalp, arms and hips are covered with a distinct pustular eruption of a very pale rose colour in the face, but darker in the other parts. The conjunctiva of the left eye is very generally vascular, the aqueous humour slightly turbid, and vision is impaired. The iris is free, but the inflammation is deep seated. He has pains in the elbows and knees, which are worst at an early hour of the morning. Health unimpaired.

Ordered: H. aper: Acid. nitros. d. gtt. xx. ter die sumend: Pil. hydr. giii. extr. rhei gv. M. f. pil. om. nocte maneq. sumend.

Feb. 5.—Little alteration.

20.—Mouth not sensibly affected. Eye much improved. Eruptions disappearing. Contin. medic.

March 1.—Relapse of inflammation. The sclerotic and choroid are now evidently affected. Eruptions gone, leaving small red indentations.

12.—Inflammation has subsided. Pupil not insensible to light. Vision pretty good, but is troubled with muscæ volitantes.

22.—The pupil is contracted, and there is a slight capsular opacity. Extr. belladonnæ.

29.—Since the use of belladonna, the iris is become inflamed. The pupil is of an irregular oblong shape, and lymph is copiously effused around its margin, with a distinct tubercle on the lower edge. No pain in the head. Omittantur medic. prescript: Hydrarg. submur. giss. opii g$\frac{1}{4}$. M. f. pil. ter die sumend.

This man was discharged cured after ptyalism of three weeks. Vision good. Pupil slightly irregular.

Treatment. The iritis first described, which often supervenes upon indecisive or mistaken treatment of the inflamed conjunctiva, or upon some imprudent use or exposure of the eye in this state, is cured by large and repeated blood-letting, and active purgatives. All the other forms of iritis, whether primary or secondary, simple or specific, require the constitutional use of mercury for their cure, without exception. This may be boldly stated without reference to the origin of the disease, and I should be quite at a loss to name any other disease which so certainly, and so rapidly, yields to a stated remedy. The only cases, of a vast number that have fallen under my observation, in which mercury disappointed my expectations, have been those of very elderly or debilitated persons, who were incapable of bearing the remedy; for whoever has seen much of the use of this mineral, must be aware, that a certain degree of power is required to enable it to produce its salutary effects, although I have observed, that in these cases, prudently managed, a less quantity will suffice. Cases frequently occur of syphilis, combined with scrofula, where mercury cannot be borne until the system has been prepared by tonic medicines and regimen. I have been repeatedly obliged to adopt this plan with patients before sending them to the foul wards, and with the best effect. In one remarkable case, the patient, a sailor, whose body was

covered with elevated, dense, and dry scabs, lamellated, and resembling horn, was compelled to substitute the nitric acid for the blue pill three times successively before he could bear the continued use of mercury, under which he at length obtained a cure. Of this fact, if it were necessary, I could mention many other examples; more than one in which not only the affected organ but life itself has been lost from the patient's inability to support the remedy. In such cases the mercury should at first be given in very reduced quantity, and remitted or gradually augmented according to the patient's strength.

Recent employment of mercury in iritis.

The beneficial use of mercury in iritis, strange to say, is an observation of but few years' date*. Its use was still more recently confined to the cases which were combined with traces of the syphilitic poison. But averse as are European practitioners, from education or prejudice, or both, for they are not always unconnected, to introduce mercury into the system during a state of active inflammation, it is now by a multitude of facts incontestibly established as a remedy of unfailing efficacy in the most acute form and in every variety of inflammation of the iris. The ascertainment and promulgation of this fact are due to the infirmary of this metropolis for diseases of the eye, and in the catalogue of modern contributions to medical science, except

* Its effect is but partially known on the continent: I am sorry that I have it not in my power to refer in proof of this opinion to a modern Latin tract, On the Inflammations of the Eye, which I some time ago perused.

the practice of vaccination, I know of none entitled to rank before it.

It is scarcely necessary to remark, that in the active and early stage of acute inflammation, blood-letting and purgatives should be premised and repeated as circumstances indicate. If the adhesive inflammation is already far advanced before the mercurial action is induced, opacity of the adhering capsule cannot be prevented, nor can such opacity be removed, and hence a motive to its early employment.

Its opposite effects, how reconciled.

To those who have observed the unquestionable tendency of patients to this disease during and subsequent to the use of mercury, its double character of bane and antidote must appear a paradox; but considering the opposite conditions, both of the system and the part, in health and in disease, I think the seeming contradiction ceases. I see no difficulty in understanding how the sound iris should become inflamed and its vessels throw out lymph —and on the other hand, the vessels of the inflamed iris recover their healthy action, and the lymph become absorbed, under the operation of the same agent. A sound part presents at least as marked a distinction to a part diseased, as the opposite states of diseased parts present to each other. Yet we see deposition and absorption going on at one and the same time in different parts of the same system, healthfully if according to their respective need; the reverse, if otherwise; even sound parts, not to speak of morbid depositions, reduced by absorption and deep ulcers filling with granulation—

nay, who has not seen one ulcer cicatrizing, and another sloughing, on the penis or pudendum of the same individual? The effects of local applications place this fact in a more striking point of view. We inject a transparent ulcer upon the cornea with a solution of caustic; lymph is thrown out, and it heals. We inject the cornea rendered opaque by a redundant deposition of lymph, with the same solution; the lymph is absorbed, and it becomes clear. Now in either of these cases a contrary effect would be produced, if the remedy were resorted to at an improper time—viz.: the ulcer would increase, and the opacity become more dense.

But there is another and perhaps more consistent explanation of these phenomena, since it does not require that the remedy should possess opposite modes of action. It is this: the changes which parts undergo in the commencement of the healing process, are not in fact opposed and dissimilar, as the conditions of the parts appear to be.

The absorbents, for example, are set to work to level the thick, abrupt, callous edges of ulcers, and thus to prepare or put them in a state for healing. This, it will be admitted, is as obvious an effect of mercury as the absorption of simple depositions without læsion. The granulation from the bed of the ulcer is an after process—an action of healing which follows as a natural effect of the salutary change which has taken place in the circumference. Thus, the filling up of the breach is an act of the constitution, and may be regarded as the *remote*, not the

direct consequence of the stimulus of mercury.

For myself, however, I do not consider the alterative action of mercury to be limited to one order of vessels.

The two cases which I subjoin are among the most remarkable of those which led me to the opinion, that the disease induced by mercury is afterwards cured by it.

CASE.

Case of iritis following three courses of mercury; after an interval cured by it.

Mr. ——, a barrister, applied to an eminent surgeon on the 20th May, 1815, for a swelling in one of his groins, for which a liniment was prescribed. He was assured it was not venereal.

30.—An excoriation upon the prepuce of doubtful appearance. Entered upon a course of mercury, which was continued for five weeks. The excoriation was healed in two days.

July 10.—The swelling having suppurated and broke after a trifling discharge, healed. Began the bark.

Aug. 21.—Throat became sore, and a small rash appeared on the skin. A second course of mercury was begun upon, aided by the warm bath. The rash in a few days had disappeared. The patient complained of great pains in the legs, with much general debility.

Sept. 23.—Throat continued sore, but was not now considered venereal. Mercury was discontinued. To take sarsaparilla, with carbonate of soda.

Oct. 7.—Consultation. The surgeon now called

in, a practitioner of the highest reputation, at once expressed his decided opinion that the case was not venereal, and recommended the sarsaparilla and soda to be continued, with the addition of a gargle of rose honey and infusion, with alum and tincture of myrrh.

10.—The compound ipecacuanha powder ordered, and a bread and milk poultice to the throat.

14.—Throat becoming daily worse, a third course of mercury was commenced under the direction of the surgeon first consulted, and a sublimate gargle. Persevered in this course for six weeks.

November 30.—Began to take decoction of sarsaparilla with small doses of tartar emetic.

December 11.—Eyes inflamed. A collyrium of sublimate and lime water.

27. Consultation with an eminent physician. —Bark decoction with extract. conii and pil. submur. hydrargyri.

Jan. 3, 1816.—Sight of right eye began to clear; left deprived of vision. Two drops of the vin. opii to be instilled into the left eye at night. Leeches to the temples; blisters behind the ears.

21*st.*—The extr. conii gradually increased in quantity. Bark discontinued. Pulse this day 130. Bad cough and incessant spitting.

February 5th.—The muriatic acid has been exhibited with some advantage. Left eye continues quite dark. Leeches directed to be applied to the eyelids. All medicines discontinued.

At this juncture I was consulted. The throat was affected with a diffused redness, and the

velum palati covered by a thin crust or coating of lymph, roughening the surface. Patient had great difficulty in shewing the throat, which was irritable on exposure to the air, and was almost unable to swallow. Left eye disorganized: the anterior chamber obliterated by coadhesion of the iris and cornea. Right eye in a very advanced stage of internal inflammation, verging on disorganization. Iris furred with lymph; no motion of the pupil; conjunctiva crouded with vessels of a purple colour; vision greatly obscured. Patient very weak and irritable, has a rapid and thready pulse, and perspires copiously.

8*th*.—I advised immediate recourse to mercury. This was stoutly resisted by the physician and surgeon in attendance, on the ground that the patient's complaints were all referrible to this medicine. My opinion of its necessity was not shaken, but it was agreed to wait a few days. The muriatic acid prescribed, and a fomentation of poppy.

13*th*.—The right eye considerably worse. Patient almost blind. My advice was now followed. ℞ Hydr. c̄ cretâ gr. v: submur. hydr. gr. $\frac{1}{2}$ M. f. p. bis die sumend. Leeches to be repeated. An issue to be set in the nape of the neck and to be kept discharging.

20*th*.—Mouth has become gently sore in less than a week. Inflammation greatly reduced; vision returned and gradually improving.

28*th*.—The eye having rapidly recovered, the mercury was discontinued. The extr. sarsap. with the decoction was ordered to be taken freely.

30th March.—Throat well. Health greatly re-established. Appetite daily returning. Sleep undisturbed. Patient gaining flesh.

August, 1817.—I lately saw this gentleman, who has had no relapse. The right eye and its functions are perfect, and he is in full health.

CASE.

Case of iritis, following the continued use of mercury, and afterwards cured by it.

S. C. æt. 24, a young woman of respectable appearance and connections, was the subject of severe pain, affecting the forepart of the head and left temple; pains in the calves of her legs accompanied with cramp, and generally disordered health, which she attributed to a neglected cold. After much unavailing treatment directed to relieve the pains in the head, she was compelled to quit service, and in the month of December to come into the hospital. Here she was put upon a course of blue pill, and leeches were applied to the temple twice a week. Her gums were at this time a little tender, and she complained of tasting the pill, but ptyalism was never induced, although she continued to take the pill three times a day without intermission for three months. On her admission the right eye was slightly inflamed, but it soon recovered. Two months after her admission she took a severe cold by sleeping under an open window, and the consequence was an inflammation of the right eye. This was also superficial, being removed by a single application of leeches to the temple. She quitted the hospital greatly relieved of her pains, but not cured.

In about six weeks afterwards, she again took a severe cold, which was followed by enlarged tonsil and sublingual glands, sore throat, and a fresh inflammation of the right eye; a rising also appeared upon the tibia of the right leg, a little below the tubercle, which was painful, but the skin not discoloured.

She applied to me a fortnight after this time, for an advanced inflammation of the interior tunics of the eye. The pupil was contracted, irregular, and a very large mass of brown lymph covered the semi-diameter of the iris next the temple, projecting so as to occupy more than one third of the aqueous chamber. The cornea and humours were hazy. The sclerotic conjunctiva had a leaden colour, and the eye-ball appeared to have lost its spheroidal shape, as if from interstitial absorption of the vitreous humour. She suffered severe hemicrania on the same side; her strength was greatly impaired, and with the affected eye she had scarcely any vision. I took her into the hospital, and after freely bleeding the temple and eyelids by cupping and leeches, prescribed the calomel and opium pill;—it disagreed with her bowels; the sublimate was given in frequent doses; and the ext. hyoscyami night and morning. The mouth soon became slightly sore, and the inflammation gradually subsided. The lymph was rapidly absorbed, the sight daily became clearer under the use of the belladonna. The swelling on the tibia had now become larger and acutely painful, and as it had evidently suppurated, I directed it to be laid open, which

operation was followed by an attack of hysteria.

October 1.—The eye and vision are surprisingly restored, the pupil clear and much improved by the belladonna. Her health is also materially better, but the leg is affected with a diffused inflammation, of an erysipelatous character, accompanied with much tumefaction and tension, indicating the presence of a collection of matter beneath the periosteum, which her timidity would not permit to be divided. This young woman assured me, in a manner that I could not reconcile with the belief that she uttered a falsehood, that she had never known an individual of the other sex. It was evident that her feelings were deeply wounded by the suspicion.

How are these and similar cases to be explained but by supposing the medicine, now salutary, to have been formerly deleterious? And this may be admitted. Of mercury, as a remedy, it may truly be said, '*nisi paret, imperat.*' We see daily examples of its mischievous effects; and we refer them either to the quantity exhibited, the form employed, or the precautions neglected; without always sufficiently regarding the texture of the part inflamed, the character of the inflammation, and the actual state of the constitution*.

But whether the action of mercury, by rousing the absorbent vessels, serves as a vehicle to

* See Observations on Phymosis in another part of this volume.

the morbid poison, and modifies its effects on the system—or whether this be a simple inflammation excited by mercury, as we observe fever to be—or an inflammation peculiar to a cachexia, which its use has engendered, the fact that the disease yields to its discreet exhibition cannot be controverted. Nor is its efficacy less in cases to which no suspicion of syphilis or mercury in the system can attach; for example, where the iritis is obviously an extension of unchecked superficial ophthalmia, a very frequent case; or where the affection is at first proper to the iris, the external inflammation being secondary and sympathetic. From the facts which I have stated one or two inferences are deducible, too important to be overlooked.

Modus operandi of mercury.

1st. The view, which, in the cases of iritis, we are enabled to take of the operation of mercury upon a part undergoing the adhesive inflammation, ought not to be confined to this case; it must be capable of extension and application to other organs in a similar condition. It affords demonstration the most palpable of its power to alter the action of the extreme vessels, which are the instruments of morbid changes in all organs of the body. Its effect on membranes generally, especially the skin, is another proof of this. Its action on parts disposed to adhesive inflammation, as the serous membranes, is more marked than upon those which tend to the suppurative action, as the mucous. But for the gonorrhœa, in the army and on the continent, the sublimate is still generally employed, and often with success.

The effect of mercury as an application, is to oxidise the blood of the capillary circulation, and thus, by exciting a brisker action of the *vascula minima*, it stimulates indolent and ill conditioned ulcers to assume a new and florid granulating surface, and a healthy secretion.

Upon a tumor, whether solid or fluid, the indirect effect of this remedy is to promote its removal by stimulating the absorbents of the neighbouring part. The brisker action of the extreme arteries induces a corresponding activity of the absorbents, for in proportion as the exhalants are unloaded, it is well known that the avidity of the absorbents is increased. It is common to see people grow fat after a course of mercury.

The effect of mercury to excite a new and peculiar action in the capillary system, is as marked upon the constitution as upon the part. It first quickens the heart and pulsating arteries, and is a stimulus in this stage which enfeebled habits but ill support. When it has entered the system, the febrile irritability is allayed, and a general tranquillity prevails, for all the secretions of the body are manifestly increased, the biliary and cutaneous especially. The absorbent vessels are next reciprocally excited to increased activity; and where its effect is salutary, it is at this time that the patient experiences a relief as from a burthen, a return of appetite and digestive power, and a lithesomeness almost conveying a sense of renovation.

2d. Without further urging the inquiry, whether mercury ever induces or is concerned in in- Not specifically antisyphilitic.

ducing the inflammation which it unquestionably cures, the fact that it acts with equal rapidity and effect upon all cases of inflamed iris, whatever their origin, seems to me to shew that the idea of a specific anti-syphilitic virtue is an erroneous one. It arrests the inflammation produced by the absorption and secretion of a poison, as it arrests inflammations which have no such origin; and the after effects are, in both cases, attributable to the stimulus, which, having entered the blood, it communicates to the extreme vessels. The fætor of the breath and the discolouration of silver applied to the surface, shew that it actually permeates the minutest orders of vessels, and the phenomena of its operation appear to me to depend essentially upon the change which it induces in their action.

Plate VI. exhibits different appearances of the iritis, combined with the symptoms which have been described.

The following interesting communication was addressed to me by my valued friend Dr. Farre, after a perusal, at my request, of the foregoing paper; and knowing the esteem in which his opinions are deservedly held, I gladly avail myself of his permission to present it to the public:—

Dear Travers,

I am glad to travel a part of the way with you as a former colleague, for whom I entertain so high a regard.

We are mainly indebted to John Hunter for directing our attention to the action of the capillary arteries, a knowledge essential to medicine and surgery, considered as a science. To be able to present to the mind the actual condition of the capillary arteries of an inflamed organ, and the changes which are taking place at their extremities, is to know the disease; and to be able to alter, to regulate, and to controul that action by remedies, is to cure it. Whilst the principal tendency of that series of remedies, which we comprise under the received term, antiphlogistic, from general blood-letting downwards, is to diminish the force of the heart and arteries; it is in a peculiar manner the operation of mercury on the whole capillary arterial system to change its action, but not indefinitely. The gentlest action of mercury is to correct and restore the secretions proper to the alimentary canal to their natural condition, and, as by a charm, to dissolve the functional disorder of distant organs sympathizing with the first passages. This is an operation which so exactly accords with the intention of nature, that no morbid actions ought to result from the remedy itself when thus used. But it is quite another thing when it is necessary to arrest organic disease. The remedy itself produces a train of morbid actions. Not to dwell on what is well known, suffer me to direct your attention to the condition of the extreme arteries when fully excited by mercury. It is an erythema—an action which essentially weakens the cohesion of parts: but the adhesive inflammation is so exactly opposed to this, that

both cannot be the result of mercurial action. From the moment that I commenced the study of morbid anatomy, I directed my attention to the adhesive inflammation, because it opened to my view the most usual process of disorganization in the viscera.

This is not the place to enter into the progress of my research respecting this important fact, or to shew that I applied the practice to the chief organs of the body before the interesting changes on the iris particularly engaged my attention. Suffice it to say, that I have been led, from repeated observation of the adhesive inflammation of various textures being cured by the mercurial action, to receive it as one of the *general laws* of its operation to change that arterial action on which the effusion of coagulable lymph depends, and consequently to arrest all the subsequent changes which flow from this process. Doubtless, there are exceptions to this general law. The class of tumors properly so called, form an immense and lamentable exception to it; and scrofula, in the same proportion that it has impaired the restorative powers of the constitution, forms another not less considerable. The extent and duration of the adhesive inflammation itself forms a third; for all reasonable expectation of success, even from the use of the most powerful remedy, is founded on, and pre-supposes a structure perfect enough to effect the salutary changes; but it is the actual organization of the part which suffers by the continuance of this process, and thus unfits it to effect them; I take

this to have been the reason of the failure of mercury in the case of Chapman, described and illustrated by figures in "Saunders on the Diseases of the Eye." The following is a parallel case as to the failure of the remedy, although not as to the cause of that failure:—

In September, 1816, a very delicate female, aged 25, suffered an unusually severe and obstinate attack of pleuritis. The disease yielded only to repeated, general, and topical bleeding, and to the frequent application of blisters; but the function of respiration was not set perfectly free till January, 1817, when the pericranium of the right side of the head became exquisitely painful. Various remedies, both external and internal, were tried without producing any permanent benefit till the month of May, when a gentle but regular course of mercury, which she had previously resisted from her aversion to it, was commenced. About the middle of the month before any mercurial action was apparent from the use of the blue pill, she complained of pains of the left tibia, and a node appeared just below its head, the tonsils became deeply ulcerated in several places, and her face, body, and extremities, were pretty extensively covered with a copper-coloured eruption. Her husband was now questioned, and acknowledged, that he had been diseased, and that he had also infected her in the month of July, 1816; that it was considered to be only a gonorrhœa, yet that his surgeon kept him two months under a mercurial course, during which his mouth was sore; that he had never had any secondary symptom;

that his wife also submitted to a mercurial course, but so very partially, that her mouth was never made sore. As soon as those facts were stated, she was directed to rub in daily one drachm of the strong mercurial ointment, and in four days she was excessively salivated, and the function of the heart was so exceedingly disturbed, that it became essential to omit the use of mercury. The sores, however, on the tonsils, healed, the eruption faded and disappeared, the node on the tibia was absorbed, and the pains of the head subsided. As the mercurial action declined, which it did during a fortnight, the pupil of the right eye dilated, and the vision became impaired. Leeches were applied to the palpebræ, and a blister to the right temple. The soreness of the mouth and throat disappeared rather suddenly, and the right eye immediately inflamed; lymph was deposited on the iris, and became organized. Whilst I was compelled to wait till she had power to bear the repetition of the mercurial action, the iritis advanced, and the eye became amaurotic; for ordinary means had no influence here. As it was now certain that disorganization would take place if mercury were not administered, its action was again risked. The second course was commenced early in June, by rubbing in one drachm of the strong mercurial ointment daily. Her mouth was but slightly affected at the end of seventeen days, when she fell into so violent and obstinate a mercurial colic, with tenesmus and uterine irritation; her heart palpitated so much, the arterial action was so feeble, and her ema-

ciation so considerable, that I was compelled to withdraw the influence of the only means of saving the eye, hoping, at least, that the tranquillity of the organ was secured; for the iritis was nearly subdued, and there was some manifestation of returning sensibility of the retina; but at the end of a fortnight, when the mercurial action had subsided, the inflammation of the internal tunics of the eye returned with an extent and duration of suffering which has rarely been exceeded. Now the disorganization was progressive, the anterior and posterior chambers were filled with lymph, and all sensibility of the retina was lost. In one week from the re-commencement of the inflammation, the disorganization of the eye was completed. From the general appearance of the sclerotic coat, and a distinct pointing at one part of it, joined to the excess of coagulable lymph in the anterior chamber, it seemed to me, that, contrary to my former experience, the iritis had terminated in suppuration. The sufferings of the patient were so great, that, on a consultation with Mr. Lawrence, an incision was made into the posterior chamber by that gentleman. No discharge of pus attended the operation; and this case confirms the opinion, that iritis terminates in the adhesive stage. In this respect it precisely corresponds with Fig. 3. Plate 1. in the work above cited, representing an eye disorganized by syphilitic inflammation of the iris, on which you performed the same operation. In that case the eye became tranquil; but in this the sufferings of the patient were only aggravated by the ope-

ration. The inflammation of the internal tunics continued unabated for two months, in spite of every palliative that could be used. Even opium, the refuge of the miserable under incurable disease, failed, after a time, to mitigate her sufferings. The morbid action gradually spent itself, and the remnant of the eye has been tranquil for the last month.

Is iritis an example of pure adhesive inflammation?—I consider that it is; for if the case be left to nature, this is its tendency and termination.

Is the mercurial action an erythema or an adhesive inflammation of those parts on which it falls?—If the former, which I believe it to be, no two actions can be more opposed.

Are sloughing ulcers cured or aggravated by the mercurial action in which the establishment of adhesive or phlegmonous inflammation is essential to the preservation of the part? Accept an example or two. Mr. B. was under mercurial action for a chancre on the glans penis; an erythematous inflammation surrounded the ulcer, and the part sloughed; contiguous portions of the glans died successively. As soon as this destructive inflammation was set up, the further use of mercury was suspended, and two ounces of the powder of the best Peruvian bark was given daily. The granulating process was established before the whole of the glans was lost. You know that mercury would never have occasioned the deposition of lymph, nor the organization of that lymph, so as to heal by

granulation in this alarming case. A child was brought to me with one eye lost by slough, and the other inflamed, with nothing remarkable in its appearance except a small opaque yellowish spot on the cornea. A mild antiphlogistic treatment was prescribed; but just before the patient was dismissed, the mother told me that the child had some sores about the pudendum and nates. On examination several small ulcers appeared, all of which were in a sloughing condition. This served me as a key to the condition of the capillary arteries. The extract of bark was freely given. In eight and forty hours every ulcer on the body had a clean surface. The ophthalmia declined, and the eye was saved. Need I ask you what would have been the effect of the mercurial action in this case?

I have uniformly regarded the mercurial action as one of the most effectual means of arresting the disorganizing process of adhesive inflammation, whether of the iris or of any other texture of the body. To the liver in this state of disease, (hepatitis) it has been long applied, except that some have had their fears about commencing it too early; and through this delay, have probably lost the opportunity of preventing suppuration. In cynanche trachealis it has been more recently used with success. In the last stage of marasmus, from nodes of the large bones, I applied it with success in 1805, and since that period, with equal success, to adhesive inflammation of the pericranium, both where it has been entitled, pseudo-syphilitic, and where it was neither syphilitic nor bearing any resem-

blance to syphilis; before and since that period with marked advantage, in arterial congestion, and even in organic changes of the brain; in 1809 successfully in carditis from acute rheumatism, and since that period, in chronic carditis.

Believe me, dear Travers,

Yours, with sincere regard,

J. R. FARRE.

Charterhouse Square,
November 8, 1817.

Whether the mercurial action is always restricted to the state denominated erythema, and never advances to the adhesive stage of inflammation, is a point which I cannot take upon myself to decide. The facts which I have adduced seem to militate against this hypothesis, and a consideration of the case related by Dr. Farre, does not, I confess, induce me to alter my opinion that the iritis is frequently a direct consequence of the mercurial action. It appears that the eye was attacked with inflammation, for the first time, after an excessive salivation, by which all the syphilitic symptoms were permanently removed, and that lymph was deposited on the iris and became organized.

Since this paper was written, I attended an elderly lady, the subject of iritis of the right eye, cutaneous eruptions, and rheumatic pains, which yielded readily to a very slight ptyalism.

Three weeks after the cure of the iritis, she

was attacked with an inflammation, precisely resembling the former, in the left eye, and notwithstanding a slight paralytic affection of the right side, I persisted in the plan before pursued, diminishing the quantity of mercury one half, and at the same time exhibiting a light tonic; the inflammation yielded as speedily as before.

Whether sloughing sores are cured or aggravated by mercury, is an inquiry to which it is not difficult to reply, but which does not appear to me to be fairly connected with the question at issue. It will not be denied that ulcers often granulate even luxuriantly under the mercurial action. I have seen a rapidly destructive ulcer on the penis arrested by mercury, to which bark gave no check, but opium is a remedy on which I place more reliance in progressive sloughing.

The cutaneous erythema in some well marked cases which have fallen under my observation, has been produced by a very small quantity of mercury, and with such a state I have never seen the iritis combined, which on the contrary usually follows a larger or longer use of that mineral. It is a rare case, and is produced by opium, and other substances as well as mercury.

I am quite aware, that the facts which I have stated in this paper admit of different conclusions. Some may incline to consider the iritis after mercury as casual, and not essentially depending upon its use. Others may be unwilling to yield their belief of the presence of syphilis in the system, for which they will conclude

that the remedy had been ineffectually administered. The subject is obscure, and an earnest desire to promote the investigation of it is perhaps the best apology I can offer for submitting it in so unfinished a state to the profession.

Fig. 1.



Fig. 4.

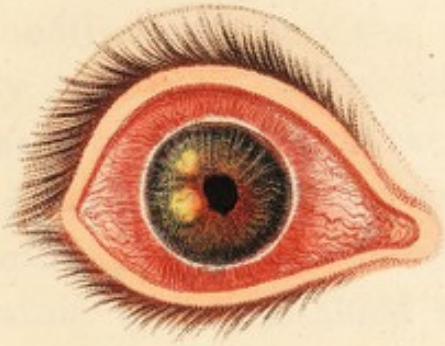


Fig. 2.

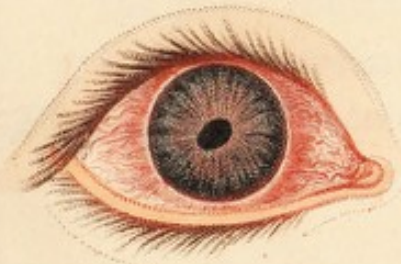


Fig. 3.



London Published June 1st 1818. by E. Cox & Son. St. Thomas Street. Borough.

EXPLANATION OF

PLATE VI.

Different appearances of Iritis.

Fig. 1. Represents the eyes of a woman who was the subject of eruptions and joint pains, and who had been long under the irregular action of mercury. The disease as here depicted is chronic, the violence of the inflammation has passed away, the pupillary portion is in either eye loaded with masses of lymph, which are in a degree organized; the figure of the pupil is lost, and the vision is greatly impaired. Under the continued gentle action of mercury, the deposit was nevertheless so far absorbed as nearly to restore the shapeliness of the pupil, though it remained permanently fixed, and the vision was considerably restored. The circumscribed tubercular eruption seen on the forehead was thinly scattered over the arms and other parts of the body.

Fig. 2. Is an idiopathic iritis not allied to syphilis, and wholly independent of the mercurial action. The zone is strongly marked, the pupil contracted and misshapen, but without any external appearance of lymph.

Fig. 3. Is a secondary iritis. The onyx is of pus as its figure demonstrates, and is derived

from an interstitial ulcer of the cornea, which had opened into the anterior chamber. This does not admit of graphical delineation. The internal ulcer of the cornea is in my observation the only source of purulent onyx or hypopion. The iris becoming inflamed preserves its proper mode of inflammation, viz. the adhesive. The inflamed iris does not secrete pus, nor does it take on the ulcerative action.

Fig. 4. Acute iritis during the use of mercury for secondary syphilis, and accompanied by doubtful or at least mixed symptoms.

CASE OF LIGATURE

ON THE

AORTA.

By Mr. ASTLEY COOPER.

I FEAR that the title of this paper may impress the reader with an idea that nothing could justify me in performing the operation which I am about to describe; for that a ligature made upon the aorta must necessarily prove fatal. But I trust, that it will be seen in the sequel, that the operation was not attended with the immediate danger which might have been apprehended; that the patient complained of but little pain during its performance, that it afforded the only hope of safety, and that we had to lament, not that the operation was performed, but that it had not been sooner done.

Operation not attended with immediate danger.

Sorry indeed should I be, to sport with the life of a fellow-creature who might repose a confidence either in my surgical knowledge or in my humanity; and I should be equally disposed to consider myself culpable, if I did not make every possible effort to save a person, whose death was rendered inevitable, if a disease were suffered to continue which it was possible for surgery to relieve, as in the case which forms the subject of this essay. In the performance of our duty one feeling should di-

rect us; the case we should consider as our own, and we should ask ourselves, whether, placed under similar circumstances, we should choose to submit to the pain and danger we are about to inflict. Guided by this principle, and having collected all the evidence which applies to the case, we perform our duty without the reproaches of conscience which must await those who unnecessarily subject their patients to pain and danger.

First operation for carotid aneurism unfortunate; second successful.

Those who feel disposed to condemn the attempt which I have here described, will have the kindness to recollect, that although my first operation for carotid aneurism proved equally unfortunate with this, yet in the second operation, I was gratified by the successful issue of the case.

Three sources of medical evidence.

In collecting evidence upon any medical subject, there are but three sources from which we can hope to obtain it; *viz.* from observation on the living subject; from examination of the dead; and from experiments upon living animals. By the first, we learn the history of disease; by the second, its real nature, so far as it can be certainly known; and by experiments upon living animals, we ascertain the processes resorted to by nature for restoring parts which have sustained injuries, and then apply that knowledge to accidents in man.

General considerations on ligatures of arteries;

In applying ligatures upon the arteries generally, the only circumstance to be considered is, the probability of the blood being conveyed by means of anastomosis to the parts beyond; but

in the larger cavities;

in operations upon those arteries, which are seated in the larger cavities of the body, it be-

comes a subject of consideration, by what mode the ligature shall be prevented from occasioning destruction. In common parts, it produces suppuration and ulceration, which end in the separation of the ligature; but amidst the vital organs, a suppurative process may endanger life.

in common parts;

amidst vital organs.

The Aorta is so rarely obstructed, that the opportunity of ascertaining the power of anastomosing vessels in propelling the blood is extremely unfrequent. The first impression arising on examination of the structure of the aorta at its curvature would be, that an anastomosis would not be sufficiently free to permit the blood to find its course by circuitous channels; and the only opportunity that I have had of seeing a contracted aorta in the human subject would serve to confirm that opinion: but Mr. Graham has met with a case (which will hereafter be detailed) which shews that even in that part of the aorta, the communication may be sufficient to allow a passage to the blood.

Aorta rarely obstructed.

Obstruction at the curvature.

With respect to the case of contracted aorta, which I had the opportunity of seeing, the following are the particulars, as given to me by Mr. Winstone, Surgeon, of Charter-house Square, who solicited me to inspect the dead body:—

"The gentleman, who formed the subject of it, was 57 years of age, of a full habit, accustomed to free living, had been in good health for years, excepting in the winter, when he was always troubled with a violent cough; more violent than I ever witnessed in any other person. In the night of April the 7th, 1809, he was affected with cough and difficulty of breathing to a greater degree than usual; and at five in the

Mr. Winstone's case.

morning I saw him. He complained of pain under the sternum, the extremities were cold, the countenance exhibited marks of inexpressible anxiety; the pulse was rather weak, but regular, and much altered in frequency. These symptoms continued with but little alteration, notwithstanding cupping on the sternum, blistering and volatile medicines, until about eleven o'clock, when he was prevailed upon to go to bed. He walked up stairs, and fell on the bed lifeless."

Dissection. Upon our opening the body, the pericardium immediately presented itself, exceedingly distended; and on making an incision into it, a large quantity of blood was discharged; upon examination of the heart, one of the coronary veins was found ruptured on the anterior surface of the right ventricle. At first I supposed this was the source of the blood found in the pericardium; but upon more minute examination of the heart, when I had brought it to my house, I found an opening leading into the right ventricle, and

Rupture of the right ventricle of the heart. that the rupture had begun in this part of the heart and extended through its substance, bursting the vein in its progress. I opened the pulmonary artery, but found it free from disease; the left side of the heart was also healthy, but the lungs adhered in some degree to the inner

Adhesion of the lungs. side of the chest, and a small quantity of fluid was found in each remaining portion of the cavity of the thorax. The finger being thrust into the aorta, opposite to that part at which the *canalis arteriosus* terminates, a stricture was dis-

Stricture in the aorta. covered in it, which with difficulty admitted the little finger, and which, on more particular ex-

amination, was found to be a thickening of the circular fibrous structure of the vessel, accompanied with some ossification of its coats. This state of contraction in the aorta impeded the passage of the blood through the heart and lungs, and under the extreme degree of distention thus produced, the right ventricle, from its less power of resistance, gave way, and occasioned the sudden termination of the patient's existence.

The following case has been published in the Medico-Chirurgical Transactions, by Mr. Graham, Physician to the Infirmary, Glasgow.—(Vide Medico-Chirurgical Transactions, Vol. V.)

Mr. Graham's case.

"The case which I take the liberty of transmitting to the Medical and Chirurgical Society, has, as far as I know, but one parallel on record; and in it the appearances on dissection only are mentioned; no history is given of the case. I believe, I have extracted from the books of the infirmary, such parts of the reports taken at the patient's bed-side as are of any importance, and have noted some anomalous symptoms which may now appear trifling; because it may perhaps be found that an improved state of knowledge may give importance to what at present seems adventitious, and without value. I am sorry to say, that as I can see no diagnostic symptom, the occurrence of this derangement adds but another chance to our guessing wrong during life, at the diseases of the heart.

Henry Frere, 14 years of age, a weaver, admitted into the infirmary the 3d of August,

1813, where the following history of his symptoms was entered on the journal of the house:—

Symptoms.

"Two weeks ago, after exposure to cold, was affected with dry cough, which, for the last eight days has been attended with tolerably copious expectoration and pain, impeding respiration, and excited by the cough, in the left side of the chest; pulse 100, somewhat firm; little appetite; much thirst; tongue rather white; bowels regular; sleeps ill; sweats considerably; has used no medicines."

Supposed to be pneumonia in an advanced stage.

The disease was regarded as a case of pneumonia, but of such standing, that suppuration seemed to have taken place, and in which, therefore, no material benefit was likely to result from any treatment. However, under the ordinary means, bleeding, blistering, expectorants, and the free use of cathartics, I had the satisfaction of seeing the symptoms decline. The blood from the first bleeding presented somewhat of the buff coat. The pulse, however, generally ranged from 92 to 104, and is variously marked in the reports; full, strong, sharp: it was always regular. The *sputum* became more copious, gross, and tinged with blood. He perspired chiefly from the upper parts of the body, moaned in his sleep, and took little food. On the 8th he was affected with nausea and vomiting. On the 19th he had a febrile attack, which lasted a few days. On the 20th there was much pain in the left eye-ball. On the 27th he complained only

Palpitation.

of palpitation—the first time that symptom is noticed in the journal, though I rather think this was an oversight. No report was taken from

this date till the 6th of October, when he was dismissed from the hospital "cured."

The palpitation had subsided as the strength increased; which encouraged a hope I was willing to entertain, that this symptom proceeded from weakness, though I could not but express fears that the inflammation had extended to the pericardium or the heart. The uncertainty of the diagnosis in cases of this kind, is but too well known to every practitioner. I was inclined to suspect the effusion of serum within the pericardium, or perhaps adhesion of the heart to its capsule, though I had seen at least two cases about that time of the most intimate and general adhesion, without the circulation having been in any degree affected.

Uncertain diagnosis.

These fears were much strengthened by the boy's appearance on returning to the hospital on the 13th of November, when the throbbing of the carotid and subclavian arteries was very remarkable. On his re-admission, the following report appears on the journal:—

"13*th November*.—Dyspnœa, palpitation at the heart, and pain in the left side of the thorax returned soon after he left the house, and have been gradually increasing; pulse 88, regular; bowels kept open by physic; received temporary relief from the application of a blister."

Dyspnœa, palpitation, and pain of the left side.

Blisters and cathartics were again employed, and the symptoms for a time declined. The pain, which had been removed, returned to the left side of the chest on the evening of the 29th. A blister was repeated next day, which gave much pain, till he was suddenly seized with a

Febrile attack. febrile attack on the 2d of December, when the part became quite easy. There was no strangury. The fever was gone next day. A simi-

Nausea and vomiting. lar attack, accompanied with nausea and vomiting, was experienced on the 12th, and immediately removed by the operation of an emetic.

Acidity and cardialgia. He had acidity at the stomach, and cardialgia after meals. On the 23d, he is reported as having been affected for ten days with pain in the right side of the chest, increased by motion, and by full inspiration, accompanied by frequent cough, most troublesome in the night. The pulse had again risen; he was blistered, used cathartics, and was twice bled; the blood, especially after the first operation, being very buffy. The pulse subsided, and the pain was removed, but the cough and palpitation continued. The circulation was again quickened on the 27th, and remained hurried till his death; he sunk at length; was drenched in perspiration; took no

Copious perspiration, vomiting, sandy urine. food; was attacked with frequent vomiting; the urine became sandy; his sleep was disturbed; the dyspnœa and palpitations increased, and he

Death. expired about noon on the 2d of January. The pulse, while he was last in the hospital, fluctuated from 90 to 116, and was of various degrees of strength and firmness; latterly only, weak: it was always regular.

Dissection.

Serum in the abdomen. There was nearly a pound of serum in the cavity of the abdomen, and the bowels were distended with flatus, but the viscera seemed

natural. Immediately on turning up the sternum, the pericardium presented itself very much enlarged, obscuring the left lung, and adhering to the pleura costalis. This capsule, which was thin and beautifully transparent, contained about an ounce of fluid, and a heart nearly twice its natural size for a boy of this age. The arteries and trachea were distended above the arch of the aorta; the contents of the thorax were turned downwards; and the aorta, being divided below the whole, was removed from the body. The walls of the left ventricle were about an inch in thickness, but no other derangement in the structure of the heart or its valves, was observed. The capacity of the cavities seemed natural. The aorta expanded unusually near its origin, so as to form a kind of pouch, but after having given off the branches to the head and superior extremities, its diameter was preternaturally contracted. It was continued of this diminished size till after its union with the canalis arteriosus, where it was completely impervious. The coats were not thickened, or in any way diseased, except that about half an inch below the stricture, there was a smooth elevation on the inner surface, less raised, but having nearly the diameter of a split pea; otherwise the appearance was exactly such as if a ligature had been tied tightly round the artery. The obstruction was about a line in breadth. The artery then received three trunks about the size of crow quills, and near them three smaller ones, afterwards resuming its natural size along the vertebræ. These three trunks are evidently the uppermost of the infe-

Increased size of the heart.

Aorta expanded near its origin.

Preternatural contraction of it.

Impervious.

Received three trunks immediately below the stricture.

rior intercostals; their coats were remarkably thin, like those of veins. A probe passed from the pulmonary artery along the canalis arteriosus to the obstructed portion of the aorta; but from its thickened appearance, it did not seem probable much communication by means of it could have been allowed, and the florid countenance of the boy during life establishes the same conclusion. There having been no suspicion of this singular deviation from the natural structure till after the contents of the thorax were removed from the body, it was impossible to trace, with the accuracy that could be wished, the anastomosing branches by which the circulation had been carried on in the inferior parts of the body; but I think enough has been observed to lead us very near the truth. The arteria innominata, the left subclavian, the superior intercostals, and the mammary arteries, were much enlarged. The epigastric was reported to be of its natural size. These facts, and the aorta acquiring at least very nearly its natural size immediately below the stricture, shew that the blood did not pass to the inferior extremities, in any material quantity, as might perhaps have been expected, by the inosculations of the mammary and epigastric arteries, but chiefly by the communications of the superior intercostals and the mammary arteries with the three large branches entering the aorta below the stricture: also from the mammaries and thoracics through others of the intercostal and diaphragmatic arteries.

Circulation carried on by the superior intercostals and mammaries.

The lungs were very light coloured; the left

lobe much collapsed. In each side of the thorax there was a small quantity of bloody serum."

After the aorta has formed its curvature, it gives off numerous intercostal arteries within the cavity of the chest; and though these vessels are small, they communicate so freely with each other, that under a gradual obliteration of the aorta, the blood would be still readily transmitted to the inferior parts of the body. An example of this kind is related by Mr. Paris, and is quoted by Mr. John Bell, in his Surgical Observations.

Mr. Paris's case.

Mr. Paris, Dissector for the Amphitheatre of the Hotel-Dieu, in the year 1789, injected the body of a very lean old woman, about 50 years of age, whose arterial system was found to be singularly deranged, and the circle of the blood changed altogether by a complete contraction of the aorta a little beyond the arch. Mr. Paris had his attention particularly excited to the condition of this subject by the unaccountable enlargement of the small arteries upon the fore part of the chest. He had filled the arteries with an injection composed of equal parts of suet and resin, coloured with lamp-black; and this injection, thrown in from the mouth of the aorta, passed along so easily, that far from suspecting an obliteration, he felt that he could have thrown in more injection than is usually required for filling an adult body.

The subject was so meagre, that, without dissecting, Mr. Paris felt the thoracic arteries run-

ning down the sides of the chest tortuous and remarkably enlarged. It was natural for him to be very careful in the dissection of this subject. He found the aorta immediately beyond its arch contracted to the size of a writing quill; the coats of the artery were of their usual thickness, and its cavity of course extremely small; the arch of the aorta above this contraction was but very slightly dilated; the part below had lost nothing of its natural size. Nothing could be found either in its own structure, or in the condition of the neighbouring parts, to account for this contraction of the artery.

Aorta contracted below the arch.

Arch very slightly dilated.

The carotids were in the natural state; the arteria innominata, and the left subclavian were enlarged to twice their natural diameter; all their smaller branches were increased in the same proportion, and had assumed a curled and zigzag course: the internal mammary and phrenic arteries were greatly enlarged and very tortuous. The transverse arteries of the neck were of twice their natural size; their posterior branches were tortuous, extending to a great distance over the back, with long inosculations which were met from below by the branches of the upper intercostal arteries, and they were also remarkably enlarged; the thoracic and scapular arteries which run along the side of the chest, were twice their natural size.

Below the constricted part of the aorta, the lower intercostals were remarkably enlarged, even to three or four times their natural size; each of them was dilated, but those were most affected which were given off nearest the contracted part; and the posterior branch of each,

which penetrates to the muscles of the back, was more dilated than that which runs between the ribs: indeed, those posterior branches were so remarkably dilated with contortions so closely succeeding each other, that they resembled a necklace of beads; and their inosculations with the branches of the *transversalis cervicis* were very remarkable. The lower phrenic artery was enlarged, forming considerable inosculations with the superior phrenic; the epigastric artery was dilated to the size of the enlarged mammary, and was joined with it by very numerous and conspicuous inosculations!" This case clearly demonstrates, that the greater part of the blood, usually conveyed by means of the aorta through the thorax, is capable of finding a circuitous course by the branches of the subclavian and intercostal arteries.

Posterior branches more particularly dilated.

With respect to the aorta in the abdomen, I have met with no instance in the human subject of its obliteration or contraction; but if such an event were to occur, little difficulty could arise in the transmission of blood by collateral channels: the mammary and epigastric, the superior and inferior mesenterics, and the lumbar arteries would furnish abundant opportunity for a collateral course of the blood.

Although in the human subject we are thus deficient in evidence concerning a circuitous circulation in the cavity of the abdomen, yet with respect to other animals, it is probably generally known, that I have several times made

ligatures upon the aorta of the dog, and found that the blood was readily carried by anastomosing vessels to the posterior extremities of the animal. Of which experiments an account has been published in the Medico-Chirurgical Transactions.

Operation of tying the aorta in dogs.

The incision was, in each experiment, made on the left side of the spine, the aorta was drawn to the surface of the skin by an aneurismal needle, and all the surrounding parts being separated from the vessel, so as to perfectly bare its coats, a ligature was applied around it. An animal under these circumstances was kept for a few weeks, and then killed: being injected and dissected, the lumbar arteries, which were considerably enlarged, were found to be the chief agents of the new circulation. We have a beautiful preparation in the collection at St. Thomas's Hospital, shewing the obliterated aorta, and the numerous and enlarged anastomosing vessels which carried on the circulation; thus establishing, as far as analogy could go, the possibility of the blood being transmitted in a similar manner in the human subject.

Dissection.

I shall now proceed to detail the circumstances of the case, which forms the principal object of this Paper, leaving the remarks upon the kind of ligature to be employed till a description of the operation has been given.

CASE.

Charles Hutson, a porter, aged 38 years, was admitted into Guy's Hospital April 9, 1817, for a swelling in the left groin, situated partly

above, and partly below Poupart's ligament. An obscure pulsation could be perceived in it, and it was concluded to be an aneurism. The history which he gave of himself was, that thirteen months previous to his admission, he had fallen against the corner of a chest, by which accident he received a violent blow upon the left groin, and was so much hurt as to be unable to walk to his home. On the following day, his thigh became so much discoloured and swollen, that he could not rise from his bed.

Case concluded to be aneurism.

Received a violent blow on the left groin.

Thigh next day much swollen.

After a confinement of three weeks, he began to recover, and the limb soon returning to its natural size, he resumed his employment, but was never able to exert that limb with the same freedom as the other: however, he continued to work, though with the greatest difficulty, till within a fortnight of his admission into the hospital: for some time previous to which, he had been occasionally troubled with a pricking sensation in the limb, but it was only transient, and seemed to arise from the pressure of the swelling upon the anterior crural nerve. Some degree of swelling had remained in the groin from the time of the accident; and for some weeks previous to his admission, he had been obliged to loosen his clothes on the left side.

Complained of pricking sensation in the limb.

At this period the swelling was considerably diffused, several large veins crossed its surface, and pressure upon it gave considerable pain. On the third day after he had been in the hospital, the swelling increased to double its former size, and the pulsation became less distinct, excepting in the course of the iliac and

Swelling greatly diffused.

Extent of swelling.

femoral arteries. The swelling extended from three to four inches above Poupart's ligament, to an equal distance below it, and was of great magnitude. Just below the anterior and superior spinous process of the ilium, a distinct fluctuation could be perceived in the aneurismal sac above Poupart's ligament, so that the blood had evidently not yet coagulated; and the peritoneum was carried far from the lower part of the abdomen, in such a manner as to reach the common iliac artery, and to render an operation impracticable without opening the cavity of the peritoneum. I therefore determined to avail myself of other means, or to wait the efforts of nature towards a spontaneous cure, before I performed any operation; a circumstance which it is well known every now and then occurs.

Fluctuation perceived above Poupart's ligament.

Swelling suddenly increased.

May 16.—The swelling had suddenly increased; and the pulsation becoming more distinct, twelve ounces of blood were ordered to be taken from the arm.

Pressure applied.

21.—Pressure was applied upon the fore part of the swelling, by means of a cushion bound down upon it by a broad roller; twelve ounces of blood being drawn from his arm, the patient declared himself to be more at ease.

27.—The pressure upon the tumor being removed, the skin was found abraded and discoloured, with the loss of its sensibility.

30.—In the morning he reported, that he had passed a restless night, and appeared to labour under considerable constitutional irritation. The swelling had very much increased; a tourniquet was ordered to be applied upon it, with di-

Tourniquet ordered to be applied.

rections to adjust it in such a manner as to press upon the aneurism, but upon the surrounding parts as little as possible.

June 1.—He had borne the pressure of the tourniquet tolerably well, but it made no difference in the size of the tumor.

4.—When the tourniquet was loosened, a slight ulceration of the skin over the sac was observed, and it was therefore ordered not to be re-applied. Slight ulceration from the tourniquet.

5.—He complained of the limb feeling so excessively heavy, that he had difficulty in raising it. The skin over the aneurism is shewing a disposition to slough. Limb excessively heavy.

19.—A slough was observed on the exterior part of the swelling below Poupart's ligament, which had nearly separated with a deep ulceration around it. Slough and ulceration.

20.—At ten in the morning he had a bleeding from the external part of the sac, but the loss of blood was not considerable. A compress of lint was applied, and confined by adhesive plaster. He had no return of bleeding on the following day. Slight hæmorrhage.

22.—At 7 o'clock in the morning, after some slight exertion, he bled again; but still the bleeding was not profuse.

24.—The bleeding again recurred, but stopped spontaneously.

25.—About half-past two o'clock in the afternoon, in consequence of a sudden mental agitation, he bled profusely. My apprentice, Mr. Key, fortunately succeeded in preventing his immediate dissolution by pressure, but the man was so much exhausted, that the fæces were passed involuntarily. Profuse hæmorrhage. Involuntary passage of fæces.

At 9 o'clock the same evening I saw him, and found him in so reduced a state, that he could not survive another hæmorrhage, with which he was every moment threatened. Yet, still anxious to avoid opening the abdomen, to secure the aorta near to its bifurcation, I determined to ascertain whether it were practicable to pass a ligature around the artery from within the aneurismal sac; for I was of opinion, that if the artery had given way near the centre of the sac, as it usually does in aneurism, I might compress it with my finger, and pass a thread around it. With this view, I made a small incision upon the aneurism, about two inches above Poupart's ligament; and having made a very small opening into the sac, I passed my finger easily into it, and felt for the artery upon which it was formed; in doing which, my finger so completely filled the opening, that it prevented the escape of any blood by its side. I moved the finger to feel for the artery, but found only a chaos of broken coagula, and that the artery entered the sac above and quitted it below, without there being any intervening portion of vessel; and therefore, was constrained to abandon that mode of operation. When I was about to withdraw my finger, I directed two of the students to compress with their hands the aorta upon the spine, and they succeeded in stopping the pulsation in the artery of the right groin. As I withdrew my finger, I put a dossil of lint by its side, and closed the opening which I had made into the sac.

In danger of another hæmorrhage, which would prove fatal.

Small opening made into the aneurism.

Finger introduced.

It is proper here to observe, that the aperture

made into the aneurism by the sloughing process, was situated too far from the natural seat of the artery, to allow a hope of my finger reaching it from thence. As I was quitting the patient's bed-side, I felt a great regret, in which all the students by whom I was surrounded joined me, that the patient should be left to perish, without giving him the only chance which remained of preventing his immediate dissolution from hæmorrhage, by tying the aorta; and I therefore said, "Gentlemen, this only hope of safety I am determined to give him."

Artery could not be reached from the slough.

The operation was performed as follows: The patient's shoulders were slightly elevated by pillows, in order to relax, as much as possible, the abdominal muscles; for I expected that a protrusion of the intestines would produce embarrassment in the operation, and was greatly gratified to find that this was prevented by their empty state, in consequence of the involuntary evacuation of the fæces; and here let me remark that I should, in a similar operation, consider it absolutely necessary, previously to empty the bowels by active aperient medicines.

Operation.

Intestines empty.

Caution.

I then made an incision three inches long into the linea alba, giving it a slight curve to avoid the umbilicus: one inch and a half was above, and the remainder below the navel, and the inclination of the incision was to the left side of the umbilicus in this form( ). Having divided the linea alba, I made a small aperture into the peritoneum, and introduced my finger into the abdomen; and then, with a probe-pointed bistoury, enlarged the opening into the peritoneum

Incision made in the linea alba.

Curve to avoid the umbilicus.

Opening of the peritoneum.

to nearly the same extent as that of the external wound. Neither the omentum nor intestines protruded; and during the progress of the operation, only one small convolution projected beyond the wound.

Finger passed into the abdomen.

Having made a sufficient opening to admit my finger into the abdomen, I then passed it between the intestines to the spine, and felt the aorta greatly enlarged, and beating with excessive force.

Peritoneum divided by the finger nail.

By means of my finger nail, I scratched through the peritoneum on the left side of the aorta, and then gently moving my finger from side to side, gradually passed it between the aorta and spine, and again penetrated the peritoneum on the right side of the aorta.

Ligature passed around the aorta.

I had now my finger under the artery, and by its side, I conveyed the blunt aneurismal needle armed with a single ligature behind it; and my apprentice, Mr. Key, drew the ligature from the eye of the needle to the external wound; after which the needle was immediately withdrawn.

Exclusion of the intestine from the ligature.

The next circumstance, which required considerable care, was the exclusion of the intestine from the ligature, the ends of which were brought together at the wound, and the finger was carried down between them, so as to remove every portion of the intestine from between the threads: the ligature was then tied, and its ends were left hanging from the wound. The omentum was drawn behind the opening as far as the ligature would admit, so as to facilitate adhesion; and the edges of the wound were brought together by means of a quilled suture and adhesive plaster.

Wound united by quilled suture, and adhesive plaster.

During the time of the operation, the fæces passed off involuntarily, and the patient's pulse, both immediately, and for an hour after the operation, was 144 in a minute; he was ordered thirty drops of tincture of opium and camphorated mixture, and the involuntary discharge of fæces soon after ceased. I applied my hand to his right thigh immediately after the operation, and he said that I touched his foot; so that the sensibility of that leg was very imperfect.

Involuntary discharge of fæces; pulse 144.

Imperfect sensibility of the limb.

For the following particulars I am indebted to Mr. Cox, one of my apprentices.

At midnight his pulse was 132.

26.—At one o'clock in the morning, the patient complained of heat in the abdomen, but he felt no pain upon pressure; he said that his head felt hot, and that he had pain in the shoulders; his lower extremities, which were cold soon after the operation, were now regaining their heat; his body was in other parts covered with a cold sweat. The sensibility of the lower extremities has been very indistinct since the operation.

State at one in the morning.

At 2 o'clock, he felt so comfortable from his medicine that he wished to have more of it, and ten drops of tincture of opium were given him; his legs were wrapped in flannel, bottles of hot water were applied to the feet, and he then said that the heat of his belly was lessened.

At 6 o'clock the sensibility of his limbs was still imperfect.

At 8 o'clock A.M. he expressed himself as feeling quite comfortable; he however passed

no urine, and had no evacuation; his right limb was warmer than the left, and the sensibility was returning.

Difference of temperature in the two limbs.

At noon the temperature of the right limb was 94, that of the left or aneurismal limb $87\frac{1}{2}$.

At 1 o'clock, P.M. Mr. Cooper visited him, and as he walked up the ward he appeared much gratified at seeing his patient, who was at the point of death the evening before, and who was now adjusting his bed-clothes, and smiled as Mr. C. approached his bed.

At 3 o'clock after a fit of coughing, the man was much alarmed with the idea of the thread having slipped into the wound: it was a false alarm; but, to prevent the idea of its occurrence, it was fastened to a quill: soon after this he complained of pain in the abdomen; it was not very severe, nor did it last long; readily yielding to fomentations. As he had no evacuations, he was ordered an enema.

Vomited.

At 6 o'clock, P. M. he vomited, soon after the glyster had been administered: the heat of the right leg was 96, that of the left or diseased limb $87\frac{1}{2}$.

At nine in the evening he took half a glass of port wine in warm water, which he immediately rejected: he complained of pain in the loins; his pulse was 104 and feeble; he was very restless, and had an involuntary discharge of fæces.

Eleven at night, his pulse 100 and weak; he still vomited.

27.—At 7 A.M. the report was, that he had passed a restless night; the vomiting had returned at intervals; his pulse 104, weak and

Vomiting returning at intervals.

fluttering; he complained of pain all over his body, more particularly in his head; and the carotids beat with considerable force; he had great anxiety expressed in the countenance, was very restless, and the urine dribbled from him, with some degree of pain at the end of the penis. Pain of the head; increased action of the carotids.

At 8 o'clock, A.M. the aneurismal limb appeared livid and felt cold, more particularly around the aneurism, but the right leg remained warm. Coldness and livid appearance of the affected limb.

At 11 o'clock his pulse was 120 and weak; he appeared to be sinking. To the questions which were put to him he did not return any answer; he appeared to have an uneasiness about the heart as he kept his hand upon the left breast.

He died at 18 minutes after one, P.M. having survived the operation 40 hours. Died.

After being informed of his death, I requested Mr. Brookes of Blenheim Street to attend with me at the inspection of the body. Mr. Travers, surgeon of St. Thomas's Hospital, Mr. Stocker, apothecary of Guy's, and a large concourse of medical students attended the examination.

When the abdomen was opened, we found not the least appearance of peritoneal inflammation, excepting at the edges of the wound. The omentum and intestines were free from any unnatural colour; the edges of the wound were glued together by adhesive inflammation, excepting at the part at which the ligature projected. We were much gratified to find that the ligature had not included any portion either of the omen- Dissection. No portion of intestine included in the ligature.

tum or intestine: the thread had been passed around the aorta about $\frac{3}{4}$ of an inch above its bifurcation, and about an inch or rather more below the part at which the duodenum crossed the artery.

Clot of above an inch closed the vessel above the ligature.

Upon carefully cutting open the aorta, a clot of more than an inch in extent was found to have sealed the vessel above the ligature; below the bifurcation, another, an inch in extent, occupied the right iliac artery, and the left was sealed by a third which extended as far as the aneurism; all were gratified to observe the artery so completely shut in 40 hours.

Aneurismal sac.

The aneurismal sac, which was of a most enormous size, reached from the common iliac artery to below Poupart's ligament, and extended to the outer side of the thigh. The artery was deficient from the upper to the lower part of the sac, which was occupied by an immense quantity of coagulum.

Neck of the femur fractured.

The neck of the thigh-bone had been broken within the capsular ligament, and had not been united.

Upon consideration of all the circumstances of the case, to what are we to attribute this man's death? It did not arise from inflammation, for the viscera of the abdomen were perfectly free from it.

Cause of death.

His death appears to me to have been owing to want of circulation in the aneurismal limb; for although the warmth of the other limb was preserved, that on which the aneurism was

seated never gained its natural heat, which must have arisen from the great bulk of the aneurism, and from the disturbed state of the coagulum which it contained, which would prevent the free course of the blood through the aneurismal sac. That limb never recovered its natural heat, there being seven degrees difference between the two extremities; the sensibility also in the right limb was returning, which did not appear to be the case in the left. In an aneurism therefore similarly situated, the ligature must be applied before the swelling has acquired any very considerable magnitude.

There is still a circumstance, however, that remains to be decided respecting a ligature upon the aorta; which is, in what manner it is to be afterwards separated: whether it should be left suspended at the wound, or cut off close to the vessel: whether the *presse-artere* of that ingenious surgeon Mr. Crampton should be employed; or some unusual material should be used as a ligature. Although the patient whose case I have here given, did not suffer from inflammation of the abdomen, yet I should much fear that if he had lived longer, an extraneous substance suspended amidst the intestines would have produced that effect.

Danger from an extraneous substance amidst the intestines.

My friend Mr. Lawrence has proposed that the silk usually employed for ligatures should be cut off close to the knot, so as to heal the wound over it. It has occurred to me that catgut would answer the purpose better, and I shall give the result of the trial which I have made, wishing it to be understood that I consider the subject

Catgut proposed for a ligature.

at present as undecided, and only as one for future investigation.

Catgut, employed as a ligature, being more of the nature of the animal matter in which it is embedded, will be more easily absorbed than silk; or, if even not absorbed, will be less likely to excite irritation in the parts.

I have reason to hope that the following case will be considered as highly interesting and important, as the operation was performed upon a person so advanced in life as to lessen the hope which would have arisen from the more usual operation for aneurism.

I performed the operation at Guy's Hospital, where the patient, who is the subject of it, at present remains; the notes of the case were taken by Mr. Hey, the son and grandson of the celebrated practitioners of that name at Leeds, who is now my pupil and clerk at Guy's Hospital. From the assiduity he has discovered in his studies, and the acquirements made in his profession, there is every probability that he will confer additional brilliancy on a name which ranks amongst the highest in the present race of the medical profession.

CASE.

Case of Wm. Heydon.

October 15th, 1817, William Heydon, aged 80, of a spare habit, but enjoying good health, has been for some years without any regular employment on account of his age, but accustomed to take more or less of walking exercise; his ha-

bits of life have been always regular. About three months ago he perceived a pulsating tumor situated very low down in the ham, and which at that time was about the size of a pullet's egg; he could assign no cause for its appearance, and took but little notice of it. In a few weeks, however, it increased so much in size, and the pulsation became so strong, that he was induced to shew it to a surgeon, who, finding it to be an aneurism, recommended him to come into the hospital.

The tumor was now larger than an egg, compressible, the pulsation very strong and perceptible, and the skin of a natural colour. The pulse, though slow and not weak, intermitted; and the pulsation in the tumor exactly corresponded with it. He complained of a considerable pain in the leg at times, and when the pain was most violent the leg was very much swelled. The motion of the joint was somewhat impeded.

24.—The usual incision for popliteal aneurism was made, and a single ligature was applied round the artery, both ends of which were cut off close, and the edges of the wound brought together by adhesive plaster; the substance made use of for the ligature was catgut, which had been previously soaked in water, about the temperature of 100°. The coats of the artery were very much relaxed, so as to occasion some difficulty in passing the ligature round it.

Operation.

Ligature made with catgut.

$5\frac{1}{2}$ P.M. About four hours after the operation, complained of a sense of coldness and uneasiness

in the limb which had been operated on; its temperature was 80°, and that of the sound limb 84°. The pulse which beat 76 times in the minute was full and very irregular, but did not intermit.

25.—Has not passed a very good night, but feels comfortable this morning. Temperature of the limb that has been operated on 84°, that of the sound limb 92°; pulse 60, and intermits; but very rarely.

26.—Has had a good night, and feels more comfortable, though he still complains of violent pain in his leg at times; temperature of the affected limb 89°, that of the sound limb 92°; pulse intermits once in every 10 or 12 beats.

27.—Much in the same state as yesterday; temperature of the affected limb 89°, sound limb 87°.

Wound completely united.

28.—The wound was dressed for the first time since the operation, and was found to be *completely* united; the pulse varies very much in its intermissions, but upon the whole they have been much less frequent since than before the operation.

29.—Temperature of the affected limb 89°, sound limb 87°.

30.—Temperature of the affected limb 89°, sound limb 93°; the tumor in the ham is considerably lessened and has no pulsation; nor is any pulsation to be yet felt in the anterior or posterior tibial artery, though a free circulation appears to be carried on in the superficial veins.

31.—Temperature of the affected limb 90°, sound limb 91°.

November 1.—Temperature of the affected limb 91°, sound limb 91°. Temperature equal.

7.—Nothing material has occurred since the last report; there has been very little variation in the temperature of the limb, or in the state of the aneurismal tumor, which continues gradually to subside. The wound remains perfectly united and free from irritation.

15.—The tumor continues to diminish in size and is much softer; no pulsation can yet be felt in the anterior or posterior tibial artery: his health is very good, and he can walk about the ward with the assistance of a crutch.

24.—Continues to improve, no appearance of irritation from the ligatures; no pulsation in the anterior or posterior tibial artery.

In three weeks after the operation he walked in the ward with the aid of a crutch, and in the first week, he had no other complaint than coldness in the foot on that side, with some pain in the heel.

December 17.—His health is perfectly good; he walks without the aid of crutch or stick; the swelling is reduced to a small size; and the part at which the incision was made has been and now is quite free from irritation.

I confess that this case gave me much pleasure; the great age of the patient, the simplicity of the operation, the absence of constitu-

tional irritation and consequently of danger, and his rapid recovery, lead me to hope that the operation for aneurism may become at some future period, infinitely more simple than it has been rendered to the present moment.

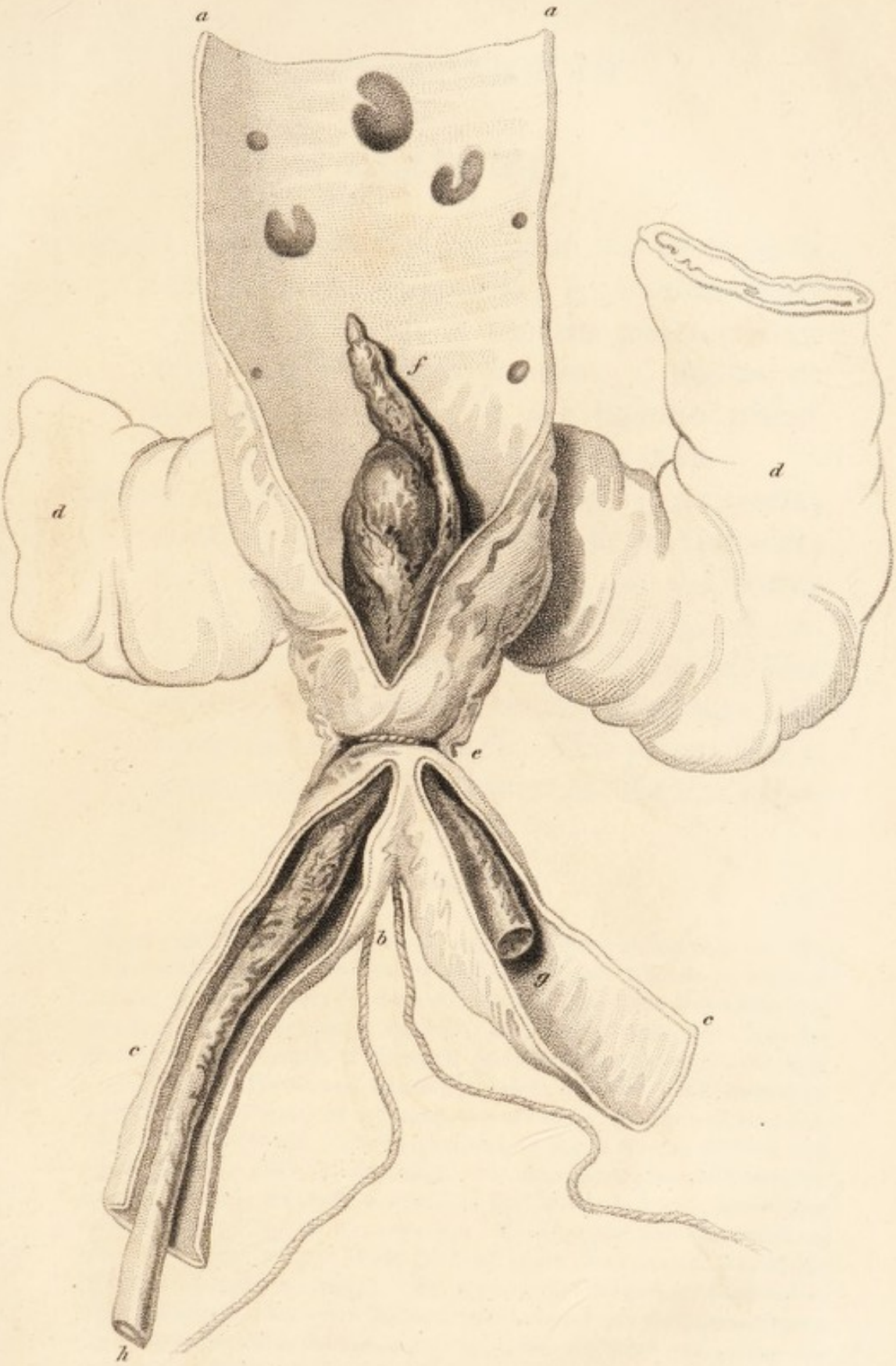
Fig. 1.



L. Thomson Delt. *Kennerley Sculp.*

London Published Nov.r 1.st 1817. by F.Cox & Son. St. Thomas's St. Borough.

Fig. 2.



H. Thomson Delt.

Kennerley Sculp.t

London Published Nov.r 1.st 1817. by E. Cox & Son, St. Thomas's St. Borough.

EXPLANATION OF

PLATE VII.

Fig. 1. Shews the ligature upon the aorta in its anterior view; *a*, *a*, aorta; *b*, its bifurcation; *c*, *c*, iliac arteries; *d*, superior mesenteric artery; *e*, *e*, emulgent arteries; *f*, duodenum crossing the aorta; *g*, the ligature placed around the aorta above its bifurcation.

Fig. 2. Posterior view of the aorta; *a*, *a*, aorta; *b*, bifurcation of the aorta; *c*, *c*, iliac arteries; *d*, *d*, duodenum; *e*, ligature on the aorta; *f*, clot formed above the ligature; *g*, clot in the right iliac artery; *h*, clot in the left iliac artery, with the clots sloughy, adhering to the inner side of the vessel. This preparation is preserved in the Museum at St. Thomas's Hospital.

Since the foregoing Essay was printed, I have seen a paper of Mr. Lawrence's in the Medico-Chirurgical Transactions, wherein an account is given of several cases in which the arteries have been tied with silk; and the ligatures cut close to the knot: the result of these cases is as follows. Mr. Carwardine, of Thaxted, tied the femoral artery in this way for aneurism. The wound entirely united by adhesion. Mr. Lawrence tied the femoral artery of a patient sent to him by Mr. Ilott, of Bromley, on the 29th of March. The ligature came away at the end of May, and the wound then ceased to discharge. Mr. Kenrick Watson, of Stourport, tied the humeral artery for a wound of the vessel; in a little more than two months the ligature was expelled. Mr. Hodgson tied the ulnar artery; a swelling formed about the knot which was removed by incision five or six months afterward. Mr. Cumin, of Glasgow, transmitted to Mr. Lawrence a knot of a ligature which had been discharged from a stump at a considerable distance of time, two or three years from the operation. See Medico-Chirurgical Transactions, Vol. VIIIth.

ON

PHYMOSIS AND PARAPHYMOSIS.

By Mr. TRAVERS.

IT has upon many occasions appeared to me, that practitioners are too anxious to contend with the specific character of the venereal disease, to the neglect of the inflammatory state of the affected parts, and of the evils which mercury produces, when exhibited during its height.

The abuse of administering mercury for an acute gonorrhœa and recent sores, accompanied by phymosis, or an approach to that state, is of common occurrence, and it is far from being recognized by the profession as an established rule of practice, that its constitutional administration is inadmissible during the existence of active inflammation in cellular textures. The gangrenous inflammation which spreads and destroys with such terrible rapidity the entire integuments of the lower opening of the pelvis in young and delicate females, proceeds, I am convinced, from the exhibition of mercury for inflamed and irritable sores, oftener than from any other cause.

There is no class of cases exhibiting the local effects of impure intercourse in so formidable a view, in its nature so wholly distinct from a

syphilitic taint, in its origin so purely casual, as that which forms the subject of this paper. That it was not formerly so regarded, nor even by writers comparatively modern, it would be easy, if it were necessary, to shew. It is true that the mischievous consequences which I shall presently detail, rarely occur in private practice, a plain proof that they are the result of neglect or gross ill treatment, and that such complaints in a recent state are easily remediable. But in hospital and pauper practice we continually meet with people under the constitutional influence of mercury, who are the subjects of inflammation of the penis, bordering on gangrene; often by their own indiscreet conduct; and sometimes, it must be confessed, by following the advice of persons who have the credit of being better informed.

Origin of phymosis from swollen glans,

The most frequent origin of phymosis with gonorrhœa, is the swelling of the glans penis under inflammatory congestion, such as always accompanies more or less a gonorrhœa virulenta, and often a sore upon the glans. The inflammation of the urethra where the gonorrhœa has its seat, or the irritation of a sore, however inconsiderable, causes a detention of blood in the corpus spongiosum penis; and unless antiphlogistic measures are strictly pursued, the prepuce frequently retracted, and the surfaces of the glans and prepuce exposed and bathed, the latter becomes confined by the progressive turgescence of the corona glandis within it, and cannot be drawn back without very considerable pain and difficulty.

Phymosis also follows the inflammatory œdema of the prepuce, to which its lax and abundant cellular tissue disposes it upon very slight irritation, as gonorrhœal inflammation, or an excoriation, sore, or pimple upon the prepuce. The increased influx and retarded efflux of blood are promoted by the natural depending posture of the penis, a condition for the same reason most unfavourable to healing. The glans, compressed by the enlargement of the hood of the prepuce, which by the continuance of inflammation becomes a solid substantial enlargement, shrinks away from the aperture of the prepuce, and becomes buried in its folds. or prepuce.

In either case the profuse and incessant discharge of gonorrhœal matter is pent up, and lies in the plies and folds of the membrane, which is reflected from the prepuce over the glans penis. This matter is often furnished by the inflamed surface of the corona glandis and prepuce, and sometimes the gonorrhœa is altogether external. The chaps and abrasions, which often accompany a gonorrhœa from its commencement, of the fine cuticular covering of these parts, are irritated and ulcerate; and when the inflammation is subdued, and the discharge furnished by the sores is arrested, it is in consequence of adhesions which have taken place between the opposite surfaces of the glans and prepuce, and thus a permanent phymosis is the cost of cure. The confinement of the matter.

These incipient states of the phymosis are generally uncombined, but it is easy to see that they may co-exist, as they of necessity do in a

more advanced stage; and this is not unfrequently the case.

Paraphymosis.

The paraphymosis is an artificial or accidental, not a natural morbid condition, if we except the cases of malformation or the destruction of a portion of the prepuce by former sores. It is, therefore, much less frequent than the phymosis. The patient, anxious to prevent or to remedy the incipient phymosis, produces the contrary state. There is the same œdematous tumefaction of the prepuce and glans, and if allowed to continue until the supervention of the adhesive stage, it is attended by some of the evils described as consequent upon the phymosis, both being equally cases of stricture. But the pain of paraphymosis, and the obvious inconvenience and deformity of a permanently exposed glans, and enormously enlarged prepuce, bring it sooner to notice, and it is so easily reduced by the aid of timely scarifications of the swollen prepuce, fomentations, and compression of the glans, that it is rarely suffered to remain unrelieved. Besides the exposure of the glans removes the peculiar circumstances by which the phymosis is rendered of such formidable consequence.

Heister says, that the paraphymosis is frequently produced *in coitû*, where the penis is larger, or the vagina is smaller than usual, and comments on the injustice of the suspicions which newly married men have inferred of the chastity of their wives, from a circumstance which warrants the very opposite inference.

Both the phymosis and paraphymosis occa-

sionally arise from circumstances wholly unconnected with sexual commerce. "Young boys," says Mr. Latta, "frequently bring on a paraphymosis by retracting the prepuce in diversion, until they become unable to pull it forward again. As they conceal this for some time through fear, it is not uncommon for the parts to become inflamed and swelled to a great degree, and I have even found gangrene taking place before the matter was found out*." I saw lately a case of troublesome phymosis with swelled testicle from a blow, and another of paraphymosis from the irritation of a hair lodged behind the corona glandis, which had produced a superficial ulceration.

Stricture from distension.

Where either state is accompanied by extreme enlargement of the body of the penis or glans, it occasions a degree of temporary stricture upon the urethra, so as to induce a partial retention; great irritation is propagated from the neck of the bladder to the point of the penis, and the urethra in a state of high inflammation, more readily ulcerates, and thus relieves the symptoms of retention.

"It is easy to understand," says Bichat†, "how inflammation of the urethra may occasion retention of urine. We have only to bear in mind that inflammation (especially of cellulous parts) is always accompanied with swelling; and that swelling of the parietes necessarily diminishes the calibre of a canal."

Ulceration of the prepuce.

Where the glans has originally been the seat

* Latta's Surgery, vol. I. p. 391.

† Œuvres Chirurg. de Desault. tom. iii. p. 189.

of chancre or common superficial sores, the state of tension is relieved by the sloughing of the glans, and the urine infiltrating the elongated prepuce, gives occasion to circumscribed ulcers of the prepuce, by which it is discharged. The ulceration of the prepuce, from the lodgment and retention of urine within it, where the mouth of it is closed by adhesion, takes place to a greater extent; for the retained urine is extravasated into the cells of the connecting membrane, and gangrene ensuing, denudes the entire body of the penis even to the pubes. The urine passes by ulcerated orifices in the urethra, and by the irritation which its constant dribbling creates, the sloughing process is kept up and aggravated. In the debilitated state of the system produced by large quantities of mercury, cases now and then occur in hospital practice, in which the whole of the external organ becoming affected with an erysipelatous inflammation, gangrenes, and falls off from the pubes, leaving only the vestige of the bulb in the form of a fleshy tubercle beneath the symphysis pubis, from which the urine is discharged.

Swollen labia, or clitoris and nymphæ of females.]

In women, as in men, the gonorrhœa virulenta is generally attended with swelling of the external parts. The labia pudendi frequently attain an enormous bulk, and very slowly recover their natural size, if they do not advance to suppuration. Sometimes the swelling exclusively affects the clitoris, its preputium, and the nymphæ, which, if not reduced, become dense, hard, and permanent elongations. But the different structure of the organs occasions a difference in

the symptoms as well as the seat of the disease, and seldom exposes females to the danger of sloughing from this cause.

The states in which phymosis presents itself are three.

1. With tumefaction from inflammation of the glans or prepuce, easily admitting of a gradual reduction by the assiduous employment of those means which diminish inflammation and the bulk of the enlarged part. 1st Stage.

2. That in which inflammation has supervened upon phymosis of longer standing; where the swelling is excessive, so as to compress and partially stricture the urethra, and unrelieved, tends to abscess, ulceration of the urethra, extravasation of urine, and gangrene of the integuments. 2d Stage.

3. That in which the phymosis is chronic, confirmed, or irreducible; the glans and preputium being in close adhesion, from cicatrization of their inflamed surfaces. Here abscess or fistulous ulcer is formed in the elongated prepuce anterior to the glans; the cellular texture of the prepuce is wholly obliterated and condensed, and resembles the glans itself in size, and often in figure. On slitting it open an ulcerated groove is seen, through which a part of the urine has dribbled. 3d Stage.

Sometimes in this state of phymosis we find the glans studded with numerous vascular warts; sometimes it is reduced to a mere bud by ulceration; the proper urethra, having a small contracted orifice, is with difficulty found, and

will scarcely admit the blunt end of a probe. At other times I have found a deeply ulcerated groove, nearly detaching the glans from the corpora cavernosa penis.

Treatment. In the first of the states described, injections of tepid water, or milk and water, beneath the foreskin, and the immersion of the penis three or four times a day in a tepid bath, with a well contrived support of the part at an angle upwards with the symphysis, constitute the best *local* treatment. To this the free employment of leeches, will be often found an useful addition, if applied at some distance from the swollen part. As the inflammation subsides, injections of weak goulard wash or the solution of alum or liq. calcis and calomel may be substituted. To reduce the inflammation, and thereby lessen the bulk of the glans, is the indication; when this is accomplished, the reduction of the phymosis follows almost spontaneously.

Elastic catheter. In the second state, in addition to such palliative measures as suggest themselves, as emollient cataplasms and fomentations, if a small elastic gum catheter be introduced into the bladder and retained in it, it will remove the danger of ulceration of the urethra, or at least prevent extravasation where ulceration has already begun.

This is not a practice indicated by the degree of stricture, which is seldom considerable enough to require it: but by the approaching danger of extravasation. It should not therefore be taken up unless the cellular membrane

of the penis has advanced to suppuration. I believe that its timely use would prevent the breach of the urethra*.

Objection to the knife.

It is not adviseable to cut the inflamed prepuce, nor indeed any inflamed part. I lately saw a phymosis induced by a thickened and rigid state of the membrane of the prepuce during the free use of mercury constitutionally and locally, for the cure of two sores, each of the size of a split pea, situated one on each side of the anterior fold of the prepuce. It was the opinion of an eminent surgeon that these sores, which were thoroughly intractable, would not heal until the prepuce was freely divided, and impressed with the same idea, after poulticing for some days, I slit it up. The sores immediately healed, but the wound as quickly assumed the same indolent and intractable character which had belonged to the sores, and was so slow in healing, that it seemed to be only a transfer of the disease from one part to another.

In a case of extreme enlargement, where the retention was urgent and livid discoloration marking the approach of gangrene had begun, I slit up the prepuce: but although considerable relief was afforded, the recovery of the part was very slowly effected.

* The reader will find some judicious observations on this subject in the Surgical Works of Desault, by Bichat. Art. Retention d'Urine dans l'Urèthre: tom. iii. p. 189, 249. et seq.

CASE.

Slough of the prepuce from inflamed phymosis.

June 13, 1816.—John Baker, aged 19, contracted a gonorrhœa six months ago. During the recent use of mercury, which he took by the advice of a friend, the inflammation began. The penis is much swollen and inflamed quite to the pubes, and a profuse and purulent discharge issues from the prepuce, which is œdematous, ulcerated, and sloughing around the glans.

Ordered: H. aperiens: Catap. commun.

19.—The glans protrudes in a sound condition through a sphacelated opening in the prepuce.

Ordered: Decoct. cinchon. c̄ acid: Catap. c̄ lot. nigrâ.

27.—The upper portion of the prepuce has fallen off, the lower is pendulous; the disposition to slough appears to be checked; the inflammation is abated.

July 3.—The remaining portion of prepuce has contracted, and is granulating kindly.

After this, in the month of August, the parts re-assumed an unhealthy aspect, which was removed by the nitrous acid lotion, the bark being continued.

Sept. 18.—Sores healed.—Discharged.

CASE.

Slough of the glans penis, and

April 11, 1816.—Thomas Adams, aged 42, admitted with a smart hemorrhage from the

penis, attended with phymosis of a fortnight's duration, following a chancre on the glans. There is no sign of mercury having been taken. The hemorrhage yielded to pressure and cold applications. hemorrhage with phymosis.

Ordered: H. aper: Lot. alb.

20.—The phymosis is reduced, and the glans appears in a state of ulceration; a part has sloughed, and hence the bleeding proceeded.

Ordered: Lot. acid. nitr. d: Ung. hydr.

After a five weeks' course he was discharged cured.

CASE.

Nov. 16, 1815.—Dennis Prendergast, aged 34, was salivated six weeks ago, for a chancre on the prepuce, to which phymosis succeeded. The prepuce has since been much swollen and elongated, and an ulcerated opening, which has a sloughy appearance, is formed upon one side of it, through which the urine passes; the os preputii being closed by adhesion. Slough of the prepuce and glans penis, with phymosis.

Ordered: Catap. c̄ lot. nigrâ.

Dec. 1.—The sore looks clean; the prepuce as before, but uninflamed. A curved bistoury was passed through the closed extremity of the prepuce, and out at the ulcer, about an inch and a half distant; and the projecting portion, of which the canal was obliterated, circumcised. Scarcely a vestige of the glans penis remains; the orifice of the urethra upon the dorsum is discovered with difficulty, being very small.

Ordered: Cerat. simp. c̄ catap. A portion of bougie to be worn in the orifice of the urethra.

20.—Wound nearly healed; has been much relieved by passing urine freely since the operation. Complains of rheumatic pains, for which he took the pulv. ipec. comp. and decoct. sarsap. and was discharged cured.

CASE.

Slough of the prepuce and glans penis, following phymosis.

Feb. 8, 1816.—Alfred Wright, aged 18, of a scrophulous habit, had a gonorrhœa four months since, for which he took mercury, so as to make his mouth tender. Under this treatment the penis swelled greatly, and phymosis succeeded, the prepuce sloughed to a considerable extent, so that the glans penis passed through it on the upper side. The remaining portion of the hood of the prepuce, the frenum, and the front of the glans also sloughed. The urine now flows by an aperture in the dorsum, behind the corona glandis, where is situated a deep, irritable, and ill defined ulcer, disposed to spread.

Ordered: H. aper. p. r. n.: Antim. tartar. gr. $\frac{1}{4}$. opii gr. i. f. pil. om. noc. sum.: Decoct. cinchon: cerevisiæ fort. lb. i. per diem. To the part, catap. cerevisiæ: this was afterwards changed for the lot. acid. nitros. d. c̄ catap. and when the ulcer had cleansed, for the lot. argent. nitrat.: ung. hydr. mit: ung. calam. &c.

As the health slowly but progressively improved, the sores healed.

Discharged in May following.

Some time subsequent, Wright applied with an unhealthy ulcer surrounding the nail of the index finger of the left hand. He was admitted, and shortly after discharged, the sore being healed by the use of the lot. arg. nitrat. From bad living and neglect, the ulcer broke out afresh, and he was again admitted, when it had assumed a much worse appearance, having extended to the second phalanx. Various lotions were applied, and constitutional remedies employed, without arresting the sloughing process. This was at length effected by washing it with a strong lotion of muriatic acid. Separation took place at the first phalanx, and as the sound integuments upon the under side projected beyond the joint, they were brought up as after an amputation with a flap, and the wound healed, forming an excellent stump without the aid of the knife.

July 24.—Discharged in good health.

CASE.

Slough of the prepuce and glans penis, following phymosis.

April 11, 1816.—Charles Wood, aged 33. An unhealthy ulcer upon the penis has destroyed the prepuce and glans, and is now eating deep into the body of the penis. The urine escapes through an aperture on the dorsum penis. The disease was contracted six months ago. For sores, on the glans and prepuce, with phymosis, he was salivated, and sloughing of the inflamed parts was the consequence. At present the ulcer is irritable and painful, its edges are ill

defined, and it is surrounded by a livid hue. He has also a bubo discharging in each groin.

Ordered: — Catap. c̄ lot. nigrâ: Decoct. cinchon: Pil. hydr. gr. x. opii gr. i. o. n.

26.—Sore on the penis and buboes clean and granulating.

29.—Sores still healthy in appearance, but his mouth is slightly sore, and he is much indisposed, complaining of head-ach, languor, oppression of the præcordia, &c. His skin exhibits an eruption in patches of a scarlet colour, not elevated, but rough and furred.

Omitt. pil. hydr: H. aper: Contin. decoct. cinchon: Cerev. f. lb. i. per diem.

May 4.—Eruption has disappeared; health improved, but sores languid.

Repet. pil. hydr. sine opio.

20.—Health in all respects improved, and sores healed.—Discharged.

CASE.

Slough of the penis, with phymosis, producing extravasation of urine.

Aug. 15, 1816.—John Weston, aged 29, for six months past has had phymosis, which came on while taking mercury for gonorrhœa. Two days prior to his admission, the os preputii became closed, and the urine accumulating within it, distended the integuments enormously. They are now in a state of gangrene. He has passed scarce any urine for two days.

Ordered: Catap. c̄ fotû communi.

16.—A copious discharge of purulent sanies and urine took place yesterday afternoon, by

which he has been greatly relieved. The tumefaction has considerably subsided, and he has this morning passed his urine through the slough at pleasure. About the middle of the dorsum penis, a line of separation is formed in the integuments. Pulse 112, small and feeble, bowels torpid, tongue foul, and perspiration copious.

Ordered: H. cathart. statim. et p. r. n. rep: Decoct. cinchon: Cerev. f.: Lot. acid. nitr. c̄ catap.

19.—The gangrenous prepuce has fallen off, and healthy granulations are seen upon the line of separation. The glans penis is sound.

21.—Surface clean. Suppuration free. Cerat. calaminæ.

31.—Granulations healthy. General health restored.

Sept. 18.—Sores healed. Discharged.

CASE.

Slough of the entire integuments of the penis and pubes, following phymosis.

July 4, 1816.—Charles Barber, aged 28, of a weak constitution, and evidently suffering from poverty, contracted a virulent gonorrhœa nine months ago, which was succeeded by phymosis, and being neglected, by ulceration of the prepuce. In this state he fell into the hands of an advertising quack, who drenched him with mercury. The prepuce sloughed rapidly during the period of his salivation. The penis, on admission, completely divested of integument, had fallen down from the pubes by the destruction of the ligamentum suspensorium,

the integuments of the pubes were sloughy and a probe passed under the symphysis pubis, in front of the bladder, for near two inches: the urine escaped through fistulous openings in the dorsum penis. Pulse is quick and feeble, but his appetite is good; sleeps well, suffers but little pain, and has much less constitutional commotion than could be expected.

July 5.—Ordered. H. aper: Decoct. cinchon. c̄ conf. arom: Cerev. f. lb. i. ad lb. ii. per diem: Catap. lini.

9.—Discharge improved, but sloughing continues. Lot. acid. nitr. c̄ catap.

13.—Pulse improved; sores somewhat cleaner; complains of much pain at the symphysis pubis, groins, and thighs.

15.—A fuller and slower pulse; sloughing has ceased, and granulations are springing both from the penis and pubes.

22.—Scrotum now discoloured and excoriated; lot. alba; the sores are indolent, and the purulent discharge profuse.

27.—Sores much improved.

31.—Discharge still considerable, but healthy, and he is free from pain. The excoriations of the scrotum terminated in sloughs, and these have left ulcers on the septum scroti, and around it.

August 26.—The sore on the pubes and penis is so far healed, that the urine begins to pass in quantity by the natural passage; the sores are improved by the nitrous acid lotion.

Sept. 4.—The whole of his urine is now voided by the original passage; his health has been

daily improving for the last month: the extensive surface which had been exposed by the slough, and the sores which afterwards appeared in the scrotum, were cicatrized in October following, when he was discharged cured.

The treatment of these cases when presenting themselves in the states above described, requires little if any further illustration. The important practical lesson which such cases convey, addresses itself particularly to those who venture upon the use of mercury before it can be used with safety, and for the most part in cases where the probability is, that it ought not to be used at all. The cleansing of the surface and the support of the patient are the obvious indications. As the penis becomes covered, which is a very slow process where the corpora cavernosa are denuded, a catheter should be worn to prevent the breaking out of fresh sores on the scrotum and pubes from the excoriating discharge of urine, as well as for the purpose of preventing such an obliteration of the passage, as occurred in the following

CASE.

Case of abscess from closed urethra.

A sailor, who had been for some months in the hospital on account of extensive ulceration of the fauces, was at the same time labouring under an habitual retention of urine; the penis was shortened by the loss of a great portion of the glans and the prepuce, from chancre, concealed

by phymosis, while a patient in a naval hospital, a twelvemonth prior to his admission. The urethra had been suffered to close in the healing of this sore, and was found upon examination with a probe and catgut bougie, to be imperforate, at the distance of an inch from the orifice. His stillicidium was extremely painful, and the irritability of the part so great, that the introduction of the smallest instrument occasioned very severe pain. In this state an abscess formed in the corpus spongiosum behind the stricture, and upon opening it, urine mixed with pus flowed from it. Through this opening I passed a catheter with ease into his bladder, which was retained there, and completely relieved the dysuria; with a narrow curved bistoury, a passage was then opened through the upper portion of the penis, where the urethra had been obliterated. A probe was introduced, and afterwards a bougie was worn in the new urethra; and when in this stage of the treatment, the catheter was about to be passed through it into the bladder, thus to re-establish the continuity of the urinary passage, the man, in fear of any further operation, abruptly discharged himself, and sacrificed the object of the treatment, after having endured the pain.

Importance of the operation in the confirmed state.

In the chronic and confirmed phymosis, there can exist no doubt of the propriety of dividing or circumcising the prepuce, adopting one or the other method according to circumstances. I have not met with that success in the use of prepared sponge tents, or any other mode of dilatation, of which I have heard some practitioners

speak as superseding the operation. A dilating instrument was contrived by Trew, consisting of two elastic plates, which were introduced within the prepuce, and regulated by a screw *. Where parts have recovered soundness, patients are naturally unwilling to submit to an operation, for the sake of a remote advantage, or the removal of a mere inconvenience. But in this case more cogent reasons may, and ought to be stated. The diseases to which a permanent phymosis gives birth, are not simply those, which result as a consequence of its recent formation. Mr. Hey's cases of malignant ulceration, complicated with congenital phymosis, are sufficiently instructive, and to these I beg leave to refer the reader †.

The congenital phymosis is not uncommon. It is a source of inconvenience in micturition and coition. I believe that it more frequently depends upon a short frenum, than any other circumstance, and that the frenum of the prepuce may be in these cases divided with similar advantage, as the frenum linguæ in the case of tongue-tied children. I have rarely seen intractable ulcers of the penis without phymosis, recent or original, and have observed the advantage which Jews derive in the healing of sores from the exposure of the glans.

* See Heister's Surgery. Vol. II. plate 26. fig. 5. I join with Heister in much doubting its usefulness, and that of any similar contrivance. The thin integument of the prepuce is lacerated when forcibly extended.

† See Practical Observations in Surgery, 2d ed. chap. xiv. "On the Cancer of the Penis."

CASE.

Congenital phymosis with gonorrhœa, and consequent ulceration of the prepuce.

Aug. 7, 1817.—William Hollington, aged 19. This man has a natural phymosis, which had produced little if any inconvenience, until a month ago, when he became the subject of gonorrhœa. Upon its appearance he took mercurial pills for a few days, during which time an inflamed spot on the upper part of the prepuce sphacelated, and allowed a protrusion of the glans through the opening. The prepuce is at present swollen and inflamed, and the discharge is copious, but not unhealthy. Ordered: Catap. c̄ fotû. H. cathart. p. r. n.

16.—The inflammation having sufficiently subsided, the extremity of the prepuce beyond the ulcerated opening was removed by circumcision. A poultice was again applied.

20.—The wound appears languid. To be dressed with the ung. hydr. nitr.-oxid.

25.—Cicatrization advancing kindly.

Sept. 3.—Discharged cured.

The growth of warts is favored by the existence of confirmed phymosis during the state of inflammation; and indeed often takes place where the phymosis is recent. In other instances the warts produce the phymosis, as in the following

CASE.

Warts followed by phymosis.

Aug. 7.—George Beard, aged 19. Six weeks ago warts began to form at the extremity of

this lad's prepuce, and increasing in size and number soon prevented him from denuding the glans penis, which, he says, has been free from inflammation and sores. They are vascular, irritable, fungating, and protrude beyond the orifice of the prepuce, and being partially everted, give a cauliflower-like appearance to the end of the penis. This bunch is of the size of a walnut. Behind it the prepuce is swollen, tense and inflamed, having several openings through which isolated warts are protruding, as if springing from the glans. A probe passes readily through the centre of the anterior cluster round the glans, and out at the several openings of the prepuce.

20.—The part has been poulticed since admission; and to-day the bunch of warts and the portion of prepuce from which they grew, were removed by one stroke of the curved bistoury. The glans being denuded appears sound; the principal warts are attached to the prepuce; two small ones only are seen upon the glans. Poultice to be repeated.

27.—The liq. plumb. acet. has been applied to the remaining warts; it has acted well: they are ulcerated at their bases, and much diminished in bulk.

Sept. 2.—Other warts have been removed by the scissors.

4.—A narrow border of prepuce was this day divided, confining a bunch of warts, which are connected by peduncles to the glans.

An ointment of arsenic was afterwards ap-

plied to them with the best effect, and he was discharged cured.

I shall add a case of malignant ulceration of the prepuce and penis, following phymosis, which appeared to have been produced by the persevering use of mercury during the period of inflammation.

CASE.

Malignant ulcer of the penis, following chancre and phymosis.

Oct. 26, 1815.—Daniel Partridge, admitted for an extensive ill-conditioned ulcer around the corona glandis, which seemed disposed to spread, being surrounded by much inflammation of the sound surface. About eight weeks before he contracted a chancre, for which he was rapidly salivated; during his salivation swelling and phymosis took place, and the ulcer increased until it had nearly destroyed the prepuce.

For some time after his admission the sore appeared to cleanse and improve under the blackwash poultice, after which it became languid and covered with a white crust; which the application of the argentum nitratum did not prevent from forming.

In January following, it is noted that the sore has healed in part, but is no sooner cicatrized on one side, than it breaks out in another, and that a gentle course of mercury which now affected his mouth, had in no sense improved the condition of the sore.

Feb. 25.—This man has taken mercury sufficient to heal the sore if it were venereal. He has no secondary symptom of lues. The sore has a carcinomatous more than syphilitic character. Its edges are thick, inverted in some places and everted in others; its surface is uneven, fungous granulations covering it at irregular distances, divided by hollows covered with a dense coat of white opaque lymph; it discharges a thin ichor. The root of the prepuce is hardened into a ridge behind the glans. The man complains of constant shooting pains through the body of the penis, and the glands in the groin are slightly swelled and tender. His health, which was lately robust, is much impaired. His countenance is sallow and heavy, and he is much emaciated. Stimulant detersive applications which have been made to the part, have neither given uneasiness nor produced any favourable change in its aspect.

Ordered to a clean ward. Soothing applications were now used, and the nitric and sulphuric acids, the liq. arsenicalis and other tonics exhibited, by which his health was benefited; the conium, hyoscyamus, and remedies of this class were tried, but without benefit; the sore remained as reported.

March 25.—Amputation was performed an inch above the diseased part. The stump healed kindly, and he was discharged cured, in May following.

This appears to have been a simple sore rendered untoward and intractable, and at length threatening malignity from what might be termed the cachexia mercurialis.

It is my design by these brief observations, to direct the surgeon's attention to the early stage of the phymosis: to recommend it as an invariable practice to examine the naked glans, before venturing upon the constitutional use of mercury: to point out the aggravation occasioned by an habitual though partial retention in the state of extreme swelling, and the advantage which may be derived from the introduction of a small elastic gum catheter, especially where ulceration is threatened, in preventing extravasation and preserving the urethra during healing: lastly, to shew the expediency of the operation in all cases of confirmed phymosis, whether congenital or the result of inflammation.

I offer no apology for giving a degree of importance to this purely practical subject, to which the senior members of the profession may consider it to be unentitled. The cases, if they were rare, must be acknowledged to be sufficiently deplorable; but, unfortunately, they are of common occurrence, while the prevention of them, by a proper view of their nature and treatment, is easy and obvious. I have thought, therefore, that some advantage might be derived from these observations.

ON

EXOSTOSIS.

By Mr. ASTLEY COOPER.

EXOSTOSIS is a preternatural growth of ossific matter, generally producing a circumscribed swelling upon the bone on which it originates. This definition, although true, with very few exceptions, is not at all periods of the disease, or in every example of it, strictly accurate; for I have examined exostoses in the early part of the complaint, in which ossific matter had not yet been deposited, but in which, from dissection of other cases, I know that such a deposition would in future have occurred. Definition.

Exostosis has two different seats; it is either *periosteal* or *medullary*. By the *periosteal* exostosis, I mean a deposition seated between the external surface of the bone, and the internal surface of the periosteum, adhering with firmness to both surfaces; and by the *medullary*, is to be understood a formation of a similar kind, originating in the medullary membrane and cancellated structure of the bone. Two seats of exostosis.

With regard to its nature, exostosis is of two kinds, either *cartilaginous* or *fungous*. By the *cartilaginous*, is intended to be expressed that species which is preceded by the formation of a

cartilage, which forms the *nidus* for the ossific deposit: and by the *fungous*, is to be understood, a tumor of softer structure than cartilage, yet firmer than fungus in other parts of the body, containing spicula of bone, malignant in its nature, depending on a peculiar state of constitution and action of vessels: a disease similar to that which Mr. Hey has denominated *fungus hæmatodes*, but somewhat modified by the structure of the part in which it originates.

The venereal exostosis, or node, although depending upon a different cause, is still a cartilaginous exostosis. But this subject I do not now intend to consider, as it ought rather to form part of an essay on the venereal disease.

Seat.

I know of no bone in the body which is not liable to the formation of these diseases, although there are some in which it much more frequently occurs than in others.

Bones of the cranium.

Upon the bones of the cranium we see both kinds of exostosis. That which forms between the outer table of the skull and the pericranium is of an extremely hard consistence, is generally attended with little pain, and does not usually acquire any considerable magnitude; but a very large tumor, with a basis of bone, was lately removed by Sir Everard Home from the head of a person in St. George's Hospital. Four of these have been known to arise from the same os frontis; one of larger, and three of smaller size. The fungous exostosis springing from the diploë of the skull, is of less firm consistence, and is endowed with a greater degree of vascularity than the former. It is of a malignant kind,

and is found to proceed through the inner table of the skull, occasioning disease of the dura mater: and by its pressure upon the brain to produce a diseased state of the functions of that organ, by which means life is destroyed.

Bones of the face.

Exostosis of the facial bones is of very frequent occurrence. We have in the collection at St. Thomas's, a skull which I took from a fish-woman who died in that Hospital, who had long been remarkable, (even at Billingsgate,) for her hideous appearance. Two large swellings had been formed under the orbits in the fore part of the cheeks, between which the nose appeared wedged, and the nostrils were closed; each eye projected considerably from its socket. This person was seized with a fit, which seemed to be of an apoplectic nature, and in that state was brought to St. Thomas's Hospital, where she almost immediately died. Upon examination of the head an exostosis was found growing from each antrum, and forming the large swellings upon the cheeks: these also projected into the orbits so as to occasion the protrusion of the eyes. On the left side, the exostosis entered the cranium, projecting inwards through the orbitar process of the os frontis, and occasioning such pressure upon the brain as, under a considerable excitement of the vessels of that organ, to produce apoplexy, which proved fatal to her.

Upper and lower jaw.

The alveolar processes of the upper and lower jaw, are very frequently the seat of this disease; and I have at present in Guy's Hospital an example of exostosis of the lower jaw springing from the medullary membrane and cancellated

structure, in a girl, for which I had occasion to perform an operation, which will be related more at length hereafter.

There is a large spongy exostosis in the collection at St. Thomas's Hospital, with the history of which I am unacquainted, except that I have heard from Mr. Cline, that it grew from the lower jaw.

A woman of the name of Williams, who is now an out-patient at Guy's, and whose case will be found more particularly detailed hereafter, has a fungous exostosis growing from the symphysis of the lower jaw, forming two livid projections at the alveolar processes of the *incisores* teeth, and a large fungus at the chin.

Mr. Waring, surgeon of St. Mary Cray, sent me a child, with a similar disease in its jaw, which has since acquired very considerable magnitude. And with Sir Charles Blicke I attended a case of the same kind springing from the upper jaw, which was successfully removed by the knife and subsequent application of the actual cautery, the use of which was proposed by Sir Charles Blicke.

Spine. Exostoses from the spine are of rare occurrence, if we except those ossifications of the ligament covering the intervertebral substance, which sometimes in old persons destroy the flexibility of the part, and form considerable projections on the anterior and lateral surfaces of the vertebræ.

Dr. Moncey, formerly physician at Chelsea, who died at a very advanced age, had the intervertebral substance thus covered with

ossific matter, rising into considerable masses. Perhaps however I ought not here to mention these appearances; as they are not true exostoses; but ossifications of the natural structures, bearing some analogy in principle to those which are produced in the larger blood-vessels of old people.

I have however seen an exostosis arise from the sixth or seventh cervical vertebra, or perhaps from both. The subject of it was a woman who was admitted into Guy's Hospital, having no pulse at the wrist or elbow. Her hand was of a venous redness, always cold, generally benumbed, yet seemed painful; there were small gangrenous spots upon it. On examination of the superior part of the arm, these appearances were found to be the consequence of a projection of the lower cervical vertebra towards the clavicle, and consequent pressure upon the subclavian artery. Whilst she was in the Hospital, by means of warmth and friction, the natural heat of the arm and hand was greatly restored, the further increase of the swelling seemed suspended, and, at the time she was discharged, the arm was in a very improved state; nevertheless the pulse at the wrist had not returned.

Ossa innominata.

The ossa innominata are also sometimes affected with this disease, which is more frequently seated at the posterior sacro-iliac symphysis than on any other part of these bones. Boyer mentions an instance of one growing from the os pubis, which produced a retention of urine, prevented the introduction of the ca-

theter, and thus occasioned the destruction of life.

Ribs. Exostosis sometimes forms upon the ribs. A lady applied to me with a very large swelling, which was occasionally severely painful, situated directly behind the right breast: it was extremely hard, quite immoveable, and seemed to sink between the ribs. I requested to be informed of this patient's dissolution, which, from her exhausted appearance, I considered to be most probably at no great distance, that I might have an opportunity of examining the part. However, I afterwards heard of her death without having the opportunity afforded me.

We have a preparation in the collection at St. Thomas's Hospital, of a very large exostosis seated between two of the ribs, which seems to have been contained in a tumor between the two bones.

Clavicle. Exostosis of the clavicle is extremely rare, if we except the venereal enlargements of that bone; nor do I recollect to have met with any

Scapula. instance of this affection on the scapula.

Os humeri. Upon the os humeri, I have seen a growth of bone at the insertion of the deltoid muscle. It arose about the size and form of the finger end. As it occasioned no inconvenience and had not lately increased, I did not recommend any thing to be done for it. We have likewise, amongst the preparations at St. Thomas's Hospital, an exostosis of the os humeri of considerable size, which occupies the whole circumference of the bone; the periosteum appears in this bone to have been generally diseased, as the surface of the humerus

is extremely irregular. We have beside an immense exostosis occupying the superior half of the os humeri, excepting that the cartilaginous head of the bone is unaffected. The particulars of this case will be hereafter detailed.

There is also, in the same Museum, a humerus with the shell of the bone considerably expanded, the periosteum over it thickened, and in the seat of the cancellated structure several hydatids had formed, which had been the cause of the enlargement of the exterior surface of the bone as well as of the increase of its cavity.

Ulna. The ulna is very rarely affected with exostosis, excepting sometimes at its lower part near to the wrist, where I have, in the living subject, seen some enlargement of the bone.

Radius. On the radius we have an excellent preparation of this disease growing to an enormous size, ulcerated upon its surface, and that ulceration having gone on to sloughing; thus exposing the exostosis. This case occurred in Saint Thomas's Hospital, where the arm of the man was obliged to be amputated in order to preserve life.

Metacarpal bones. We have also a fine specimen of exostosis upon the metacarpal bones growing to a very considerable magnitude; a section of which shews extremely well the internal structure of the disease.

Fingers. A young friend of mine has an exostosis growing on the metacarpal bone of the little finger, which undoubtedly arose from a blow.

I have twice removed an exostosis from the

second phalanx of one of the fingers; a considerable portion of it was still cartilaginous, but at its root it was bony. The first operation being insufficient to prevent a recurrence, a second was rendered necessary.

Os femor's. The os femoris, of all the bones of the body, is most frequently the subject of this disease. I have seen it arising from its upper part at the trochanter major, and spreading into enormous masses which projected into the groin, and upon the ilium. We have a preparation of it occupying the whole of the bone from a little below the trochanter to the condyles, forming a considerable mass, or rather masses of bone: and some specimens where it is principally periosteal; the shell of the original bone not being yet absorbed; and others in which portions of this shell have been removed. We have also examples of small projections between the periosteum and the bone, rising in the direction of the triceps femoris; one of the best of which was given to me by Mr. Dodds jun. son of the surgeon of Haslar Hospital. (See Plate.)

Tibia. Next to the femur, the tibia is most frequently affected with exostosis of the periostial kind. The seat is at the insertion of the sartorius and gracilis muscles; and now and then at the insertion of the ligament of the patella at its tubercle. We have specimens of this disease in our Museum at St. Thomas's, one in particular, in which the bone has formed a large cavity, covered with a strong bony case, similar to that which I have mentioned in the lower jaw; and another

in which it is expanded into a large spongy shell. We have also an example of this disease growing upon the surface of the head of the tibia, and which I believe to have been of the fungous kind. I have lately seen one arising from the fore part of this bone just above the ancle joint, with the flexion of which it begins to interfere.

A man was admitted into Guy's Hospital under the care of Mr. Forster with a large tumor seated upon the upper part of the tibia, which felt soft, and yielded to the finger, so as to give the impression of its being a fungous disease. Mr. Forster directed adhesive plasters to be applied, by the pressure of which the size of the swelling was so much reduced, that the patient quitted the hospital, satisfied that a continuance of the means which he had applied would suffice to accomplish a cure. In a few weeks he returned with the swelling greatly increased, when he was admitted under the care of Mr. Lucas, who made an incision into the swelling, and discharged several hydatids, which were of the common globular kind. However, constitutional irritation, with sloughing of the integuments which covered the swelling, induced the necessity of amputation. An incision being made into the tumor after the removal of the limb, a large nest in the bone was found, containing numerous hydatids. Upon boiling the section opposite the bony nest, a fracture was found in the tibia, which had probably been produced by the disease, as the patient did

not mention it. This fracture had united, but irregularly.

Fibula. The upper end of the fibula, near the head of the bone, is sometimes enlarged, and its lower end very frequently so, where it is connected by a ligament to the tibia. This enlargement, however, arises perhaps more frequently from common adhesive inflammation in the bone than from true exostosis.

Metatarsal bones. The metatarsal bones are now and then the seats of exostosis. I have known half the foot obliged to be amputated for this disease, placed at the extremities of these bones towards the toes.

Toes. Two instances of exostosis under the nail of the great toe, projecting considerably beyond it, have occurred in my practice; one of which occasioned so much pain and inconvenience to the lady who was the subject of it, that I was under the necessity of removing it; which I easily accomplished with a saw.

In that useful work, Cooper's Surgical Dictionary, an account is given of a case related by Mr. Abernethy, in his lectures, of a boy who came out of Cornwall, who was so excessively afflicted with an apparent predisposition to exostosis, or an exuberant deposition of bony matter, that a very trifling blow would occasion a bony swelling in any bone of his body. His ligamentum nuchæ was ossified, and prevented the motion of his neck; the margins of the axilla were also ossified, so that he was as it were completely pinioned; besides all this, the subject in question had numerous other exostoses in various parts of his body.

Of the fungous Exostosis of the medullary Membrane.

The object of this paper was more particularly to describe the simple cartilaginous exostosis, with the operations which might be undertaken for its removal; but, in the dissection of exostoses, we found varieties, of which we judged it necessary to give some account, in order to prevent the performance of operations which could never be followed by a successful issue. We shall therefore first proceed to say something concerning the *fungous* exostosis of the medullary membrane.

Symptoms of medullary exostosis.

This kind of exostosis is attended with the following symptoms. The disease begins in a general enlargement of the limb in the part opposite to the seat of the complaint, and to a considerable extent around it. It generally occurs in young persons, but I have known it to take place at fifty years of age. Its increase proceeds very gradually; and even when it has acquired considerable magnitude, although it produces some diminution of motion in the limb, yet it does not occasion pain, or prevent the patient from using it. When any pain does arise from this disease, it is of an obtuse kind, and is extended very much in the course of the bone and nerve, but becomes very acute whenever a nerve happens to be stretched by it, as in the exostosis of the thigh bone which presses on the sciatic nerve.

Health of the patient.

The general health is in these cases defective: paleness, debility, irregular states of the bowels,

mark the early stages; and, when the disease is confirmed, a sallowness of complexion is observed; the limb at length becomes of an enormous size at the diseased part, but the skin retains its natural colour; the swelling feels hard in many parts of it; but in others, it is elastic, yielding to the pressure of the finger, in such a manner, as to convey an idea of a fluid beneath; but if an opening be made, no fluid issues, excepting blood.

Tubercles on the surface.

The surface of the tumor next becomes tuberculated, and these tubercles are tender to the touch; they are also frequently slightly inflamed on their surfaces.

Constitutional disease.

To these appearances succeeds constitutional irritation; the rest becomes broken, the appetite impaired, and the bowels extremely irregular.

Ulceration of the tubercles.

During the continuance of these symptoms many weeks elapse, and, at length, ulceration takes place on the tubercles; the skin secretes pus, but when the swelling itself becomes exposed, it discharges a bloody-coloured serum; a fungus then arises, which occasionally bleeds, sometimes largely; and, as usually happens in the fungous disease, the blood is loose in its coagulations, and separates a large quantity of serum; the bleeding relieves the painful sensation, but for a very short time; indeed, only for a few hours.

Sloughing.

The fungus projects considerably; the skin yields very extensively, and at length sloughs take place, by means of which, considerable portions of the swelling are separated, and the disease becomes so far diminished in volume,

as to induce a hope of its ultimate complete destruction by gangrene; a hope, however, which, in this complaint in the bone, I have never seen realized. From the surface of the fungus, there generally occurs a very considerable discharge of serum, mixed occasionally with red particles, which moisten a great many folds of linen in a few hours.

Discharge of serum.

Thus the occasional losses of blood, the immense discharge, but still more, the constitutional irritation, wear out at length the powers of the body; but the time occupied in destruction by these means, is sometimes two years, and at others is a much more protracted period, as from seven to ten years.

Duration of the disease.

It often happens in this disease, that tumors of a similar kind form in other parts of the body during its progress; so also when the affected limb has been amputated, a similar disease will occur at a future period, and in organs of the greatest importance to life.

Similar tumors in other parts.

This disease originates from the medullary membrane of the bone within the cancelli, and if a circular incision be made of the limb, and the parts be observed, the following appearances present themselves. The skin is found in its natural state, excepting that it is projected by tubercles, which proceed from small masses on the surface of the tumor. In one case, in which ulceration had taken place, it was found that the ulcer extended all the way through the tumor to the bone. The muscles are removed to the distance of three inches or more from the surface of the bone, and form a thin layer over the tumor.

Dissection.

Appearances on a circular incision.

Situation of blood vessels and nerves.

The large blood vessels are next observed to be carried, as well as the muscles, to the vicinity of the surface of the limb—we have a curious specimen in the collection at Guy's, shewing this change in the situation of the vessels, in which the arteries have been injected—in the same manner the nerves are likewise removed from their natural seat.

Periosteum.

Under the muscles appears the periosteum, which is separated to different distances from the bone; in some parts of the swelling to two or three inches.

The tumor next appears composed of lobulated masses of various colours, consistence, and materials. A part is yellow like fat, part a substance resembling brain, and a third part composed of coagulated blood, with interstices containing serum. In some parts the white substance is found firm, nearly as much so as cartilage, but in general it is of more spongy appearance, and contains spicula of bone within it. The shell of the bone itself is in parts absorbed, in others it is only thinner than usual; in some cases it has been seen immensely expanded, so as to form a case like wire-work over the tumor; (See Plate,) in others it is only absorbed on one side by the pressure of the swelling. (See Plate.) In those instances in which fungous granulations arise from the medullary membrane, they are exceedingly vascular, very soft in their texture, secrete abundantly, and are sufficiently luxuriant to rise from the cavity of the bone considerably above the level of the skin.

Cause.

With respect to the cause of the fungous medullary exostosis, nothing certain is known. In some instances it has been attributed to a blow; in others to a jump from a very considerable height. Either of these causes, by disturbing the interior action of the bone, might produce the effect. In the lower jaw I have seen this disease arise from a decayed tooth. When, however, the exostosis proves of the fungous kind, it is required that there should exist an unhealthy state of the constitution, in order to produce the unusual action which follows the injury.

Treatment in general.

In the treatment of this complaint, we have not only to combat the local disease, but likewise to effect a change in the constitution in which it occurs. When it has however produced any great changes of structure, or occasioned very considerable increase of parts, no medical means will suffice to restore them, or prevent the fatal tendency of the complaint. But in the commencement of any deep-seated disease in bone, the best medicine, so far as I have had opportunity of observing, is the oxymurias hydrargyri in small doses, given either in, or with, the decoct. sarsaparillæ compositum. This mercurial medicine, by reproducing the natural secretions of the body, and the sarsaparilla, by lessening its irritability, restore the general health, and will sometimes crush in its bud a disease, otherwise likely to become formidable, and at the same time prevent the formation of a similar affection in other structures.

The local treatment consists in the application of leeches, if there be pain, and of blisters,

taking care to keep up the discharge from their surfaces by means of equal parts of Ung. Hydr. and Ung. Sabin. Should the disease, however, after all, refuse to yield to these means, the patient is, by the constitutional remedies, rendered a better subject for the removal of the part by amputation or excision, which becomes then the only resource.

Tying the artery.

I wished to try what would be the effect of cutting off the supply of blood in these cases of fungus, by tying the artery which supplies them. My colleague, Mr. Lucas, also made a similar trial; but the result of both cases shewed, that such attempts will avail but little. They are therefore here mentioned, to deter others from making them.

CASE.

A young woman, aged 20, was admitted into Guy's Hospital, with a large fungous tumor growing upon the lower extremity of the radius. As it did not yield to any of the local or constitutional means which my mind could suggest, and she positively refused to submit to the operation of amputation, I proposed to her to ascertain what would be the result of cutting off the supply of blood to the tumor by tying the brachial artery, assuring her at the same time that it could not be followed by any prejudicial effect, even should it fail to produce a favourable influence. She readily submitted to this operation. A few days after its performance, a slough was produced upon the sur-

face of the fungus, by which its size was considerably reduced. But as the vigour of the circulation was restored by anastomosis, the original malignant nature of the disease again betrayed itself; the fungus grew to nearly its original size, and after the expiration of a few months destroyed her, as she still refused to submit to amputation. The operation which had been performed with the hope of giving her relief, produced but a very transitory influence upon the size of the swelling, and seemed neither to have retarded nor hastened her dissolution.

CASE.

Mr. Lucas's Case.

Of this case I have preserved only the following notes in my case-book. The patient had a large fungus on the leg, which had not ulcerated. He refused to consent to the operation of amputation, but submitted to the proposal made to him of tying the femoral artery, which was done on the 8th July, 1814. The measure of the limb was twenty-two inches at the time of the operation, and for four succeeding days, when it increased to twenty-four inches; and the outer part of the leg mortified upon the surface on which the limb rested. Amputation was performed on the 15th July, above the knee, but below the part at which the artery had been tied. Yet when the divided femoral artery was observed, the blood flowed from it *per saltum* on the tourniquet being loosened, and with such force, that he

would soon have perished from hæmorrhage. The artery pulsated slightly when a ligature was made upon it; which circumstance shews how very easily the blood finds its course by anastomosis; as a week only had elapsed between the two operations.

It appears then from these operations that fungous diseases do not admit of removal from a diversion of the current of blood from its principal channel into the smaller arteries of the limb. The vigour of the circulation is for a moment lessened, but the peculiar action of the vessels does not appear to be ever suspended.

The operation of amputation after constitutional means have been employed, and the continuance of these constitutional means after the operation, hold out the chief hope of safety; for amputation without these will do no more than to avert the blow for a season. The following case, however, holds out a hope of benefit from an operation, which I have already proposed to the patient, and to which she has promised to consent.

CASE.

—— Williams, a woman, aged 32, has frequently applied as an out-patient at Guy's Hospital during the present summer, on account of a fungous exostosis of the lower jaw, which forms a large prominence on the chin. It began six years ago in the teeth becoming loose, and falling out; when *fungi* arose from the al-

veolar cavities, which were of a purple colour, and after a time sloughed away; the gum healed. The jaw then began to swell; the *fungi* re-appeared after two years, and again sloughed. At this period a probe could be passed from the alveolar cavity through the jaw to the point of the chin. A large swelling at the symphysis then began to form, which grew gradually, with little pain, excepting some occasional shootings. Five weeks ago, the skin ulcerated at the chin. From this ulcer the fungus now projects, and two purple swellings appear upon the gum. She was of a delicate habit when young, always confined in her bowels, yet has twice bred during the existence of this swelling, and produced healthy children.

In this case, as there is no surrounding disease, the absorbent glands being healthy, and all the vital organs free from complaint, I have proposed to remove the portion of diseased jaw.

Of the cartilaginous Exostosis of the medullary Membrane.

There is an exostosis produced within the cancellated structure of the bone, arising from a diseased state of the medullary membrane, which differs greatly both in appearance and nature from the former.

In this case, the shell of the bone becomes extremely expanded, or rather the original shell is absorbed, and a new one deposited; and within

this ossific cavity thus produced, a very large mass of cartilage is formed, elastic, firm, and fibrous.

In its commencement, there is nothing of a malignant tendency. It arises from common inflammation, brought on in a constitution not unhealthy; but the irritation is kept up for a length of time, and a very extensive disease is thus produced. I cannot better illustrate this complaint, than by the introduction of the following cases.

CASE.

Sarah Dulwich, aged 13, in the year 1812, was admitted into Guy's Hospital with a very large osseous tumor on the chin, which first made its appearance twelve months before, in the form of a small tumor on the gum of the lower jaw. It was in its commencement unattended with pain. At the period of her admission, the upper surface of the tumor was globular, and occupied the whole of the left cheek, but beneath the integuments it was irregular, protruding below the jaw, and extending from the dens cuspidatus of the lower jaw of the right side irregularly under the tongue, which it thrust close to the right angle of the jaw; consequently rendering articulation difficult and indistinct. Internally, it was very irregular and hard, and had been superficially ulcerated from the pressure of the teeth of the upper jaw upon the left side during the last six months; but no fungus had arisen from the ulceration. Externally, it

reached from the chin on the fore part, passing up to the side of the left nostril, even to the edge of the orbit, round towards the ear, and was nearly half the size of the head. The skin, in some places had a slight blush on it, and veins here and there of considerable size were seen running over its surface.

For five or six months, she has had severe pains in the left side of the head, and a suppuration from the right ear. Mastication is extremely difficult and painful, in consequence of the pressure of the teeth of the opposite jaw upon the tumor. On the left side, the upper jaw, together with the teeth, are pushed somewhat toward the opposite side from the pressure of the tumor. Her appetite is good, but her appearance altogether is delicate. She affirms, nevertheless, that her health had been generally good. Before the tumor appeared, she had been subject to the tooth-ach of the two molar teeth of the lower jaw constantly, for two or three months.

The tumor continued to increase until it became of most enormous size, measuring five inches and a half from side to side, and four inches from the incisores teeth to its anterior projecting point. The circumference of the swelling was sixteen inches; and less than half of the tumor, after death, deprived of the integuments, measured seven inches and a half.

At length it pressed the epiglottis upon the rima glottidis, so as to occasion difficulty of breathing, and this source of irritation caused the destruction of her life.

Dissection.—The tumor projected from the symphysis internally, and from the inner sides of the lower jaw backwards, more than three inches, occupying the space between the angles where the tongue was usually seated.

The tongue was thrust back into the throat, and to the right side, where it rested in a hollow, between the angle of the jaw and the tumor, extending only to the cuspidatus tooth; it was completely rounded. The epiglottis was bent down upon the rima glottidis, so as to produce great difficulty in swallowing.

The tumor originated from the medullary membrane within the cancellated structure of the bone, and was composed of cartilage and bony spicula, but upon the surface, chiefly of a white, fibrous, elastic mass, resembling the elastic ligaments of the body.

The shell of the bone was entirely absorbed: the alveoli of the external shell were greatly elongated, and bristled with bony spicula.

The external shell had numerous large holes in it. The incisores teeth were directed forwards, and the molares outwards.

The foramen in the jaw, for the transmission of its large nerve, was capable of receiving the extremity of the finger, so greatly was it enlarged.

The condyloid process was directed backwards instead of upwards, on account of the elongation of the jaw.

CASE.

Elizabeth Hall, aged 19, was admitted into Guy's Hospital on the 5th November, 1817. She says, that three years ago, while eating a crust of bread, she distinctly heard something snap, feeling at the same time a pain, on the right side of the lower jaw; she felt certain that it was not a tooth. Shortly after, a small immoveable tumor appeared about the centre of the jaw on the same side, which has since continued to increase gradually. She had previously had a decayed tooth, which was extracted about two years subsequent to the appearance of the swelling, without producing any effect either on the pain or increase of the tumor. On her admission, the swelling occupied the whole length of the side of the jaw from which it grew, from the angle to the symphysis; since that period it has rapidly increased, she thinks, from the frequent handling for the purpose of examination. The surface was very smooth and regular; centre considerably prominent, and on firm pressure in that part, the elastic parietes gave way, but immediately forced back the finger, as the pressure was discontinued, with a sudden jerk like parchment. She complained occasionally of lancinating pains in the tumor, particularly after being handled. Her general health was good.

With regard to the cause of the disease above

Cause of disease in this case.

described, it was evidently the irritation of the decayed tooth, the fangs of which projected into the cartilage which was effused within the bony cavity, and which, instead of producing suppuration and ulceration, as it frequently does, kept up a degree of irritation, that did not pass beyond the stage of adhesive inflammation, and a cartilaginous deposit took place in the first instance, to which succeeded an ossific effusion.

I have seen a similar diseased state of the tibia, but am unacquainted with the circumstances of the case.

Treatment.

As to the treatment of this disease, it consists in first seeking the source of irritation, and removing it as soon as discovered, in order to prevent the further progress of the disease; and indeed it may be probable that the removal of the source of irritation might sometimes, even when the disease has advanced to a considerable extent, succeed in producing a cure, and therefore it is desirable to wait the event before any further operation is undertaken.

Source of irritation to be removed.

Removal of the exostosis.

Should this however prove insufficient, it will be necessary that the external shell of the bone be removed by means of a saw, and that the cartilage which it contains be dislodged by an elevator. If the integuments be carefully preserved, little deformity follows; and thus by a simple operation, destruction, otherwise inevitable, is prevented.

Operation.

The operation performed, on the 21st of November, in the case of Elizabeth Hall, above

detailed, (page 177,) I shall here describe. An incision was carried from half an inch below the angle of the mouth, to the lower margin of the inferior maxilla, and continued along it to its angle. The flap was then dissected up, and a uniform tumor was exposed, of a hard consistence, composed of thickened periosteum upon the outer surface, and of a thin, bony, and elastic shell within it. The surface of this bony nest I with difficulty removed with a knife, and thus exposed a considerable bed of cartilage, occupying the place of the cancellated structure of the lower jaw, and expanding the remaining part of the jaw into a bulky swelling. The cartilage was removed from its bony nest by means of an elevator. The inferior maxillary nerve was seen crossing the side and bottom of the cavity, in its passage to the mental foramen.

It was necessary in the operation to avoid as much as possible inflicting any injury upon this nerve, as every time it was touched it produced considerable pain. In the course of the dissection, some hæmorrhage occurred, and several vessels were obliged to be tied. The flap was then brought over the cavity, and united by suture and adhesive plasters. The tumor, on examination, was found to consist of cartilaginous substance ; but of a nature softer than that which is produced from the shell of bone*. The patient supported the operation extremely

* In describing a bone, I divide it into its shell, or solid surface, and its cancellated structure.

well. Some hæmorrhage took place after she was removed to bed, and she complained of great pain during the whole of the afternoon, in consequence of which an opiate was administered. She suffered some pain, and was extremely irritable during the three days after the operation; but as soon as she could bear the extraction of the tooth, is was removed, and, on the 25th of November, the flap had in a great degree adhered, and she appeared to be suffering but little from the operation, although some discharge still continued.

Of periosteal Exostosis.

Fungous periosteal.

This disease, like the preceding, is both of a fungous and cartilaginous kind. The former of these scarcely differs in its symptoms from the fungous exostosis of the medullary membrane, except that the general swelling of the limb is less, and the particular tumor is more prominent; but there is the same want of sensibility in the commencement, with some pain afterwards; the skin remains free from discolouration, and has a similar tuberculated appearance. Ulceration, bleeding, and sloughing, with great discharge ensue, and occasion the destruction of life, if some operation be not performed.

Symptoms similar to fungous medullary

The following case will illustrate the history of this disease.

CASE.

A girl 19 years of age was admitted into Guy's Hospital for what was at first supposed to be an enlargement of the knee-joint, but upon more particular examination, it was discovered, that the swelling occupied the lower part of the os femoris, to which it was immoveably attached. The countenance of this girl was sallow, her general health appearing extremely defective. The swelling was small at her first admission, but during the time she was in the hospital, it rapidly increased; the skin was undiscoloured, and the surface of the tumor was tuberculated, hard as bone in some parts, but elastic in others. It was at first entirely unattended with pain; but as it increased it became occasionally extremely painful, and evidently re-acted upon her constitution in such a manner as to threaten her life, unless the operation of amputation should be had recourse to. The limb was consequently removed. Violent constitutional irritation succeeded to the operation, which for several days excited an apprehension for her life.

Case of this disease in the os femoris.

Appearance and health of the patient.

Amputation.

When these symptoms subsided, the stump put on an unhealthy appearance. Its irritability was excessive, so that she dreaded extremely the approach of her medical attendants for the purpose of changing the local applications. A fungus arose from the cancellated structure of the bone, which it was necessary to

destroy with caustic. Many weeks elapsed before the closing of the stump, notwithstanding a sufficient quantity of integuments had been preserved. And indeed, at length, when she was discharged from the hospital, some slight ulceration of its surface was still remaining: but it was thought adviseable that she should have the advantage of a more salubrious air than that of an hospital in a large town.

Dissection. DISSECTION.—The exostosis was seated at the lower part of the femur; the periosteum passed over it, and adhered strongly to its surface. The tumor itself was very firmly fixed to the external surface of the shell of the bone. It was injected minutely with size. In some parts it appeared extremely red from the injection; in others, where the injection would not enter, it was white, so that it was found very vascular in some parts, and in others not at all so. The surface of the tumor was lobulated. The periosteum at one part appeared to have formed, upon its external surface, a tumor composed of similar materials to that which was seated between it and the bone.

Dissection. Such swellings generally are found on dissection covered with a thickened periosteum, within which a white elastic substance is discovered, having numerous small spicula of bone passing in radii from the surface of the original bone; the shell of the bone is in a great part remaining: I have seen this however in some places removed by absorption. Within the cancellated structure, there appears in some instances to have existed a slight inflamma-

tion, for in the cancelli I have seen small portions of ossific matter deposited. I made a section of a tibia, on which a large exostosis of this kind was placed; one half of it I immersed in diluted muriatic acid, and found that when the phosphate of lime was removed, that the swelling remained of its former size, and that a bed of cartilage had supported the bony deposit. (See Plate.) The shell of the bone, in the remaining portion of the section, continued entire; spicula of bone in radii, passed from the shell of the bone to the periosteum, whilst in the cancellated structure, opposite to the seat of the exostosis, a very slight deposit of bone in small nodules had taken place. What structures preceded the formation of the cartilage, I do not know; but Mr. Howship, in an ingenious paper which he has published in the Medico-Chirurgical Transactions, on the growth of bone, has shewn, that a membranous structure precedes the formation of cartilage and the deposit of ossific matter in the ordinary formation of bone.

Section of a tibia.

We have in the collection at St. Thomas's, a considerable number of specimens of exostoses, chiefly seated upon the lower part of the os femoris, and the upper portion of the tibia. Those which have been macerated, exhibit appearances similar to that which I have just described, in which a section had been made; but those which have been preserved moist, in which the soft parts have not been destroyed by putrefaction, present the following marks. The periosteum thickened passes over the sur-

Appearances of moist preparations.

face of the swelling, to which it firmly adheres. The tumor itself occupies a great extent of surface between the shell of the bone and the internal surface of the periosteum. The swelling is lobulated: the greater part of it is composed of a white substance, somewhat elastic, but not so firm as common cartilage: part of it is coloured by blood, and the texture of this part is softer than the rest. When injected it shews a very unequal vascularity; being in some parts rendered extremely red by the injection, and in others remaining white; and this I have observed to be the case with fungous swellings generally, that they are only partially organized. In their incipient state, spicula of bone have not yet been formed in them; but in proportion to their extent and duration the ossific process occurs, though the spicula are smaller and less numerous than in the cartilaginous exostosis. In one specimen, it appears, that a small portion of this fungous substance is thrown out upon the external surface of the periosteum. The medullary membrane and cancellated structure of the bone in these specimens, have not undergone a similar change to that which has taken place upon the external surface: but in one of the specimens, there are distinct marks of inflammation in the medullary membrane, and in another, this membrane is beginning to participate in the disease. The surface of the exostosis viewed by the microscope exhibits numerous vascular pores.

Causes. This disease is attributed to accident; but

any irritation upon a bone in an unhealthy constitution will produce it. We have a very fine specimen of it in the collection at Guy's Hospital arising from an internal exfoliation of the os femoris: between the periosteum and the bone, in this case, instead of the cartilaginous process which accompanies internal exfoliation, an immense fungus is thrown out between the periosteum and the surface of the bone, shewing that the nature of the inflammation is determined by the state of the constitution at the moment, and that a very unusual and malignant effect may be produced by a frequent cause of irritation.

Internal exfoliation.

The treatment of this disease is similar to that required in the fungous exostosis arising from the medullary membrane; but it is only in the first dawn of the disease that we are to entertain any hopes of a benign influence from medicine. It would be dishonest to assert that we have a knowledge at present of any medicine having a specific influence over cancer or fungus. We may indeed improve the constitution a little, and keep the disease at bay; but once formed, it proceeds more or less rapidly to its fatal termination, unless prevented by the operation of amputation or excision; which the state of the constitution improved by medicine will render more safe at the moment, and hold out a better grounded hope for the future.

Treatment the same as in the disease of the medullary membrane.

No remedy for fungus or cancer yet known.

Of the cartilaginous Exostosis, between the Periosteum and the Bone.

Cartilaginous exostosis of the periosteum.

Admits of cure from surgery.

Arises from inflammation.

This is a very different affection to the preceding, and more deserving the attention of the surgeon, since it admits of relief by operation, though sometimes with the loss of the affected limb. It originates in the inflammation of the periosteum and of the corresponding part of the bone; and a deposition of cartilage, of very firm texture, and similar to that which forms the nidus of bone in the young subject, adheres to both these surfaces. The periosteum adheres to the external surface of the swelling, and the swelling itself is attached still more strongly to the surface of the bone. Within this cartilage a bony matter is deposited, which is first thrown out from the original bone; it continues afterwards to be secreted as the cartilage increases in bulk; for it appears that between the periosteum and bony mass, cartilage is constantly secreted, which constitutes the exterior surface of this tumor.

Appearances on dissection.

Thus, on dissection, we discover, 1st, The periosteum thicker than natural; 2nd, the cartilage immediately below the periosteum; and, 3d, ossific matter deposited within the cartilage, extending from the shell of the bone nearly to the internal surface of the periosteum, still leaving on the surface of the swelling a thin portion of cartilage unossified.

When the accretion of these swellings ceases, and the disease has been of long standing, they are found to consist, on their exterior surface,

of a shell of osseous matter, similar to that of the original bone of the same cancellated structure, and communicating with the original cancelli of the bone. (See Plate.) Consequently, when an exostosis has been formed in the manner here described, the shell of the original bone becomes absorbed, and cancelli are deposited in its place. In the mean time the outer surface of the exostosis acquires a shell resembling that of the bone itself. When the exostosis has been steeped in an acid, and by this means deprived of its phosphate of lime, the cartilaginous structure remains of the same form and magnitude as the diseased deposit; and as far as I have been able to discover, it is effused precisely in the same manner as healthy bone. From which it appears, that the formation of these excrescences differs in no respect from that of original bone, since they are composed of cartilage for their basis, and of an earthy salt to impart to them firmness and solidity; a circumstance which I have shewn for many years in my lectures.

Are formed in the same manner as healthy bone.

For the most part these diseases are attended with very little pain, and, especially at their commencement, are but little complained of: when, however, they have acquired some considerable bulk, they do not fail to occasion painful sensations by their pressure upon the surrounding parts; very considerable inconvenience likewise frequently arises to the patients from the impediment and interruption they present to the action of muscles, the tendons of which are sometimes detained by means of them

Not painful at first.

Inconvenience from interrupting the motion of muscles and tendons.

in particular positions, at other times they glide suddenly over them, attended by a snapping noise which can be distinctly heard by the bystanders, and occasioning by these means painful and unpleasant sensations. Others again produce considerable pain in the limbs when the tumor advances to the surface of the skin. I have seen instances of its being ulcerated from this circumstance, but the sore exhibited no signs of malignancy, as will be seen in a case which I shall presently relate, in which the ulcer formed on the surface of the skin had not an unhealthy character. We have also a preparation of exostosis upon the radius, in which the diseased growth is exposed by common ulceration.

Skin sometimes ulcerated.

The most frequent seat of the periosteal exostosis is upon the inner side of the os femoris just above the internal condyle, and in the direction of the insertion of the triceps muscle. In this situation I have seen several instances of it. (See Plate.) I have also seen it seated on the tibia, immediately under the insertion of the sartorius and gracilis muscles. A considerable enlargement of the bone is occasionally produced upon the fibula at its connection with the tibia; it seldom however in that situation rises into any thing like a circumscribed exostosis. After long continued courses of mercury, when the patient has been debilitated to an extreme degree, if he exert himself much in walking, not only is this thickening of the bone of the fibula produced, but a suppurative process is instituted, which is followed by exfoliation, and

Most frequently occurs on the os femoris.

Sometimes on the tibia.

lays the foundation of a very tedious, and sometimes of a dangerous disease.

At the insertion of the deltoid muscle in the os humeri, I have also seen this disease occur.

The periosteal exostosis occupies either a very small portion of the bone, or is extended over a considerable surface, sometimes nearly its whole circumference, sometimes several inches of its length. The following case, extracted from the Medico-Chirurgical Transactions, forms a circumstantial detail of its history, when it is of great magnitude.

CASE.

" Catherine Coulson, aged 30 years, unmarried, was admitted into Guy's Hospital, under the care of Mr. Astley Cooper, Nov. 29, 1809, on account of a firm equable and immoveable tumor situated at the upper and external part of the left arm, so high up, that on a superficial inspection, it seemed to be connected, not only with the humerus itself, but also with the clavicle and scapula, rendering it probable that it had an attachment to the glenoid cavity of the latter bone. The arm, however, could be moved forwards and backwards; but in consequence of the weight of the tumor, and the great attenuation, and perhaps complete obliteration of part of the deltoid muscle, produced by its pressure, the voluntary motion upwards was lost. On minute examination it was ascertained, that this enlargement arose from the superior part of the humerus; but as symptoms of inflamma-

tion of the shoulder joint were present, a doubt still remained, whether the morbid action, which caused its formation, had commenced in those portions of bone, which entered into the composition of that part. That the humerus itself was diseased, seemed evident, from an obvious enlargement and irregularity, felt at its inner part, commencing high up in the axilla, and ending about four inches from that point. The circumference of the tumor, at its most bulging part (the admeasurement being taken parallel with the arm) was $25\frac{3}{8}$ inches; and a line carried round its most prominent part, so as to surround both it and the arm, measured $24\frac{1}{8}$ inches.

This swelling was in general covered merely by common integuments; it was extremely painful when handled, and the skin over it felt much hotter than natural; upon it many large veins were ramified. Motion of the arm gave considerable pain, which was referred both to the tumor and shoulder joint; and the patient complained much of the weight she had to support. Her appetite was impaired, and she had some degree of fever.

After her admission, the account collected of the commencement and progress of this disease, was the following: about three years and a half previously, after having once struck the summit of the shoulder forcibly against a wall, afterwards fallen on it, and repeatedly received blows on the same part in mangling, she observed a firm tumor, about the size of a nutmeg, at the superior part of the arm. Subsequently

to this, she was always affected with pain about the shoulder when employing the limb freely. The enlargement gradually increased; and about two years and a half before, when it was equal in size to a common tea-cup, she was admitted into Guy's Hospital by Mr. Cooper. She remained under his care six weeks, during which time, repeated blisters were had recourse to without benefit. In about six months, she again applied for admission, and was re-admitted under Mr. Cooper. The tumor had then attained the size of a pint bason; and the motion of the arm had become less free than on the former occasion, though not so considerable as to prevent the general use of the limb. For this reason, and because her constitution had suffered little, she would by no means consent to the operation of amputation at the shoulder joint, the necessity of which was strongly urged; and at the expiration of eleven months, she quitted the Hospital. Within the year and half antecedent to her last admission, the augmentation of the tumor had been very rapid; but she did not notice the enlargement mentioned, to have been observed in the humerus itself, till six or seven weeks previously. Although her nights had been long restless, her general health continued good till the 26th of November, when she was attacked with severe pain in the tumor (which felt hot) and about the shoulder, with loss of appetite and languor.

From the period of admission to the 8th December, blood-letting from the veins over the tumor was twice employed, which dimi-

nished the pain and tenderness: the blood was sizy.

As the patient's arm had now become useless, and her sufferings, both from the weight, and the symptoms under which she laboured were very great, she was prevailed on, without much difficulty, to undergo an operation, which was speedily concluded on, and performed on the 8th of December. The state of the deltoid muscle before mentioned, prevented the possibility of executing it in the manner usually directed; for no flap, except of the common integuments, could have been preserved. It was concluded, therefore, that the most advisable plan would be to aim at covering the wound with those portions of integument and muscles, which anteriorly and posteriorly connected the arm to the trunk of the body.

The first step of the operation, was to secure the artery. An incision therefore was made in its direction, high up in the axilla, two ligatures put on it, and secured; when a division was made between them. The application of a ligature on the part of the artery most distant from the heart, was to prevent the possibility of any hæmorrhage from such anastomosing vessels as empty themselves into it. An incision was next commenced, immediately anterior to the acromion process of the scapula brought forwards, and ended in the axilla, passing just below the end of the artery on which the ligature had been applied; and another was carried from the same point posteriorly, and made to meet the former one.

The next part of the operation consisted in the gradual division of the muscles surrounding the joint, and the application of ligatures to such vessels as it appeared at all probable might furnish free hæmorrhage. These, being numerous and large, in consequence of the great size of the tumor, it became necessary to secure ten arteries. As a further precaution also against any bleeding which might have taken place, either from returning vessels, owing to the circulation kept up by undivided branches of arteries, or from regurgitation, the veins accompanying the axillary and posterior circumflex arteries were tied by two ligatures each, and divided at the intervening space. The capsular ligament being at length laid bare, an incision was made into it, and the cavity of the joint exposed, which was filled with coagulable lymph, of a reddish colour, and gelatinous consistence, mixed with some serum or synovia. The arm being removed, the glenoid cavity was accurately examined, and presented no mark of disease: the internal surface of the capsular ligament was more vascular than natural, but the articulating surfaces were not destroyed. The cartilage was pared from the glenoid cavity, in order to facilitate the process of granulation; and after all, hæmorrhage was stopped, the integuments were brought together, and secured in apposition, by three sutures and straps."

It is not necessary here to detail the circumstances of the case subsequent to the operation,

they have already been described at length in the Second Volume of the Medico-Chirurgical Transactions.

The wound was cicatrized about the 18th of April, but the patient still remained impressed with the idea of having the arm, and that she could move the fingers. Attempts, however, at such motions, were always attended with pain and sense of pricking of the whole extremity; which, as before, when she is in the recumbent posture, feels to be placed over the breast, but when erect, it appears to be placed posteriorly.

Dissection of the Tumor.

The weight of the tumor, including that of the os humeri, was eleven pounds.

The periosteum, in a considerably thickened state, covered the surface of the swelling.

The principal part of the tumor was composed of cartilage, which adhered firmly to the external surface of the bone, and to the inner side of the periosteum.

The bone was much increased in its diameter. Where the tumor was attached to it, numerous processes of bone passed into the cartilaginous matter.

The cancellated structure of the bone was obliterated opposite the disease, and a red pulpy mass was found in the cancelli, at that part at which the otherwise healthy bone joined the diseased.

I have lately examined the preparation made from this case with considerable care, and on making a section of the os humeri, found it spread into a large and very solid bony mass at least three times its natural size. Its cancellated structure nearly obliterated by cartilaginous and ossific deposit. The bone towards the axilla is less extended than that part which is covered by the deltoid muscle. On the outer side of the enlarged humerus, there is an immense mass of cartilage, in which numerous ossific depositions have taken place. The periosteum covers the swelling, and adheres firmly to its external surface: the swelling is composed of one third bone and two thirds cartilage, with bony masses intermixed. There is also in the collection at St. Thomas's Hospital a very fine preparation of this disease, made by Mr. South, from a patient whose leg was amputated by Mr. Chandler.

Causes.

With respect to the cause of the periosteal exostosis, which has but a small base, and which follows the course of the tendons or ligaments, as that in the direction of the triceps femoris and gracilis, I am of opinion that it arises from exertions disproportionate to the strength of the subject. The tendons which are fixed in the bone becoming sprained by over exertion, inflammation is excited in them, which is thence communicated to the periosteum and bone, and a deposition is consequently produced in the direction of the tendons sprained and inflamed, upon which the weight of the body is more

particularly thrown. We see also in horses that the disease denominated *splent* is produced by sprains of the ligaments. This disease is exostosis. The same effect also is produced in the human subject by a sprain of the ligament which connects the fibula with the tibia. Those who are attentive in observing disease must have seen enlargements of the fibula at its lower part, frequently succeeding considerable exertions in walking, pending, or immediately succeeding to a long continued course of mercury, as I have already observed.

Blows also occasionally produce this disease: I have known an enlagement of the tubercle of the tibia, produced by a fall upon the knee, continue for many years. I have seen likewise an exostosis of the metacarpal bone of the little finger occasioned by a sharp blow.

Exostosis from pressure.

Pressure is also sometimes a cause of exostosis: Mr. Cline, Mr. Hutchinson, and myself, were consulted respecting a tumor of this kind, upon the symphysis of the lower jaw, which owed its origin to a considerable degree of pressure long applied to the chin.

Treatment.

The periosteal exostosis admits of remedy, from internal medicine, from external applications, and when considerably advanced, from surgical operation. The internal and local treatment of these cases differs in no respect from that which we have already given, when speaking of the medullary exostosis. The common alterative plan of small doses of mercury, with decoction of sarsaparilla, combined with stimu-

Similar to that of medullary exostosis.

Oxymur. hydr. cum. decoct. sarsap.

lating plasters, as the emplastrum ammoniaci cum hydrargyro, with the view of promoting absorption of that which has been effused, by its stimulating qualities and by its pressure, are the means which are generally adopted. But in this instance, as in the former, my experience does not furnish me with an example of such remedies having any influence, except in the very commencement of the disease; and too often the insensibility of such swellings prevents their being discovered until they have acquired some magnitude.

When these swellings have acquired a considerable bulk, they sometimes remain stationary and produce no inconvenience: but at others, they continue to grow, occasion considerable pressure upon the surrounding soft parts, interfere with their motions, and render removal necessary. I have known a gentleman who had an exostosis upon the inner part of the thigh bone, suffer great inconvenience from it in riding, and he was under the necessity of having a leather pad contrived to wear upon the inner side of his knee, to prevent the pressure of the saddle upon the unnatural growth of bone.

Operation.

The operation for their removal is performed by means of a saw, and may be effected with comparatively little pain to the patient, and generally, I believe, without any danger, if the nature of the disease be well discriminated, by distinguishing the fungous from the cartilaginous swelling.

Mr. Machell's saw.

Mr. Machell, surgeon, Rider-street, St. James's, has invented a saw which answers the purpose of sawing to a great depth exceedingly well, by which the operation is much facilitated, as this instrument admits of being applied at a considerable depth amongst the muscles without doing them any injury. The form of this saw will be best explained by consulting the annexed plate. I have had the position of the handle altered in order to enable me to support and apply it more easily, but in every other respect the instrument is delineated precisely according to his invention. Beside the saw, it will be necessary for the surgeon to be provided with a strong pair of nippers for the purpose of removing any irregular fragments of bone that may remain after the exostosis has been removed. The highly ingenious instrument of Dr. Jeffries of Glasgow, called the chain saw, may also be sometimes employed with considerable advantage.

The following cases will serve better to illustrate this operation than any separate detail of the operation itself.

CASE.

Sarah Hart, aged 48, was admitted into Guy's Hospital, 25th June, 1800, under the care of Mr. William Cooper, at that time surgeon to this hosiptal. She was the subject of a large exostosis which grew out of the anterior part of the tibia. When I succeeded to the

surgeoncy of that hospital, she became my patient, and was the first person on whom I performed any operation in that institution. In answer to my inquiries respecting the first appearance of this tumor, she stated that it had begun in her childhood, and had now existed forty-four years. It had acquired the magnitude which I have endeavoured to express in the plate subjoined to this paper, but was of the form of an inverted pyramid, the apex being attached to the tibia, and considerably narrower than the base, which constituted the surface of the exostosis. A small ulcer was seated on its external surface. It was not, nor indeed had it ever at any time been extremely painful, and what little pain she had suffered was of the obtuse kind. As the ulcer above mentioned rendered her apprehensive of ill consequences, and I had represented to her that she could not hope to obtain relief from any other means than that of sawing off the tumor, she readily submitted to the operation.

Operation.

I made an elliptical incision through the integuments, preserving enough of them to cover again the surface of the tibia after the exostosis should have been removed. When the skin was turned back sufficiently to expose to view the surface of the original bone, I attempted to saw through the exostosis by means of a small metacarpal saw, but found the structure of the tumor of too solid a nature to admit of an impression being made upon it by that instrument; I was consequently obliged to have recourse to

the common amputating saw in order to effect my purpose, sawing first in a direction from the upper part of the tibia, and then from the lower part, so as to make the section meet in the centre, and in this manner the exostosis was readily detached.

Little blood was lost during the operation, nor did the patient suffer much pain. I endeavoured by approximating the integuments to unite the wound by adhesion, but did not succeed. Granulations of a very healthy nature arose from the surface of the wound, and six weeks after the operation, two small portions of bone exfoliated; the patient, not only recovered from the operation, but regained also the perfect use of the limb.

CASE.

The result of the foregoing case gratified me exceedingly; for I felt a hope that exostosis, when seated on any accessible part of the body, might be safely removed by an operation similar to that before described: but I have a case now to relate which proved by no means so fortunate in its result. This case, however, was of the fungous and not of the cartilaginous kind. A man who lived near to me when I resided in the city, had a large tumor growing out of his forehead. Anxious to examine it, I called upon him, and found him labouring under a swelling of the magnitude, when compared to the size of the head, of that

represented in the plate. It had been growing several years, the skin over it exhibited a blush of inflammation. Its fixed state, and the firmness it presented to the touch, convinced me that it was exostosis; yet at the same time it was less resisting and more vascular than the cartilaginous exostosis usually is. I related to the patient the case above given, stated to him its favorable result, and advised him to become a patient in the hospital, where he might undergo a similar operation; as, without it, I conceived that the disease must necessarily prove fatal. To my advice he readily assented, and submitted to the operation I had recommended to him a few days after his admission into the hospital. I began by making an incision through the integuments directly over the tumor, from the surface of which there issued a very considerable quantity of blood. I continued to turn aside the integuments until I reached the surface of the cranium, and then with a metacarpal saw, succeeded in cutting through a substance much softer than common cartilage, containing numerous but slender spicula of bone within it. Each part of the swelling bled freely; but on bringing the integuments over the surface, and making use of pressure upon them, the bleeding from the bone was stopped, and it was only necessary to secure a few vessels of the integuments. Upon examination of the removed tumor, it appeared softer than cartilage, although it contained

some osseous spicula, and I was able readily to break it down with my finger.

On the following day the patient had a considerable degree of fever, which continued to increase until the fourth day, when he became comatose, and on the sixth day he died. Upon examination of the body I found that the swelling occupied the internal as well as the external table of the cranium; it extended through both, and affected the dura mater which had several fungous projections proceeding from it; and that the inflammation which had been excited by the operation, had extended to the membranes of the brain opposite to the part where the disease had been seated.

This complaint seems to have originated in the diploë of the os frontis, and to have produced an effusion both between the pericranium and the skull, and between the skull and the dura mater. The swelling upon the outer part of the head, was, however, much larger than that which had arisen from the inner table. It was evident, too, that this case must ultimately, and at no distant period, have proved fatal, if no operation had been performed.

An exostosis on the external table of the skull, growing slowly, very little vascular, unattended with any considerable pain, may safely be rendered the subject of an operation; but a swelling of more rapid growth, red upon its surface, shewing signs of considerable vascularity, and attended with great pain shooting through the brain, is one for which I should now hesitate to perform an operation.

CASE.

Miss E. O. 11 years of age, was brought to my house in July 1817, by Mr. Prior, Surgeon of Clapham, on account of having an exostosis on the thigh bone: it was seated a little above the inner condyle of the os femoris in the line of the insertion of the triceps muscle. The account she gave me was, that it was accidentally discovered about eight months before she applied to me. At first, it did not interfere with her daily exercises, and it produced no pain on walking; but from the month of May last she found some difficulty in bending the limb. Mr. Mortimer, Surgeon, of Bristol, wrote to me, that he was requested to examine Miss E. O.'s thigh in the beginning of the year, and found a small tumor about two inches above the inner condyle of the femur, directly under the seat of the garter. This tumor was evidently an osseous enlargement, insensible to pressure, and by no means painful. The skin was perfectly free from inflammation, and there was no reason to suppose that the tumor had acquired any addition to its bulk for years. Its origin was unknown; it occasioned no pain or inconvenience whatever, nor did it in any way impede her walking or dancing, or produce any degree of lameness. Mr. Mortimer's view of the case was perfectly correct. In the month of May last she first found that on going up stairs, she was under the necessity of advancing her right foot on each

stair; and the same in descending, when she was obliged to proceed sideways, being unable, without great inconvenience, to bend the limb. Whilst sitting down, and more especially on a low seat, she felt considerable pain in bending the knee: and after having sat for some time, she experienced pain and difficulty on rising. Her lameness, just before her journey to London, had considerably increased, and her leg had become painful down to the heel. When she attempted to run, she felt a snap upon the swelling, as if a cord had slipped out of its pulley, which was owing to the tendon gliding over the projecting part of the bone.

On Monday, the 21st of July, the operation was performed for the purpose of removing the swelling, in the presence of Mr. Prior and Mr. Plowman. An incision was made over the projecting portion of the bone, and the muscles drawn aside from its surface: the periosteum, which was much thicker than usual, was divided by the knife, and turned aside from the exostosis, which was covered by a bed of cartilage, in which bony matter had not yet been deposited; and this was about the thickness of $\frac{1}{8}$ of an inch. The exostosis was next cleared of the soft parts from the surface of the thigh bone upon which it grew, and a spatula was passed down to confine the muscles from interfering with the saw. The saw was then attempted to be used without the forceps, but it could not be well fixed: the forceps were therefore added to it, and the bone was sawn through. Some irregularity remained upon the thigh bone,

which I endeavoured to remove by means of a saw recommended by Mr. Hey, but the muscles interfered with its employment, in consequence of the depth at which the bone was seated; and I removed it readily, by means of a pair of bone nippers.

No vessel of any importance was wounded in this operation, nor was there any necessity for applying a ligature. The edges of the wound were approximated, and retained, by means of adhesive plasters; and an evaporating lotion was applied.

On the 22nd she had some fever, which on the 23d had subsided.

On the 24th she was carried to the sofa, after which she experienced no further inconvenience from the operation; and before leaving town had entirely lost the painful sensations which had previously existed.

CASE.

James Aris was admitted into Guy's Hospital August 13, 1817, with an exostosis occupying from one to three inches of the thigh bone, above its internal condyle, which felt, through the integuments and muscles, about the size of the finger, and which was directed rather upwards, not being exactly at right angles with the thigh bone. His age was 24 years; and 14 years ago, while jumping over a post, he first discovered pain in the part which afterwards formed the seat of the disease. The pain lasted but a very short time, but it led

him to examine particularly the part, when he perceived a small and hard swelling. This tumor gradually increased, and at length began to interfere with the motion of the limb, so as to render him anxious to have advice respecting it. When walking, he felt what he described as a snapping in the part, which probably arose from the extension of the sartorius muscle, and its sudden slipping over the swelling. When he placed the limb quite straight, he found a difficulty in bending it; and when bent it was almost equally difficult to extend it: each flexion and extension producing a snapping noise, which could be distinctly heard.

On considering the inconvenience which the swelling had produced, and that the disease was obviously on the increase, I recommended to him the operation which I had performed in the preceding Case, and advised him to become a patient in the Hospital, and to submit to one of a similar kind. He procured admission immediately.

On the 22nd of August I performed the operation. The man was lying upon a table, with his thigh slightly bent, and I made an incision through the integuments over the swelling, and thus exposed the sartorius muscle, which appeared to have gained an increase in its breadth, and to be incapable of being sufficiently drawn aside to completely expose the tumor without considerable violence; I therefore made an incision through it in the direction of its fibres, sufficiently large to allow the exostosis to pass through the opening. The peri-

osteum which covered the swelling, was then exposed, and being cut through, and turned aside, a surface of cartilage was laid bare, and beneath it a large process of bone. Mr. Machell, the inventor of the saw, who was present at the operation, himself applied it, and with a very few turns of it removed the osseous tumor. The edges of the wound were brought together, and union attempted by adhesion.

In the evening of that day he had some symptoms of constitutional irritation, and some blood was taken from his arm. On the following day, he took a brisk purging medicine, and after this time no unpleasant symptoms appeared.

My dresser, Mr. Humble, informed me that the wound was as nearly as possible cicatrized on the 12th of September, and he was discharged from the Hospital a few days afterwards, and continues free from the inconveniences which he had experienced prior to the operation.

It appears then, that bones, after operations, unite by adhesion to the soft parts; if adhesion cannot be produced, healthy granulations arise from the surface of the bone, and cicatrization takes place upon these, as upon other parts of the body; and that there is reason to believe, that these structures may, with properly constructed instruments, become much more the subjects of operations, than they have hitherto been considered.

Fig. 6.



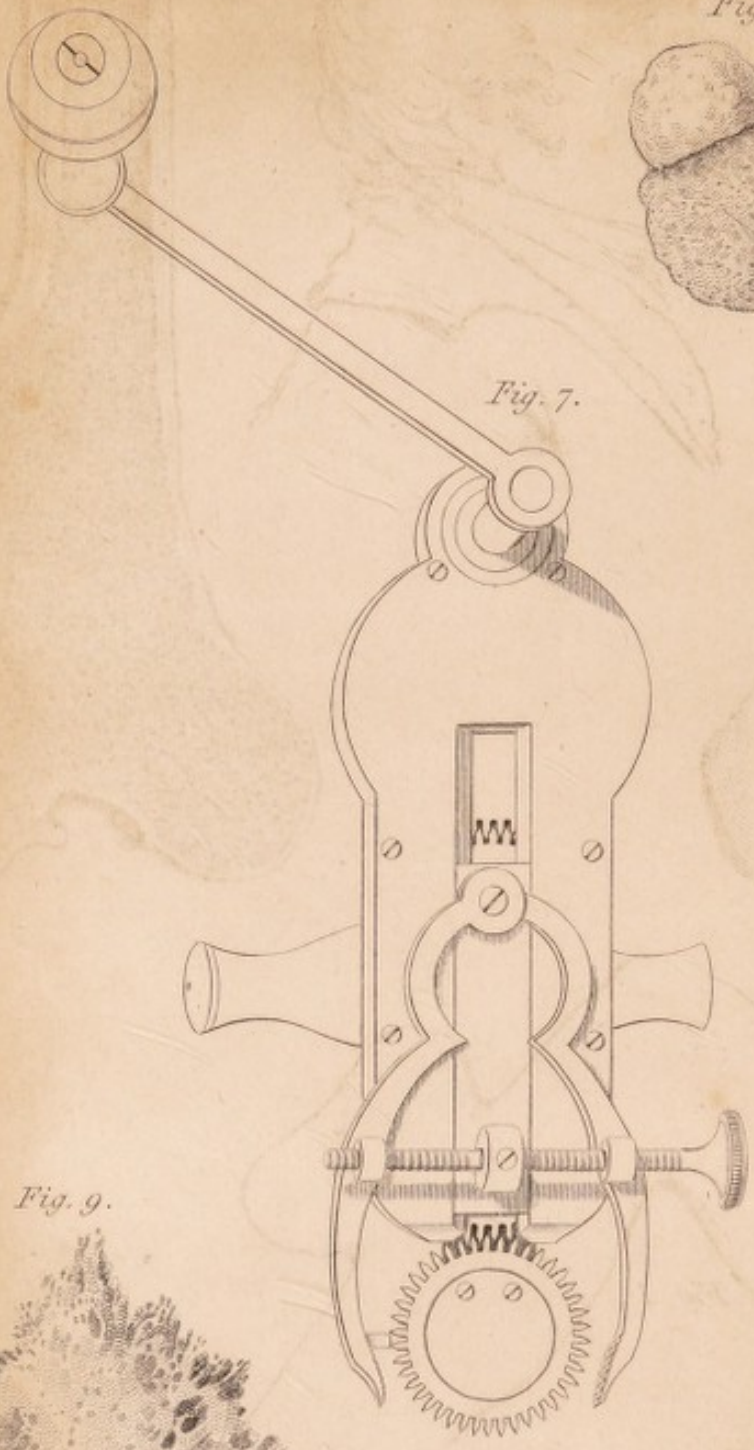


Fig. 7.

Fig. 9.



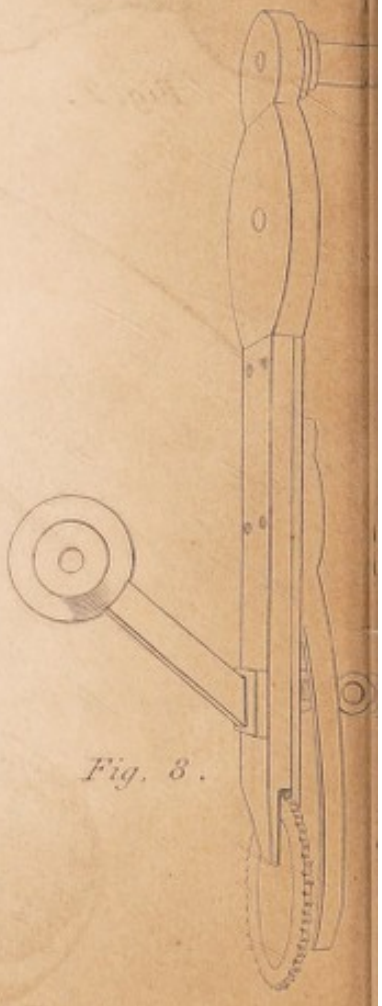


Fig. 8.

H. Thomson del.

London Published Jan.y 1st 1818 by E. Cox &c.

Fig. 4.





Fig. 2.

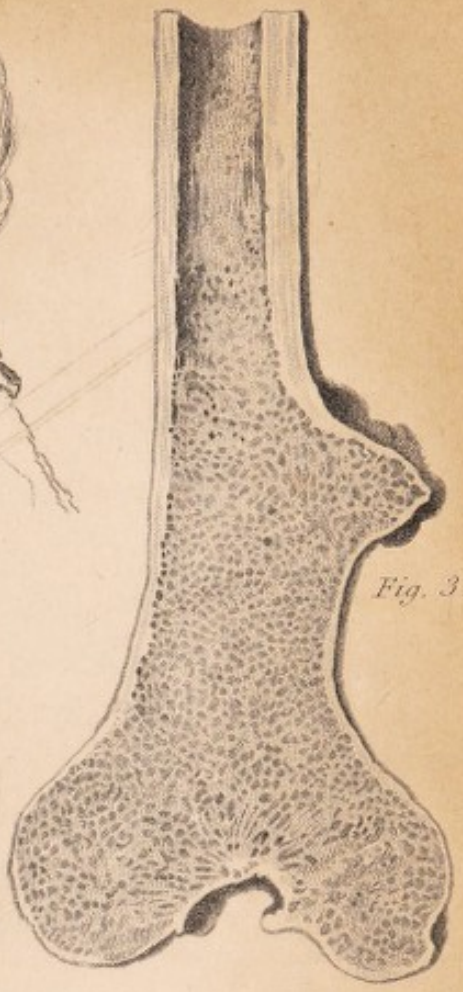


Fig. 3.



Fig. 1.



Fig. 5.

J. Mitchell sculpt.

S. Bagster & Longman & Co. Paternoster Row.

EXPLANATION OF

PLATE VIII.

Fig. 1. Shews the relative size of an exostosis of the leg of a woman, successfully removed by operation. See Case.

Fig. 2. The os femoris, with an exostosis growing from it, in the most frequent seat of that disease.

Fig. 3. The section of an exostosis, which had become stationary, a shell formed upon its surface like that of the original bone, the original shell absorbed, and a cancellated structure seen passing into the exostosis.

Fig. 4. A view of the head of a man who had a large fungous exostosis, which was unsuccessfully removed. See Case.

Fig. 5. View of an exostosis removed by the saw, in one of the Cases which I have described; its surface was covered by cartilage; its interior was of bone; I put this exostosis in a diluted muriatic acid; and having removed the ossific matter, found in every part of it a bed of cartilage.

Fig. 6. Exostosis removed from Aris; its extremity formed a cartilaginous ball. See case.

Fig. 7. Machell's saw. The forceps on the sides of the saw, by which the bone is held, regulated by a screw, a winch turns the saw by concealed wheels.

EXPLANATION OF

PLATE VIII.

Fig. 8. A lateral view of the saw, to shew the position of its handle.

Fig. 9. A portion of a large exostosis of the thigh, which had been immersed in an acid, to shew it's cartilage, the ossific matter being removed, and nothing but the cartilage remains.

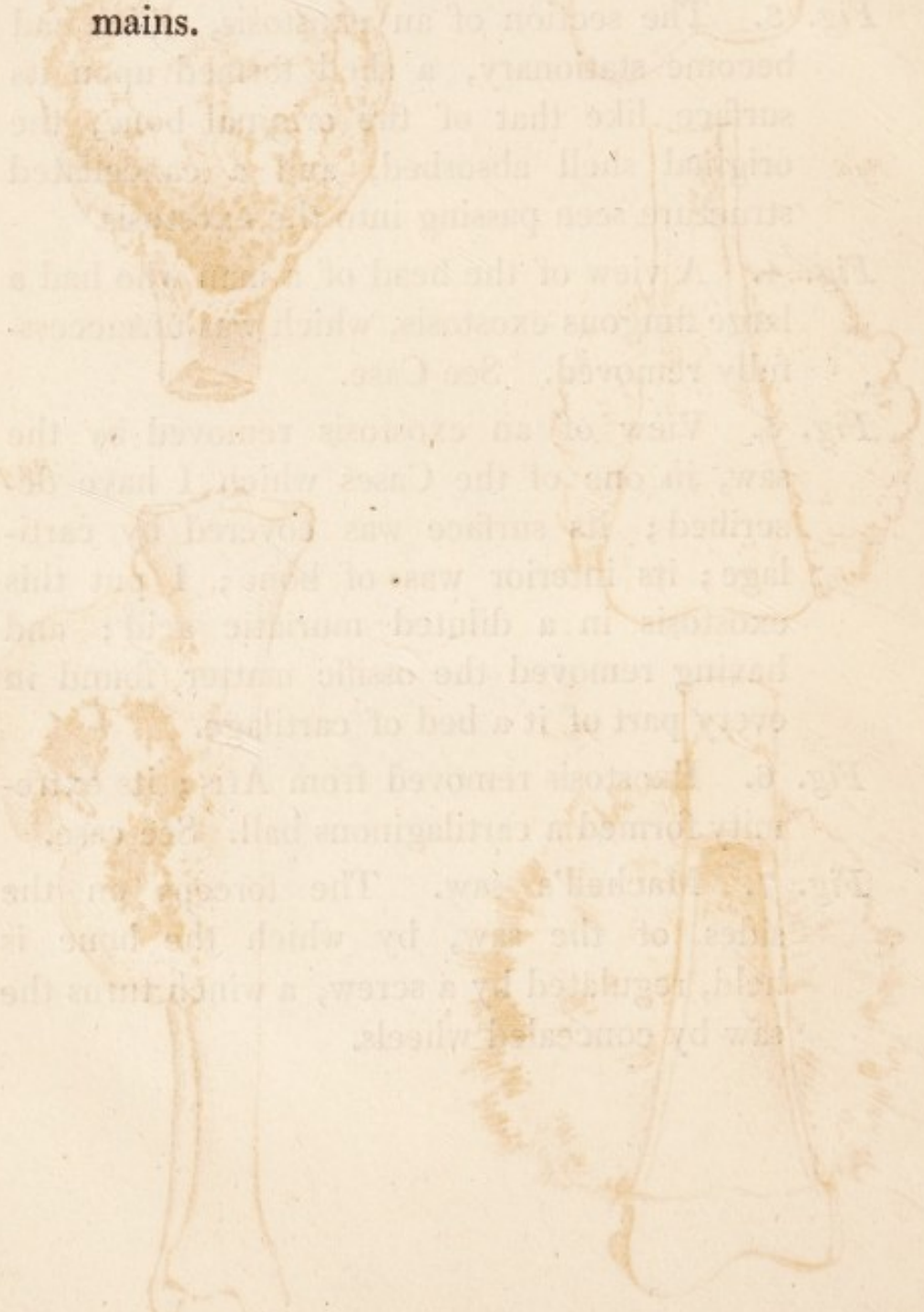


Fig. 1.



Fig. 2.



Fig. 3.



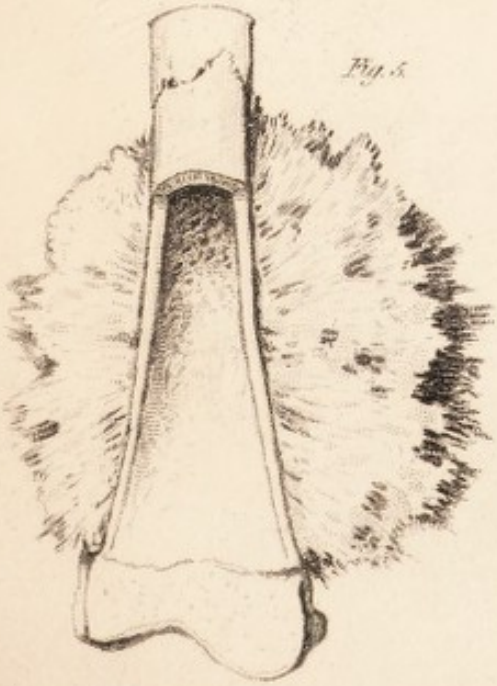
Fig. 6.



Fig. 4.



Fig. 5.



Thomson del.

Jas Mitchell, sculp.

London, Jan.1st 1818. Published by Blair & Son, 87 Thomas St & Longman & Co.

EXPLANATION OF

PLATE IX.

Fig. 1. Shews a large fungous exostosis of the thigh bone, arising from the cancelli, the surface of the bone, and connected with the internal surface of the periosteum, which passes over the swelling.

Fig. 2. Fungous exostosis from the cancelli, the bone partially absorbed by the pressure and growth of the fungus; *a*, the bone; *b*, the fungus.

Fig. 3. Shews a bone immensely expanded and partially absorbed, by the pressure of a disease of the medullary membrane and cancellated structure.

Fig. 4. A view of the tibia expanded, but forming a shell; over the tumor, as happened in the case of Elizabeth Hall. See Case, page 177.

Fig. 5. Periostial exostosis of the cartilaginous kind; composed of bone and cartilage placed between the surface of the bone and periosteum.

Fig. 6. A section of *fig.* 5, immersed in a diluted muriatic acid, and the cartilage left which forms in these cases the nidus for bone.

These preparations are in the collection at St. Thomas's Hospital.

ON

WOUNDS

AND

LIGATURES OF VEINS.

By Mr. TRAVERS.

THE inflammation to which the interior tunic of the veins is liable, was first distinctly pointed out by Mr. Hunter. The serious consequences arising from venesection had been supposed to proceed from other causes, previous to Mr. Hunter's Essay on this subject, in the Medical and Chirurgical Transactions. They were ascribed to a wound of the fibres of the cutaneous nerves, or the prick of the neighbouring tendons, or the fascia upon which the veins lie, an opinion maintained by some writers even after the publication of Mr. Hunter's paper *. Inflammation of the cellular texture, the absorbents, or the fascia may occur from any wound penetrating those parts, and it therefore now and then appears after venesection, as Mr. Abernethy has shewn in his Essay on the occasional ill consequences of that operation †.

Inflammation of veins first described by Mr. Hunter.

Inflammation of other parts after V. S. described by Mr. Abernethy.

It may happen that the fibres of the cutaneous

Of nerves.

* B. Bell's Surgery, Vol. III. p. 122.

† Surgical and Physiological Essays. Lond. 1793. Part II.

nerves may be wounded, as Mr. Abernethy has also demonstrated; but the symptoms characterising an inflammation of the nerve, are very rare, as a consequence of venesection, and our observation of the effects of wounds of nerves, does not lead us to attribute any consequences to this accident, at all resembling those which have been in many instances shewn to arise from wounds of veins.

Inflammation after tying and dividing the saphena, a modern observation.

Similar serious consequences to those which have been observed after bleeding, have upon several late occasions, followed the operations of tying and dividing the vena saphena major, in cases of varix, and have created a general distrust of the safety of the practice; yet the ancients treated the veins with singular rudeness—pricking, cutting, tying, and burning them, without ever adverting to any other than the mechanical effects of such operations upon the diseases for which they were instituted *. And that this alarming and often fatal inflammation of the inner coat of veins, should so long have escaped the notice of the profession, appears most extraordinary, if we consider how much it was formerly the practice of surgeons to tye the veins after amputation. Many of the older operating surgeons in the country, army, and navy, still adopt the practice, and are unwilling to believe that it can ever be productive

* Hippocrates punctured varices. Ætius, Paulus, Avicenna and Albucasis describe the operation of excision. This seems to have been the practice of Fallopius and Severinus. Fabricius Aquapendens and Fabricius Hildanus inclosed the varicose vein between two ligatures, and emptied it by incision. Ambrose Paré, Petit, Dionis and others emptied it by punctures and brought its sides into contact by compression.

of mischief. I have frequently seen the femoral vein tied without any obvious ill effect; and one of the most experienced and successful operators in the West of England, lately assured me, that he had been in the constant practice of tying the main vein distinctly from the artery in amputations. Neither do the continental surgeons entertain any apprehension of a ligature upon a vein, nor are they, I believe, in any degree, aware of the extensive inflammation to which the interior tunic of these vessels is in consequence exposed.

Having witnessed a few fatal cases, and heard of others, I felt impressed with the importance of the subject, and determined to investigate it by inquiry and experiment. I shall detail a few cases, that my readers may also feel its importance, and then offer the observations which I have collected from these sources, towards its illustration.

To my brother, Dr. Travers, of Newark, I am obliged for the annexed case, which occurred some years ago, under his personal observation.

CASE.

Fatal case of inflamed vein from V. S.

Ophthalmic depot, Military Hospital, Bognor, 1810.—Hugh Johnson, aged 33, constitution much impaired by hard service. Admitted 15th of May, was bled in the median basilic vein of the right arm, and a dossil of lint and fillet were afterwards applied in the usual manner; some purgative medicine was administered, and he was placed on low

diet; on the 18th was convalescent, and discharged. 24th, re-admitted, the ophthalmia having returned with increased violence, was cupped on the temples; after the operation he complained to me of pain in the right arm, and said that the wound made in the vein on the 15th, had never closed; that soon after the bleeding, the bandage becoming loose, he applied some adhesive plaster; this had also soon rubbed off, and for some days the orifice made by the lancet had been unprotected. He had from the 16th felt pain, which now becoming severe, he was induced to mention it. Upon examination there was a small open wound, with everted edges, and a slight discharge of pus; the pain extended up the arm in the course of the vein, and he had a quick pulse. A poultice was applied to the part, a fomentation to the arm, and he was purged and placed on tea diet. 25th, more pain, vein appears enlarged, much redness and tension of the arm; wound as yesterday. A good deal of fever present. ℞ Calomelanos, pulv. antimon. a a gr. iv. cons. rosæ, q. s. ut. f. bolus statim sumendus.—Admoveantur brachio hirudines xij.—Poultice and fomentation to be continued.—26th, was visited by the staff surgeon, arm less painful, tension and swelling greatly reduced; wound nearly closed; has had three copious alvine evacuations, and appears upon the whole better, though by no means free from fever. Poultice and fomentation ordered to be discontinued, and a spirituous lotion to be applied to the arm. Sumat mist. camphoræ, ℥j^{m}. ter die.

27th, much the same as yesterday, wound is quite closed. 28th, arm free from pain, but the fever continues, and is now distinctly typhoid. After this day the constitutional symptoms rapidly increased, without any material change in the appearance of the arm. The usual remedies were administered, without any benefit, and on the 6th of June, the case terminated fatally. Examination 7th of June.—Puncture in the median basilic vein closed; no other appearance of injury inflicted by the lancet. The wounded vein appeared much enlarged, owing to an unusual thickening and adhering of the surrounding cellular substance. Internally pus was found occupying the mediana longa for about two inches below the origin of the median cephalic and basilic, and a similar appearance was traced through the whole course of the humeral vein to the axilla. There was besides an irregular deposit of lymph which adhered to the lining membrane of the vein. Before passing under the clavicle about an inch, the vein abruptly presented its natural appearance, and there was no sign of disease between that point and the heart. This organ was healthy, except a small circumscribed patch of lymph upon its anterior surface, and a similar deposition upon the opposed surface of the pericardium. A small quantity of fluid was found in the cavity of the latter, and in both sides of the chest.

A second fatal case.

About the same time a similar case occurred at Selsea, another station of the Ophthalmic depot, the particulars of which I am unable to communicate; but this fact is strongly impressed upon my mind, that throughout it bore a

very close resemblance to the one which I have related.

Mr. Broughton of Argyll-street, Surgeon to the St. George's and St. James's Dispensary, has related the particulars of a similar case with great clearness in Mr. Hodgson's work, on the Diseases of Arteries and Veins.

CASE.

Fatal case of inflamed vein from V. S.

"A robust soldier, 36 years of age, was bled in the arm for ophthalmia, which was considerably relieved by the operation. A degree of fever, however, came on, and gradually increased. On the seventeenth day after the bleeding his pulse was one hundred and twenty in a minute, and feeble; his skin was hot; his tongue covered with a brown fur; his respiration difficult; he complained of great prostration of strength, and pain in his head, back, and extremities. The wound in the vein had healed, but the day after the bleeding, great swelling and pain commenced in the arm, and gradually extended upwards. He was bled in the opposite arm, and various medicines were administered. The symptoms continued with very little alteration, until the twenty-third day, when a painful swelling was observed above the clavicle; and in a few days afterwards, another soft diffused swelling was discovered underneath the angle of the lower jaw. The symptoms increased slowly; respiration became more painful and difficult; the pulse was seldom less than 120; he became delirious and died in the course of the seventh week after the bleeding.

The following appearances were observed

upon dissection; the cephalic vein at the part where it had been punctured in the first instance, resembled an artery in the thickness of its coats, and in retaining a circular form when cut across; below the punctured part it was healthy; about an inch above the puncture, its cavity was obliterated, the obliteration extended to the shoulder; the branches which communicated with the cephalic vein at the bend of the arm were healthy; the absorbent glands above the clavicle were enlarged and hardened; the internal jugular vein was much enlarged, thickened, and indurated; the effects of inflammation were apparent throughout its whole course; it had the external appearances of an artery, though larger than any artery, except the aorta; the subclavian, axillary, and brachial veins, to the bend of the arm, exhibited similar appearances. The external jugular and subclavian veins were filled with pus; when slit open, they were found to be much thickened and lined with lymph. Many of the smaller veins were in a similar condition. There was so much inflammation, adhesion, and induration in the upper part of the arm that it was extremely difficult to trace the vessels, and detach them from their connections; the vena cava superior was healthy; the diseased appearances were not gradually lost, but terminated abruptly; the heart was healthy; the lungs contained some small abscesses. A serous fluid with flakes of lymph floating in it, was contained in the cavities of the thorax; the lungs adhered to the pleura costalis, partially on the left side, but more extensively on the

right; the structure of the brain was natural, but more serum than is usual was found in the ventricles; the veins of the pia mater were turgid with blood; the vena magna galeni, and the sinuses were remarkably loaded."

There are few records of the disease which follows venesection, in which the state of the vein is noted, or its disease is suspected, in the works of the older surgeons. Hildanus reports the case of a woman whose arm was affected with gangrene after the formation of an abscess at the wound made in venesection; it spread from the wound to the fingers, and the amputation of the arm which became necessary, was performed with success. He refers the injury to the wound of the biceps tendon, and considers that the vitiated humors of the body were carried to the wound of the vein, which they gradually corroded and inflamed. The basilic vein was examined both in the stump and the part amputated; a fetid pus was copiously discharged from its extremities, so that to the former it was thought necessary, in order to correct the putrefaction, to apply the cautery *.

Abscess and gangrene of arm from inflamed vein after V. S.

I remember about the year 1801, when the operation of tying the saphena major vein was frequently practised for varicose ulcers of the legs, an elderly woman being the subject of this operation, which was performed in Guy's Hospital, a little above, and on the inner side of the knee. Inflammation of the vein followed, and several abscesses formed in the direction of the vessel, below the ligature, on the inner side of the calf of the leg. It was accompanied

Fatal cases of inflamed saphena vein from ligature.

* Fab. Hildani Cent. IV. Obs. 70.

with great constitutional disorder; some of the abscesses ulcerated, others advanced with great difficulty to the surface, and the patient died, worn out by excessive irritation. In a second case, that of a man, who had drunk hard, two ligatures were made upon the vein, and the vessel was divided between them. In three days the man complained of pain in the course of the vein from the place of its division to the groin; an inflammatory blush appeared upon the leg, extending from the knee to the ancle, and on the succeeding day considerable swelling. The pain above the ligature extended to the bottom of the belly, and the thigh became swollen and tender upon pressure; the constitution sympathised with the local disease, and without the formation of abscesses, as in the former case, this man died, as it appeared, from extended inflammation of the vein.

From division.

Mr. Hodgson mentions two cases in which the division of a varicose vein terminated fatally *, the first on the morning of the fourth day, the second on the seventh or eighth. The same author relates a case from the practice of Mr. Freer, of Birmingham, in which the ligature of a varicose vein was followed by pain in the chest, hurried and laborious breathing, and a vomiting of blood four hours after the operation, which symptoms were immediately relieved by the removal of the ligature. The operation was followed by fever and vomiting, and retention of urine, when performed on another varicose vein of the same patient six weeks afterwards, although the ligature was removed

Remarkable symptoms of constitutional irritation excited by the ligature.

* Diseases of Arteries and Veins, pp. 555, 558.

immediately after its application; and again by similar symptoms of constitutional disorder, when repeated upon two other veins, after an interval of nine weeks, the ligatures being cut away immediately after their application. The fever went further on the latter occasion; the patient was attacked with delirium and severe vomiting on the second day; the symptoms continued on the third and fourth day; on the sixth she was slightly delirious, and her respiration much oppressed; she was repeatedly blooded. "In this case," says Mr. H., "the obliteration of the vein was the consequence of the application of a ligature which was immediately removed."

In the 5th volume of the Edinburgh Medical and Surgical Journal, Mr. Oldknow, surgeon of Nottingham, communicates the following important narrative.

CASE.

Fatal case of tied saphena.

"A young man about 23 years of age, of plethoric habit, had been troubled for the last two or three years with painful ulcers about the inner ankle of the right leg, which repeatedly healed, and broke out again, so as to prevent, in a great measure, his attendance to business; he therefore became desirous, on my representation, of having the saphena vein tied, it being varicose to within a hand's-breadth of the knee. The operation was performed in the following manner. An incision three quarters of an inch long, and about one inch and a half above the distension, was made through the skin immediately over the vein, and in the direction

of its course. The cellular substance was then carefully divided, the vein lying deeper than usual, until its upper surface was completely exposed. A probe armed with a double ligature was passed under the vein, taking care to include nothing with it, it being cleanly dissected from the surrounding cellular membrane upwards and downwards as far as the extent of the first incision, and then tied. The portion of the vein between the two ligatures being afterwards cut out, the lips of the wound were brought together by a suture and adhesive plaster, with a view of healing it by the first intention. The patient was then put to bed, and directed to use a cold embrocation. On the second day he took some opening mixture. Third day, the wound was dressed, and appeared wholly united, except where the ligatures came out. The suture was cut out, and a fresh adhesive plaster applied. On this day he complained of pain in the lower part of the limb, that is, from the lowermost ligature, along the vein down the foot; to use his own expression, as if the blood in the vein were endeavouring to overcome the obstruction caused by the ligature. This sensation was however entirely removed by applying a bandage moderately tight from the toes upwards. Fifth day, there appeared a little erythematous blush about the wound. He had a trifling epistaxis, and I thought proper to take from him sixteen ounces of blood, which was not inflamed; the purging mixture was repeated. Sixth day, complained of a little pain on the inner side of the knee in the course of the vein; but there was no external inflam-

mation at that part. The lips of the wound began to separate. In the evening he was suddenly seized with a violent rigor, succeeded by a hot fit and symptoms of great vascular action, and some tendency to delirium. Pulse 130, hard and full, therefore sixteen ounces of blood were taken from the arm; it gave instantaneous relief, and was followed by the sweating stage, which continued several hours, and was succeeded by a state of quietude, soon however interrupted by a recurrence of the same train of violent symptoms, at first about once in twenty-four hours, but gradually increasing in frequency, and diminishing in strength, till nature became exhausted, death closing the scene twenty-two days from the operation.

For the first four or five days after the rigor, the wound discharged pretty freely, and by making strong pressure about the knee, a little matter was forced from it. The inflammation crept gradually up the vein, which was evident from its peculiar cord-like feel, and from giving pain on pressure, until it reached the groin, the inferior part getting well as the superior became bad, so that the wound was nearly healed before death, the ligatures having separated about the fourth day. There was no tumefaction of the cellular membrane, no enlargement of the glands in the groin, no superficial inflammation on the thigh. There was, it is true, a slight redness of the skin when the poultice was removed, (for the thigh along the course of the vein was covered with cold poultice) which entirely vanished on exposure to the air. The

medical treatment was strictly antiphlogistic; the patient was repeatedly bled, and with apparent relief every time, the blood being extremely sizy ever after the first rigor. Two days, however, previous to his death, the vital principle was so exhausted as to need the use of cordials.

This is the result of an operation which I believe is generally considered as a very trifling one, and not endangering the life of the patient; judge then my mortification at this unexpected termination. On inquiry, however, I find another fatal case has occurred in this neighbourhood, differing in its symptoms from the one I have related. Large collections of matter formed in the cellular membrane, along the course of the vein as far as the groin, and the patient died two months after the operation, the fever assuming the form of an intermittent."

A second case fatal.

My friend Dr. Stenson of Bourton, Gloucestershire, obliged me with the following letter in reply to an inquiry which I addressed to him respecting a case of varix, for which he performed the operation of tying the saphena vein.

A third.

" Most happy should I be to communicate any information you might wish relative to the fatal termination of the varix alluded to, but it is now more than twelve years since the operation was done, and at the time I made no notes, and was not permitted to examine the parts after death, consequently can say little satisfactory upon the subject. It was then strongly recommended by a surgeon of the first eminence. All I can now recollect is this, that a woman of about 55, who had an obstinate ulcer of the leg, ap-

parently kept up by a diseased saphena major vein, had it taken up just as it passes on the inner side of the knee. In eight or nine days, violent inflammation took place in the course of the vein, accompanied by symptoms of great irritation throughout the system, so that you would have said, had you seen the disease, " this woman is dying of typhus."

I beg the reader's attention to the two following cases, which occurred lately under my own observation.

CASE.

Fatal case of ligature on a wound of the femoral vein.

John White, aged 28 years, was admitted into Guy's Hospital, Nov. 22d, 1816, for an aneurismal tumor in his left ham. During the operation of tying the femoral artery in the thigh, with two ligatures, on Friday, Nov. 29th, 1816, a hemorrhage took place from a small wound of the femoral vein. The bleeding was at first troublesome, but was presently commanded by a ligature which was applied around the opening, by nipping up its coats.

Dec. 6.—The patient has been doing well since the operation.

9.—Still doing well. In dressing, a small thread came away, supposed from the vein.

10.—There has been a slight hemorrhage from the wound. He complains of tenderness on pressure between the crural arch and the wound in the direction of the femoral artery.

13th.—Lower ligature came away (fifteenth day) the wound looking well, a considerable but healthy discharge. Swelling in the ham, and inner part of the thigh, less and softer.

14.—Complains of head ache, pulse quick and full; bowels open, has not much thirst.

16th. Upper ligature came away yesterday; (seventeenth day) discharge from the wound is less; makes no complaint.

21.—The wound looks well, discharge much increased, had last night a very severe rigor, followed by heat and profuse sweating. A slight rigor this morning; bowels open; appetite good; has no pain.

24.—Patient is up for the first time; feels himself very weak; the wound discharges copiously; granulations have arisen from the bottom of the wound; the swelling in the ham and lower part of the thigh very much diminished; complains of stiffness only in the part; appetite good; no return of rigor.

25.—Patient sat up two or three hours this morning, and felt himself better, but had a rigor at 8 A. M. Evening. Upon removing a poultice which was laid over the slips of plaster, he discovered that the wound had been bleeding. It was supposed he lost about twelve ounces of blood, but the character of the blood could not be ascertained, it being then coagulated. The wound was not disturbed, but an evaporating lotion was applied to the limb.

26.—A return of hemorrhage; had a severe rigor about eight o'clock this morning. Evening. Has had a slight bleeding.

27.—Had a rigor this morning about the same time as yesterday, followed by heat and profuse perspiration; is very thirsty; bowels open; skin hot and dry; pulse very quick.

28. Has had a very bad night; frequent and

severe rigors followed by slight heat, but considerable sweating. Had no return of bleeding, and the parts are kept cool by the wash. Bowels open; he is very thirsty; no appetite; his pulse is remarkably quick. He has frequent rigors this morning, and can with difficulty keep himself warm.

29.—He is very weak; pulse feeble; had a slight bleeding; no shivering.

30.—The shivering returned again last night; the coldness has continued unremittingly, so that he cannot get warm. His pulse is quick and rapid; there is a very material change in his countenance; he has had no more bleeding, and the wash is continued; he does not complain of the limb. The tumor in the lower part of the thigh and in the ham is much diminished, but the leg is œdematous and pits on pressure.

31.—The shivering continued during the greater part of the night; his strength gradually failed, and he died at six o'clock, A. M. He complained yesterday of some difficulty in breathing, but not of any pain in the abdomen upon pressure with the hand.

Examination.

The limb, and especially the leg and foot, were œdematous; the surface of the wound was in a sloughing state, but it was filled at the bottom by granulations; the extremity of the divided artery presented a healthy appearance; the femoral and profunda veins were filled by adhesive matter. When a blow pipe was introduced

into the upper extremity of the femoral vein, the air passed by it through the wound externally. The same was attempted to be done with the femoral artery, but it did not appear to have any communication with the external wound. The vein was next laid open; its internal tunic was covered with adhesive matter, and the sides at the lower part were adhering. It contained nothing like recent blood. All the coats were much thickened, and its capacity was gradually diminished downwards to the wound, where it was completely closed. There was an opening in the coats of the vein about three quarters of an inch above the obliterated part, and this opening communicated with the external wound. Below the obliteration, the wound was in a healthy state, the coats of the vessel were natural, and it contained a clot of blood. The adhesive inflammation had extended from the internal surface of the femoral vein to the iliac, as high as the bifurcation of the cava. The cava was also inflamed, but here the inflammation had not produced lymph or pus. The internal surface of the iliac vein presented the same appearance as the femoral; the corresponding iliac on the opposite side was not affected. The artery was next examined; its internal surface was healthy, the lymph plug extended to some considerable distance above the situation of the ligature, and its extremity was contracted and closed. There was considerable serous effusion in the chest, one of the lobes of the left lung was covered with a recent deposit of lymph, and the parenchymatous substance of the lungs

appeared to have been inflamed. There was also a slight inflammatory blush on the surface of the intestines; the other viscera of the abdomen appeared in a healthy state.

CASE.

Fatal case of inflamed femoral vein from ligature in amputation.

John Crute, aged 30, suffered amputation of his right leg, above the knee, for a scrophulous disease of that joint of long continuance. His health was in no considerable degree affected. During the first two days succeeding the operation he appeared unusually low, often sighed deeply, and spoke but little. On the evening of the third day it became evident that he laboured under more constitutional irritation than is common after amputation, and he was attacked at night with severe bilious vomiting, his bowels being freely open. Early on the following morning, (fourth day) the dresser was called to him, and finding that he had passed a very restless night, and had a hard quick pulse, he drew 20 oz. of blood from his arm, and administered some aperient medicine. His pulse lowered and became softer, and he expressed himself relieved by the bleeding, but the vomiting continued at intervals. At noon the stump was opened; the lips of the wound, which were generally adhering, were separated, and a copious discharge of grumous blood, accompanied with purulent sanies, followed. A fomentation and poultice were applied to the stump: in the evening an exacerbation of the symptoms took place; slight rigors were followed by fever and delirium. On the morning of the 5th day his

pulse was thready and very rapid, his countenance sunken, and he had incessant low muttering; he continued sinking until 3 p. m. on the following day, when he died*.

Examination 20 hours after death. The femoral artery in a healthy state; a firm plug of lymph obstructing the canal, which was contracted, as is usual where a ligature has been applied. On the mouth of the femoral vein was a ligature, which the dresser, in the absence of the surgeon, had applied, for the purpose of restraining an hæmorrhage after the ligature of the artery, apparently proceeding from the vein; he had done this without hesitation, having frequently seen it done with safety, by the surgeon under whom he formerly studied. From the site of the ligature, along the femoral and external iliac veins to the point at which the emulgents enter the latter vessel, the interior tunic was literally coated by large flakes of coagulable lymph†. There were marks of diffused inflammation extending to the right auricle of the heart, but the signs of adhesive inflammation terminated as described. The vein in the right arm, from which Crute had been blooded by a free opening, was examined. The integuments had closed over the wound, and the vessel was uninflamed. Between the mouths of the femoral vein and artery was discovered a small branch, arising immediately

* As it was not my object in detailing these cases to refer to the treatment, I have purposely avoided mentioning it, that I might not uselessly divert the reader's attention from what conveys more information, the disease.

† See plate 10. fig. 1, 3, and 4.

above the ligature of the artery; and this vessel was doubtless that from which the bleeding had proceeded.

Mr. Hunter's observations.

Mr. Hunter says, "I have found in all violent inflammations of the cellular membrane, whether spontaneous or in consequence of accident, as in compound fracture, or of surgical operation, as in the removal of an extremity, the coats of the larger veins *passing through the inflamed part, become also considerably inflamed*, and that their inner surfaces take on the adhesive, suppurative, and ulcerative inflammations; for in such inflammations I have found in many places of the veins, adhesion, in others matter, and in others ulceration."—"I have found them," (these appearances) "in the bodies of those who have died from amputations, compound fractures, and mortifications*."

The origin of this inflammation after bleeding, Mr. H. attributes to the wound not healing by the first intention, and the imperfection of union being continued on to the cavity of the vein; for abscess between the skin and the vein is productive of no mischief, if the vein and parts below have united. The exposure of the cavities of the larger veins in accidents and operations, is often he thinks, the cause of the very extensive inflammations which sometimes attend these cases. He states, that the abscess or the confinement of the matter in the wounded part of the vein, is occasioned by adhesions in the vein, a little above and below the orifice; and in the part where such adhesions do not take place, an abscess is formed, occupying a

* Medical and Chirurg. Transactions, Vol. I. p. 18 and 19.

considerable length of the vein both ways; and often more than one, even a series of abscesses, generally in the direction of the vein between the orifice and the heart, but sometimes between the wound and the extreme parts.

He observed in some parts of veins thus affected, suppuration which had not yet arrived at ulceration, and in several other places ulceration had taken place so as to have destroyed that surface next the skin. He always found in cases where larger abscesses had come on than those formed simply from ulceration of the wound made by the lancet, that the vein was afterwards obliterated; a proof, he observes, that the sides of the vein can unite by the adhesive inflammation.

Mr. Hunter instances this disease in the horse after bleeding as frequently fatal, and seems to attribute it to the method of closing the external wound, when not executed with sufficient attention. He conjectures the fatal issue of the disease to be owing either to the extension of inflammation to the heart, or the passage of a considerable quantity of the matter secreted by the inflamed surface into the circulation.

Sympathetic inflammation of veins.

I entertain no doubt of the facts stated on the writer's observation in this very valuable paper; but when Mr. Hunter says it is so common a case, that he has hardly ever seen an instance of suppuration in any part furnished with large veins, where these appearances are not evident after death, we are forced to conclude that he means to describe a sympathetic inflammation, *i. e.* one which does not arise

out of violence done to the vein, but consentaneous with disease of the surrounding parts; and if so, there is surely too much latitude in the statement. The femoral vein in a psoas abscess, in abscess of the hip, and the subclavian and axillary in an abscess of the shoulder-joint, both of which had destroyed the bones, ligaments, and much of the surrounding muscular parts, shewed no signs of disease. The femoral vein of a man who died of a gangrene on the tenth day after amputation above the knee for an extensive fracture and laceration of the leg; of another who died of a mortified bubo, in whom the femoral vessels had been denuded for weeks preceding his death, presented no trace of inflammation. It is very probable, however, that the fact should escape observation, which was not particularly directed to it, as Mr. Hunter's was when this paper was written.

Morbid secretions of veins by contiguous sympathy.

A new and very interesting fact which gives much countenance to the opinion, that the cavities of veins are subject to inflame by sympathy with contiguous parts, is demonstrated by preparations in the collection of Mr. Langstaff of Basinghall Street, a gentleman, who to the active duties of his profession unites an uncommon degree of zeal and industry in the pursuit of morbid anatomy. It appears that the veins in the vicinity of parts destroyed by the phagedena of the malignant fungus, and diseases of this class, are filled by a soft pulpy matter, resembling in texture the destructive growth.

Inflammation by extension or continuity.

That inflammation may extend to these vessels from other inflamed parts, is shewn by a communication to the work above cited by Mr. Wilson,

of Windmill Street, who describes a very interesting case of inflammation, apparently originating in the uterine veins after recent delivery*. The inflammation extended to the iliac veins and their communications, and throughout the vena cava inferior, as far as to the entrance of the venæ cavæ hepaticæ. The coats of these veins were much thickened, and their canals plugged by coagula. From the emulgent veins downward, the cava was filled by lymph adhering to its sides. An abscess containing four ounces of well formed pus was discovered between the emulgent and hepatic veins. Immediately below the entrance of the latter, the tube of the cava was obliterated, partly by a puckering or contraction, and in part by a deposition of lymph. Mr. Wilson observed similar appearances of inflammation commencing in the veins of the uterus, and extending to the cava, in the bodies of two other women who died a few days after parturition; and Dr. Clarke mentions that he had found pus in the uterine veins in cases of puerperal inflammation †.

Inflamed jugular veins of horses.

In the horse the disease, though common, is very rarely fatal. This point I ascertained by inquiry of persons who have very extensive opportunities of treating the diseases of these animals. And the insusceptibility of adhesive inflammation, which belongs to the integument of the horse, is thought satisfactorily to explain its origin. My esteemed friend, Professor Coleman, of the Veterinary College, favoured me

* Med. and Chir. Trans. Vol. III. p. 65.

† Practical Essays on the Management of Pregnancy, pages 63, 72.

with the following note, in answer to my inquiry as to the correctness of Mr. Hunter's statement.

Mr. Coleman's observations.

"Inflammation of the vein after bleeding is much more frequent in horses than in the human subject; but Mr. Hunter was not correct in stating that an abscess is always formed at the wound. The most curious circumstance respecting this disease in horses Mr. Hunter has overlooked. In the human subject I believe the inflammation very generally, if not always, extends along the vein following the course of the circulation. In horses I have never seen a case where the inflammation extended to the chest, or many, even one inch below the orifice; neither do I recollect any fatal case from this disease. The inflammation extends contrary to the course of circulation towards the head. The cavity of the vein is often filled with lymph; and when this takes place an abscess forms, and the vein above is lost. I have no doubt that inflammation of the wound sometimes takes place in consequence of the mode used to stop the bleeding; but I should observe, that the most simple wound through the common integuments of horses is scarcely ever healed by the first intention; and it is this disposition to suppurate and to resist adhesive union, that is probably the most frequent cause of the external wound after bleeding not uniting by the first intention in horses, the same as in the human subject."

Mr. Sewell's observations.

In a conversation with Mr. Sewell, Assistant Professor of the Veterinary College, he stated to me his opinion that the abscesses described by Hunter must be farcy abscesses, a disease

peculiar to the lymphatic system of the horse species, for the inflamed jugular vein seldom forms abscess, much less a string of abscesses. He has occasionally seen abscess form at the parotid gland after inflammation of the vein, and this event is considered critical of the inflammation, and therefore favourable. Sometimes a horse, by rubbing his neck after bleeding, or being soon after put to work with too small a collar, or from sudden exertion, as in coughing, opens the vein afresh, and brings on a dangerous bleeding, so that he requires to be watched night and day. In order to bleed a second time on the same day, some practitioners inconsiderately give the vein a blow above the wound to rupture the adhesion; and the vein thus burst open is apt to suppurate.

Ulceration of a vein after bleeding, and its consequences.

I was shewn at the Veterinary College the vein of a horse, which had been sent in for cure, the vessel having inflamed and ulcerated after bleeding at the place of the wound. The continuity of the vessel was destroyed by ulceration to the extent of an inch or more; its sides below the breach enormously thickened, and its cavity filled by masses of coagulable lymph above, so as to have lost all appearance of a tube. It was filled with a compact and extended clot of blood towards the heart. Upon dissection both lymph and pus were traced in the course of the vein into the sinuses of the brain, and the membranes of the brain were much inflamed. Where a vein is disposed to bleed afresh, owing to an ulceration of its coats, the most approved practice is to introduce the actual cautery superficially within its cavity, to produce eschar and the process of granulation.

Obliteration of horses veins after v. s.

While prosecuting this inquiry, I met with cases in which the jugular vein had been obliterated by inflammation after bleeding, a case with which farriers are familiar; I was told of one

Slough.

in which a considerable portion of the vein had sloughed, the inflammation and abscess having extended in that case some way downward, toward the heart. I saw a third, in which the actual

Ulceration of the wound.

cautery was introduced near an inch within the vein, in consequence of repeated alarming bleedings from ulceration of the orifice; and at a slaughter-house I examined the vein of a horse which had died from hæmorrhage, in consequence of ulceration of the vein at the orifice. I obtained the following short history of this

History of a fatal case.

case. The farrier, dissatisfied with the bleeding from the first wound, again struck the vein with the phlegm, and made so large a wound that an hæmorrhage followed, which was with great difficulty suppressed. On the third day the animal was put to work, when the vein bled afresh to a very considerable amount. The cautery was then had recourse to, but the animal continued to bleed at intervals, and was soon exhausted. I have represented the ulcerated orifice of the vein in *fig.* 2. *plate* 10. Masses of coagulated blood were found in the vein above the wound, which was so extensive as nearly to dissever the vessel, but no appearance of an adhesive process presented itself in the upper portion of the vein. Next the heart the vein was lined by a rough coat of lymph, and at two inches distance from the orifice was obliterated by a contraction and interstitial thickening of its coats, so that it

presented a round solid cord of little more than the size of the artery, and of a cartilaginous hardness. The pericardium and pleura of this animal were inflamed, although the vein was sound between the point of obliteration and the chest.

Obliteration of veins.

Veins have been found obliterated and converted into ligament-like cords, in dissections of dead bodies, when no sign of a contiguous morbid action presented itself* ; and not unfrequently their canals have been interrupted and their coats removed by the pressure of adjacent tumors obstructing the circulation†. It is of course impossible to ascertain whether inflammation had taken place upon the *interior* of the vein in these cases.

Obliteration and ulceration of a vein communicating with an abscess.

I have lately seen an instance of obliterated internal jugular vein, by the pressure of a tumor situated deeply on the right side of the trachea and covering the great vessels. The patient, who was attended and examined after death by Mr. Kingdon, Surgeon, of Finsbury Place, had of late discharged pus and blood, both by the mouth and by the rectum.

The tumor was found upon dissection to contain dead cellular substance, and a quantity of blood in a state of putrefaction. The internal jugular vein was filled for some space by a coagulum of blood, but an ulcerated orifice of communication with the cyst of the tumor appeared

* Haller, Opusc. Pathol. Obs. xx. Morgagni, Lett. 56. Art. 10; Bartolin. Obs. Anat. Cent. 11. Hist. 35 ; Baillie Med. and Chir. Trans. Vol. I. p. 127.

† Scarpa on Aneurism, by Wishart, p. 20, note; Lardner, Edin. Med. and Surg. Journ. Vol. VII. p. 407 ; Young in Hodgson, p. 533.

above the coagulum, so that the blood returning from the head passed in part into the cyst; there was also an ulcerated aperture of communication between the cyst and the œsophagus, and thus the contents of the tumor were from time to time passing into the alimentary canal. The artery and par vagum were sound, but the former was curiously defended by a covering of lymph.

It would appear therefore that an artery not only remains pervious under a degree of compression which causes the obliteration of a vein, but that the coats of the latter are destroyed by an irritation, which has only the effect of additionally supporting and strengthening those of an artery.

Artificial pressure.

Veins in a state of varicose enlargement, have sometimes been obliterated by inflammation, the result of pressure artificially applied. I some years ago succeeded in obliterating a varicose cyst of the saphena, behind the inner condyle of the knee, in a labourer in the India Company's service, by means of adhesive plaster, applied in strips around the limb, with as much strictness as could be borne. The vein took on inflammation, and the cyst became a perfectly solid tumor, which afterwards shrunk, and was permanently obliterated. The inflammation was severely painful, accompanied by extreme tension of the part, and with considerable fever. By continued rest in the semi-flexed position of the limb, leeches and fomentations frequently applied, and an active antiphlogistic treatment, the man was in a few weeks enabled, with the support of a roller, to resume his employment.

I have seen a case in which this change took

place spontaneously, and was accompanied by like symptoms and consequences. The saphena, spermatic, and epigastric veins were affected, greatly distended and tortuous. Some years after the cure of the disease in the thigh, the spermatic vein underwent a spontaneous consolidation. It acquired excessive bulk, weight, and firmness, still retaining its natural tortuosity, so that it presented a very unique description of tumor. The epigastric varix remains. This is an inflammation induced by distension of the vessel I conceive, from arrest of the circulation. Mr. Hodgson is, I believe, the first who has publicly noticed this interesting fact. The reader will find two well marked cases of spontaneous obliteration by the extent of the coagulum, accompanied by symptoms of inflammation, in his valuable treatise.

Spontaneous obliteration.

"Sometimes," he observes, "the coagulum accumulates to such an extent as completely to obliterate the canal of the dilated vessel. I have seen four cases in which this event terminated in the spontaneous cure of varices. In these instances it is probable that the coagulum accumulated till it completely filled the varix, or the upper portion of the vein communicating with it; the blood being unable to pass forwards, coagulated in the vessel to a considerable extent; this coagulum was gradually absorbed; as its absorption advanced, the coats of the veins contracted; the vessel was ultimately obliterated, and the blood was conveyed through collateral channels*."

Mr. Hodgson's observation.

* On Diseases of Arteries and Veins, p. 542. 544.

It has been shewn—

Causes of inflammation.

That the inflammation of the interior tunic of a vein sometimes follows a puncture, sometimes a division, a ligature encircling the tube, or including only a part of it; or arises spontaneously from an inflamed surface, of which the vein forms a part.

Causes of obliteration.

That the obliteration of the canal is sometimes produced by the pressure of tumors, or by pressure artificially applied, or by distension from the extent of a coagulum of blood; and that the obliteration is occasionally met with in the dead subject, where the collateral circulation appears to have been long established, unaccompanied by any circumstances which explain the cause. I shall next inquire the essential points of distinction between this and the other order of blood-vessels, so far as regards their texture and properties.

Differences in texture and properties of arteries and veins.

1. The external fibrous coat of veins is thinner and looser in texture than that of arteries; it is abundantly supplied with blood-vessels, and is so closely interwoven and condensed with the inner coat as to make them in a degree inseparable. Bichat, who particularly notices this fact, remarks, that it is a character distinguishing the venous from the arterial texture*. The middle and internal coats of arteries on the contrary preserve a distinct character, and though closely adhering, do not appear in any degree to intermix.

* Anatomie Generale par Xavier Bichat. Tom. II. p. 411.

2. Veins have a slight appearance of fibres passing in the direction of their axes upon the larger trunks. Arteries have a denser and more distinct layer of fibres, passing in the contrary direction. Until of late these fibres have been regarded as muscular; but recent observations render the accuracy of this opinion doubtful.

3. The inner coat of veins which lines the auricles of the heart, and according to Bichat, the sinuses of the dura mater, although denser than that of arteries, is more flexile. It exhibits the terminations of the vasa vasorum more abundantly after fine injections than the inner membrane of arteries. It does not, however, in the natural state exhibit any appearance of blood-vessels, nor have absorbents or nerves been seen upon its surface.

4. The coats of veins, taken collectively, are remarkable for their tenuity, compared with those of arteries; hence their collapse when empty, which is improperly referred to inelasticity. They are also weaker *, but greatly more extensile, especially in the transverse direction; for they will bear a dilatation many times exceeding that of arteries, although they more frequently rupture†.

5. They are less elastic than arteries; but

* This is now the generally received opinion in opposition to the inferences of Wintringham.

† Haller Elem. Physiol. Lib. II. p. 128, 9. Lib. VI. p. 351. Soemmering de corp. hum. fab. Tom. V. p. 327.

the stagnation of the blood in varix, a disease originally depending upon a loss of this property; their contraction upon a small quantity of blood, so as to empty themselves by a wound where the circulation is obstructed; the opposite states of their canals under opposite extremes of temperature, and other phenomena prove that they possess elasticity in no inconsiderable degree.

6. The trunks of veins are excited to contract by the application of concentrated acids and other chemical stimuli. Their contraction, thus excited, is said by Soemmering to be stronger than that of arteries*. They are not excited by mechanical stimuli, and are considered by Haller and others as devoid of the principle of irritability†.

7. Absorbents relatively to veins are of greater strength; they resemble the latter in possessing elasticity, and in being furnished with valves.

I do not know that this comparative view, which might be much extended, especially if it were attempted to reconcile the discordant results of anatomical research, throws much light upon the inquiry in hand; but it is to my purpose, as it shews some prominent features of distinction in the organization and properties of the different systems.

* Loco citato, p. 328.

† Sec. Mem. sur les part. sensibles et irritables, and Elem. Phys. Lib. II. p. 126. and Lib. VI. p. 125.

A difference not less marked will appear upon considering the relative pathology of these vessels, as might indeed naturally be expected. Differences in pathology.

1. The coats of arteries are subject to ossific inflammation and deposition to an unlimited extent. Those of veins are very rarely the seat of this, and never, so far as I have observed, continuously, as we see in arteries.

2. In their disposition to inflame, as well as in other particulars, veins resemble absorbents; but the cases of inflamed vein bear no comparison in point of frequency to those of inflamed absorbents. It has been observed, that a wound of the same extent, and inflicted with the same instrument as that made in blood-letting, does not cause the extensive inflammation which we occasionally see it produce in veins, in any other texture of the body. This, however, if we consider the frequency of venesection and the rarity of these cases, can scarcely be admitted. The cellular membrane, the fascia, and especially the absorbents, inflame at least as frequently as the veins, and not less extensively from slight injuries, for example, from venesection, and from small wounds of the extremities.

3. The most material fact, however it may be explained, is this: the inner or lining membrane of veins is subject to diffused or continuous inflammation; that of arteries very rarely, if ever. I am aware that a preternatural redness of the interior surface is sometimes observed to run through the course of an artery.

4. The inner membranes of arteries and veins are susceptible of the adhesive inflammation. That of the former is defined, whether excited by pressure or by wound, or occurring spontaneously. I never saw the internal coat of an artery furred with lymph; and even where lymph is deposited in quantity sufficient to obstruct the current of blood, the deposit occupies a narrowly defined space, and the inflammation, by whatever cause excited, or however acute, is similarly circumscribed. In veins, on the contrary, the inflammation extends from the point of irritation towards the heart, or from branch to trunk. The lymph coats the vein like a fringe; and though the quantity effused is sometimes sufficient to obstruct the tube, the inflammation is often not bounded by the obstruction.

5. The inner coat of veins is susceptible of the suppurative inflammation, and the inflammation is often mixed, presenting both terminations alternately, *viz.* in lymph and pus. That of arteries is I believe incapable of suppuration, unless in a state of ulceration.

6. Veins are more disposed to ulcerative inflammation than arteries. I know not whether the interior tunics of either are capable of granulating, nor am I able to say whether there exists a difference in their power of resistance to gangrene.

7. The contrasted character of the inflammation of arteries and veins above-mentioned, explains the active constitutional sympathy pecu-

liar to the latter. This corresponds with our observation of the difference in this respect presented by the bounded and the undefined inflammation of joints, the peritoneal or the pleural cavities, and the other shut sacs of the body.

8. The constitutional symptoms excited by inflamed veins resemble in type those of diffused inflammations in other organs. They are similar to those of inflamed absorbents, which vessels also resemble the veins in their disposition to continuous inflammation.

Bichat's remarks on the disposition of veins to inflame.

Bichat has a remarkable passage on the disposition of the venous texture to inflammation, which I translate literally, as follows:—"The tissue of these vessels frequently inflames. Bell relates examples of its following external injuries. The inflammation of hemorrhoids is a circumstance commonly known. The cicatrization of wounds of veins after bleeding is a result of inflammation. The process of cicatrization in veins is doubtless assisted by the absence of the impulse, to which the arteries are subjected; but certainly the latter, under the same circumstances, would not heal so quickly, if at all. When an artery is tied, its walls brought into contact, inflamed, and often torn by the ligature, must adhere before the cure can be completed, and the ligature come away without danger. Now nothing is *slower and more difficult* of occurrence than their adhesion, on account of the *indisposition* of the arterial tissue to inflammation. To this may be attributed the hemor-

rhages which so frequently follow the operation for aneurism, and others; the bleeding often recurs, even after the expiration of twenty, thirty, or forty days. The surgeon ought to be very much on his guard after tying any of the larger trunks, on account of this great *indisposition of the arterial tissue to inflame*. Even when the artery is obliterated, it is frequently not by inflammation. Whilst the ligature arrests the blood, that portion of the artery that is comprehended between it and the collateral branches, *closes gradually, by means of the contractility of its tissue*, and forms a kind of ligament which obstructs the blood, after the thread comes away. I am not sure that these cases are not more numerous than those of inflammation. Now the veins *always adhere very soon after being tied, and their wounds cicatrise immediately*. It is almost always useless to tie them in large wounds, in the first instance, on account of the valves; and afterwards, because *the cut ends contract, quickly inflame, and adhere*. A venous hemorrhage takes place *immediately*, and not after so long an interval as in arteries. All this then proves that the vital energy is much more marked in the venous than in the arterial system, as regards their tonic powers. The want of cellular tissue in the latter, and its presence in the former, may have some influence upon this phenomenon *."

Mr. Hodgson's opinions.

The most deservedly esteemed of modern

* Anat. gener. tom. II. p. 423. & seq.

writers on this subject, says, "Inflammation frequently produces thickening of the coats of the veins, as well as adhesion of their sides and obliteration of their cavities;" and again, "A frequent cause of the obliteration of the cavity of a vein is the adhesion of its sides, in consequence of inflammation of its lining membrane."—"By placing the opposite sides of the cavity in contact, by means of compresses and bandages, the adhesion of the opposite sides of the dilated vessel is effected, and its cavity is consequently obliterated."—"When a vein is tied with a thin ligature, the internal surface of the vessel is lacerated, inflammation takes place, and, if the opposite sides of the tube be retained in contact by compression, their adhesion is speedily accomplished*." I have transcribed these opinions, considering them to be those received by the profession, and shall refer to them, after stating the results of my own inquiry.

The healing of Wounds of Veins.

When a vein is wounded longitudinally or obliquely, there is no separation of the edges of the incision, so that only a little if any blood trickles from the aperture, unless pressure be made nearer to the heart, to obstruct the passage of the blood in the vessel. If therefore

Linear cicatrix if no blood escapes.

* Hodgson on Diseases of Arteries and Veins, pp. 519, 525, 547, and 555.

an animal be killed immediately after a wound of the vein, from which no blood has been drawn, the lips of the wound will be found in contact, and if permitted to live for a short time, the cicatrix will form a line.

Coagulum in wound after bleeding.

If a vein is opened by a transverse section, it bleeds without the addition of pressure; and if the vein is half divided, the hemorrhage is with much difficulty suppressed; the blood escaping into the cellular sheath of the vein and of the contiguous muscles in the direction of the current, and forming a distinct coagulum between the orifice and the external wound. The longitudinal or oblique wound, by which blood has issued in quantity, presents the same appearances; an oval naked coagulum forms the plug of the orifice, and a flattened covered clot, which is an extravasation into the cellular sheath, extends to some distance around it.

Twenty-four hours.

At the end of twenty-four hours the lips of the wound are found separated, forming an oval proportioned to the length of the incision, the edges everted and adhering to those of the clot; the eversion seeming to be the effect of distension from the extravasation into the sheath: there is no blush upon the edges, nor any appearance of organisable or secreted lymph in the vein or the wound.

Three days.

At three days the same appearances are observed, but the internal margin of the wound is somewhat elevated and rounded, and a thin and narrow membranous expansion is perceived to be continuous with the everted edge of the internal

tunic. The clot itself is more compact; and upon section presents concentric lamellæ, the interior being of a lighter colour than the exterior layers.

Five days. On the fifth day these appearances are more confirmed: the membraneous appearance extends over the surface of the clot, if the wound is not exceeding a quarter of an inch in length; and in larger wounds the coagulum, which is reduced in size, has a membraneous surface.

Eight days. On the eighth day the new membrane is complete, the interior margin of the wound is raised and tumid, and the coagulum of a common bleeding wound is nearly absorbed. From

Sixteen days. the twelfth to the sixteenth day, numerous vasa vasorum may be seen by the aid of a glass, passing from the internal tunic over the new-formed membrane and anastomosing upon it. At the latter period the edges are less raised, so as to be more upon a level with the new membrane, and have a slight red blush. The coagulum is entirely absorbed.

Twenty days. On the twentieth day it is only possible to distinguish the recent from former wounds, by the tenuity, smoothness, and transparency of the new membrane compared with the old, which is dense, tough, and wrinkled.

This description applies to wounds of the size usually made in bleeding; the process is of course longer in completion, though not otherwise different in those which are more extensive. The coagulum, which forms the plug, is exactly proportioned to the size of the wound. The site and extent of the wound are ever after-

wards marked by the membrane which occupies it, which is thinner, more transparent, and more extensile than the proper paries of the vein. It forms, when the vein is filled, a pouch or bag; and the jugular veins of horses present many of these contiguous to each other. *— Farriers avoid bleeding in these pouches, because they find it difficult to staunch the blood. I at first supposed that this was a condensed cellular membrane, formed by the sheath of the vein; but I am satisfied that it is continuous with the everted edges of the internal tunic, and organized by its vessels. If it were consistent with what we know of reproduction, I should be disposed to conclude that the new membrane was formed out of the coagulum of blood, although I found that the coagulum could with care be detached from the membrane, which was continuous with the everted edge of the interior tunic. The new membrane is however evidently denser than the valves in structure, which are said to be prolongations or even duplicatures of the proper tunic.

New membrane forms a pouch.

Is continuous with inner tunic.

Process of healing in arteries.

Let us compare for a moment this account of the process of healing in veins with that which prevails in arteries, as related by that accurate observer, Jones. An artery bleeds, it is well known, upon receiving a wound, in whatever direction, by the impulse of the heart's action. From the difference of structure and circulation between the arteries and veins, a certain difference of course results as regards the approximation of

* See Plate 11. Fig. 6.

the edges, and the relation of the wounds of the vessels and their cellular coverings. "The longitudinal produces the slightest possible separation. The oblique occasions a separation proportioned to its extent; and the transverse, however small, seems to produce a circular aperture in the parietes of the artery." By distension of the sheath of an artery with the blood which escapes from it on receiving a wound, the relative position of the wounds in the sheath and the vessel is altered, so that "a layer of blood is confined by the sheath over the wound in the artery, and by coagulating there, prevents any further effusion of blood." But "its permanent suppression is effected by a process of reparation or of obliteration which takes place in the wounded artery." An artery, "if wounded only to a moderate extent, is capable of reuniting and of healing so completely, that after a certain time the cicatrization cannot be discovered either on its internal or external surface; and even oblique and transverse wounds, when they do not open the artery to a greater extent than one fourth of its circumference, are also filled up and healed by an effusion of coagulating lymph from their inflamed lips, so as to occasion but little or no obstruction to the canal of the artery." "When the wound is very large, such a quantity of coagulating lymph is poured out, that the canal of the vessel at the wounded part is *more or less filled up by it.*"

A marked difference then may be observed in

the direct and indirect consequences of wounds, inflicted upon these distinct orders of blood-vessels.

The longitudinal wound of an artery, from which blood has just escaped in quantity, is found with "its edges in perfect contact." A crescentic wound is in twenty-four hours united by an intervening portion of lymph, which "not only adheres to its edges, but seems to have been effused from them."

In forty hours a transverse wound of one third of the cylinder is "distinctly seen plugged up with lymph, which adheres all round to its edges, and projects a little within the canal of the vessel." In a more extensive transverse wound of the jugular vein, examined at seventy hours, I found no appearance whatever, but a plug of coagulated blood filling the wound, but not projecting within the canal of the vein.

At five days—"within the canal of the artery there was a very considerable and extensive effusion of lymph." At eight days—"on each side of the wounded part, and to some extent above and below, there was a very considerable effusion of lymph which adhered to its edges." At nine days—"the wound was seen to be completely cicatrized;" and the same abundant effusion of lymph was observed in the vicinity of arterial wounds, from which, owing to their extent and direction, the hæmorrhage had within a few days proved fatal. *

* Jones on Hemorrhage, chap. II. sec. 2.

Absence of inflammation.

The wound from which blood is not permitted to escape heals by what is called the first intention; the retarded healing and the formation of the membranous pouch are therefore incidental consequences of the separation by the clot, and by effusion into the sheath, of the edges of the wound. But neither mode of healing is attended by any such appearances as those described in wounds of arteries, nor indeed by any visible signs of inflammation, if we except the intumescence of the lips, within the vessel. I have never even observed a blush upon the edges of the wound until the membrane already formed was becoming vascular; much less any effusion of lymph in its vicinity.

The effects of Ligatures upon Veins.

Appearances of ligature at twenty-four hours, three days, five days.

A ligature does not divide the internal tunic of a vein either in man or animals. It draws this tunic into longitudinal folds, and leaves a visible line of indentation which looks at first like discontinuity; but this impression is corrected by closer examination. It appears as if the outer or cellular coat only was divided. On examining the jugular vein of a horse at twenty-four hours, three days, and five days, I could see no difference in the appearances. The vein above and below is thrown into longitudinal folds on either side of the ligature. The portion next the heart is perfectly empty and collapsed; that next the

extremity is filled to distension by a long and generally firm coagulum of blood, which is a mould of the vessel, and bears the impression of its semilunar valves*. The coagulum extends for several inches; it is not always compact and lamellated, and adhering to the interior tunic, being sometimes less consistent and broken; but it always fills the cylinder of the vein. There is no blush upon the inner tunic, much less any sign of adhesive inflammation, or thickening of the proper coats of the vein, or agglutination of the contiguous folds; these folds being effaced on the removal of the ligature; but the cellular sheath of the vein is thickened by a deposit of lymph in the vicinity of the ligature. The application of three ligatures half an inch asunder presents no difference*. The division of the vessel between two ligatures, allows of the retraction of the divided ends to the extent of an inch, but creates no diversity in the appearances described*. At seven days the effusion of lymph into the cellular sheath around the ligature is increased so as to encompass it, forming a sort of canal for the ligature distinct from the wound; and at nine days the ulceration of the coats of the vein has begun, which goes on progressively till its separation is accomplished *. This occupies a period of from fifteen to twenty-five days.—In a young and healthy horse, the ligature was not liberated till the twenty-fifth day. The ulcerated ends of the vein formed a crescentic sweep, and were separated to the extent

Three ligatures.

Division between two.

Seven days.

Nine days.

Separation at twenty-five days.

* See Plate 12.

of an inch, and fastened by adhesion to the cellular sheath, which was much extended and thickened by a subjacent deposition of lymph, so as to form a smooth solid bed between the divided ends of the vein. The internal membrane of the superior portion of the vein had a thin ragged edge where it had been severed by ulceration. The lower edge was smooth and blended in with the bed of the wound. The extremities had undergone no contraction but that produced by the adhesion of the severed extremity to the sheath. The portion of the vein next the heart was empty. The upper was filled by a dark lamellated coagulum of blood, adhering very strictly to the internal tunic which was discoloured by it. On carefully separating the outer lamellæ which coated the interior of the vein, I could not discover any thickening of the proper coats of the vein, nor any appearance of inflammatory action within its canal, nor was any such appearance indicated in the lower portion of the vein*.

Ligature upon an artery.

The effect of a ligature upon an artery is so well known, from the attention of late years directed to the subject, that it cannot be necessary to dwell upon it for the purpose of shewing the contrast which it offers to the process just described.

The internal tunic of an artery is divided by a round ligature, such as I employed in these experiments. The contraction of the tube at the place of the ligature is rendered permanent by a deposition of lymph between its coats.

* See Plate 13.

This inflammatory exudation in a few hours projects from within the fissure made by the ligature, and is increased until it forms a close bond of union between the opposed sides of the vessel. The ligature which is liberated in ten, fifteen, or twenty days, leaves the contracted ends at a small distance apart, adhering to the sheath, and of a conical form; the tube being at either end completely sealed up by a distinct coagulum of lymph tapering from the mouth; and a coagulum of blood is usually present within the vessel.

Only external changes similar.

The thickening of the sheath by an external deposition, and the condensation of the severed extremities with the sheath of the vessels, is the only point of resemblance in the processes: and this may be regarded as the effect of the foreign body, and wholly independent of the changes which the vessels undergo. Compression, which is only a broader ligature, would, I have reason to believe, produce no variation of the appearances, if applied to a vein. Upon an artery it is well known it has the effect of a ligature, operating only with more slowness.

Human bleeding veins.

These experiments, it is necessary to state, were made upon the jugular vein of the horse. The human bleeding veins are too small to exhibit so satisfactorily the process of healing. I have examined several after death, at early and remote periods, and find in those recently wounded a small coagulum in the wound, and more or less ecchymosis in the cellular substance opposite the wound, which in the case of thrombus is a considerable extravasation. The cica-

trices are more transparent than the rest of the cylinder, and may be detected, however ancient, by holding the open vein to the light; where the wound has been large, the cicatrix has a distinctly elliptic figure, but in general it is little more than a line. I have never seen the cicatrix assume that pouch-like appearance which I have described as uniform after the effusion of blood, in the veins of the horse. There is no unusual adhesion of the cellular substance and the vein, and consequently no stricter connection exists between the cicatrices of the integument and the vein than elsewhere. I have had no opportunity of examining the appearances produced upon a human vein, where it has been divided by the operation of the ligature.

Inferences opposed to those of Bichat.

From these accounts it appears that the internal coat of a vein, instead of being so strongly disposed to adhesive inflammation, as Bichat supposed, is on the contrary, when compared with that of an artery, difficultly susceptible of such inflammation. Indeed, the processes of healing and of division by ulceration, seem to be conducted without any manifest sign of inflammatory action on the interior tunic.

I confess, that although these results were unlike those which I had anticipated, the parallel which I have quoted from Bichat of the healing powers of arteries and veins, is so much at variance with our better information of the arterial pathology (thanks to our late industrious experimenter, Jones); and as regards the veins, is so palpably conjectural, that I did not feel much confidence in his exposition. The state-

ment might be reversed with a nearer approach to truth. Arteries are quickly and strongly disposed to adhesion, and the hæmorrhages which follow the ligature, after a lapse of time, depend either upon a diseased state of the artery which prevents its inflammation and the secretion of lymph, or upon the destruction by ulceration or sloughing of an adhesion which had taken place. It is from the latter of these causes that the blood flows at the expiration of thirty or forty days; for if there be no adhesion, it flows much earlier. The contractility of tissue would be a very frail security could it be exerted in the degree supposed; but to expect that this could occur during the residence of the ligature, and to an extent sufficient for security, while the vessel is occupied by a coagulum of blood, indicates a very deficient information of the after changes, as well as of the direct effect of the ligature upon an artery.

The veins do not adhere after being tied; nor do their wounds under ordinary circumstances cicatrize immediately, nor do the cut ends contract and inflame. Further, venous hæmorrhages are peculiarly apt to recur, where the large vessels have been wounded; and this at intervals of many days from the wound*. How the cellular membrane in the venous tissue favours the doctrine which Bichat inculcates, he does not explain; but to me it appears that this fact, which he seems to have appreciated, has an obvious bearing upon the case when correctly stated.

* Crute's case, p. 226.

The indisposition of the venous membrane to inflame is not, as appears to me, inconsistent with its obvious tendency under adequate excitement to inordinate and excessive inflammation. It is not unusual to find the morbid actions of parts that are difficultly roused least controulable, when once set up. The mixed terminations of the inflammation of the venous membrane in the adhesive, suppurative and ulcerative states, and its disposition to spread by continuity, are characteristic of inflammation in the cellular membrane, as seen in the erysipelas and other affections, and are therefore probably to be referred to the predominance of this texture in its composition.

Indisposition not incompatible with excessive action.

Mixed terminations referred to texture.

It appears difficult to account for the origin of this inflammation; if we refer it to the operation of any peculiar and purely local cause, how are we to reconcile the infrequency of its occurrence, after an operation so constantly and so carelessly practised as that of blood-letting? not to speak of other operations and accidents by which these parts are wounded, lacerated, contused, compressed, ulcerated, &c. Besides we have seen that it occasionally follows various and dissimilar modes of local irritation. The apparent inadequacy of the local injury as a cause, the rapid and violent character of the inflammation, and the high constitutional disorder which is manifested, would on the other hand rather induce us to ascribe it to a peculiar state of the constitution; and that subsequent venesections, performed upon these patients, have been unattended by similar local effects, can-

Origin, local or constitutional?

not be admitted as an objection. Yet allowing the rarity of the case and the frequency of the operation, it will be found in nine instances out of ten to ensue upon a local injury, however simple. Exposure of the cavity of the vein is a circumstance often not accompanying the injuries by which the inflammation is induced, and continually occurring without any ill consequence. Non-adhesion and festering of the wound in the integument is an effect of suppuration beneath it, as frequently I should think as a cause. The subcutaneous abscess, as is observed by Mr. Hunter, is of no moment *if the vein and parts below have united;* in the human subject, abscess at the wound and diffused inflammation of the subcutaneous cellular texture, the lymphatics and their glands, and even the fascia, producing œdematous swelling and tension of the entire limb, are certainly more frequent than the inflammation of the vein as a consequence of venesection, where the wound has been improperly treated or neglected, and the patient suffered to use his arm without restriction. It appears from the experiments related that the wound of a vein after blood-letting does not take on direct adhesion, but that the last effused blood forms a plug or stopper in the wound; that the agglutination is complete between the clot and the edges of the orifice which it occupies, and that the clot serves as a bed for the production of the new membrane. If from any cause suppuration occurs, the clot will be loosened and displaced, and the action which commonly ensues where the adhesive is defeated

Exposure of cavity.

Non-adhesion of integumental wound.

Deductions from the experiments, to explain inflammation after v. s.

or disturbed, *viz.* the ulcerative, will be set up on the margin of the orifice. In most of the cases examined, the wound has been found enlarged by ulceration, and converted into one of a circular figure, as delineated in fig. 2, plate 10, or the tube has been deficient from the extent of ulceration at the part where the wound had been inflicted. The tendency of the wound to ulcerate after the application of a ligature, is shewn in White's case; and in all these cases the inflammatory action takes place, as Mr. Hunter, whom nothing escaped, likewise observed, between the wounded or tied part and the heart: the obliteration where that has been effected, or the attempt at it, is likewise found on the side of the heart*. The ulcerative inflammation upon the edges of the wound destroys the process by which the reparation is effected, and which by the eversion of the edges and the presence of the clot is rendered in a degree extraneous to the canal; and it is therefore a cause of irritation abundantly sufficient for the excitement of continuous inflammation, to which we see that this membrane is so remarkably disposed. Thus "the imperfection of union is continued on to the cavity of the vein," and if the presence of a thrombus in excess, the breaking of the agglutination and the necessary displacement of the clot by secondary bleedings, casual or designed, the immediate and unguarded exercise of the limb, the friction of

Obliteration generally next the heart.

* This was the case in the horse's vein, described at page 234. It constitutes an exception to the results of Professor Coleman's observation.

the wound in the skin, or the application of adhesive plasters, which fret and inflame it, are either or any of them adequate causes of the suppurative inflammation in the vicinity of the wound; they are, I imagine, beginners of the mischief, though it may often be prevented from reaching the interior of the vein. I think however that the mode in which the wound is stopped and repaired, renders more intelligible the effect of these disturbances, and the manner in which from its exposed condition the vein is liable to be involved in the inflammation; in short, that if the wound healed like that of an artery, it would not be subject to a secondary inflammation.

Sides of veins do not coalesce.

Although it is clear that veins undergo obliteration, I do not think it is by a union of the sides of the vein, as is the opinion of Mr. Hunter, Mr. Hodgson, and others, or as we observe to be the case in arteries under high inflammation. The tube, of little less than its ordinary size, is obstructed by masses of lymph; or not at all reduced in its calibre, where obstruction simply has taken place, is filled by layers of coagula; but there is no tendency to contraction of the canal, nor any disposition to adhesive union of the sides of the tube, and indeed the excessive secretion in the one case, and the massive coagulum in the other, are equally barriers to such a union. That the sides of the vein do not coalesce, is still more strikingly shewn by the mode of obliteration which is sometimes seen between the seat of inflammation and the heart, where an extensive furring

of the inner membrane has taken place, and probably betwixt the heart and a wound or ligature. That appearance stops abruptly, the membrane resumes its healthy character, and the tube is gradually contracted to obliteration by an interstitial deposition in the coats of the vein, by which it is rendered a round solid cord of a cartilaginous hardness, in its transverse section narrower considerably than that of the healthy vein. Although imperforate from compression, the canal is readily discovered by a longitudinal section.

Obliteration by interstitial deposition.

Dr. Simpson, of St. Andrew's *, had occasion to tie the internal jugular vein in removing a tumor deep seated in the neck, with a part of which it was confounded. After eight days, seeing no appearance of separation, he cut the vein through immediately below the ligature, and found vein and all quite solid and of a cartilaginous firmness. This I conceive was that interstitial thickening which contracts the tube to obliteration. It could not from its situation be a coagulum of blood. Whether the varicose vein, which becomes consolidated, undergoes the interstitial thickening just described, I cannot take upon myself to say; probably it is only an extended and compact coagulum; in either case I imagine that the vein is ultimately reduced by interstitial absorption to that ligament-like state, in which obliterated vessels have repeatedly been found in dissections. At all events, I think we are warranted in concluding,

Example.

* Edin. Med. Essays, Vol. V. p. 337.

Successful operations do not inflame the lining membrane.

that the cure of varix when accomplished, as it often has been, by the operations of tying or dividing the vein, has not been effected by an inflammation of the lining membrane.

Two modes of termination.

It appears, upon referring to the histories of these cases, that they have two modes of progress and termination, *viz.* first, the formation of pus and sometimes of abscesses in the vein, which by ulceration of its sides communicate with the cellular membrane, and point externally in the course of the vessel: secondly, in continuous and pure adhesive inflammation, without any production of matter.

Mr. Hunter's case*, Mr. Oldknow's, p. 221, and that which I have mentioned as occurring in Guy's Hospital, p. 216, may be taken as examples of the first, where it forms abscess, an event simply depending on the interspaces left by the irregular deposition of adhesive matter, which here and there amounts to a quantity sufficient to obstruct the canal. The cases given by Dr. Travers, Mr. Broughton, and Mr. Oldknow, p. 218, are examples of suppuration in which the vein had not ulcerated so as to form abscess. The cases of White and Crute are examples of the second termination. In these cases, the inflammation produces a continuous deposition of lymph, which extends to the trunks of the system, and sometimes reaches the heart. There is a marked difference in the symptoms accompanying these

Corresponding difference of constitutional symptoms.

* Med. and Chir. Trans. Vol. I. p. 24. Mr. Hunter's indeed is an example of both; he found in some parts suppuration only, in others, ulceration and abscess, p. 229.

states: the first is a protracted irritation, producing hectic, and ending in exhaustion: the second is a typhoid fever, such as we often see accompanying the severer forms of local injury, and which speedily producing delirium, terminates within a few days. This is a difference, not, as I believe, characterising the mode or stage of the inflammation, but arising out of its situation, extent and communication with the surface or otherwise; where the vein of a limb suppurates and communicates with the surface, the constitutional disorder is of course less urgent than where it occupies uninterruptedly the vein which adjoins, or forms the main trunk of the system. The former cases, although always dangerous, are occasionally recovered; the latter, I imagine, never.

Whence the fatality of these cases.

There have been many conjectures respecting the cause of the fatal termination of these cases, at which I confess I feel surprised. Among others, the inflammation by extension, of the heart, or the membranes of the brain, and the conveyance of pus into the circulation have been mentioned. If we consider the importance of the veins in the economy, the extent of surface which the collective areæ of the venous trunks afford, larger, I imagine, than any of the shut sacs of the body, and the diffused and disorganizing character of the inflammation, we can surely be at no loss to account for the disturbance of the system. It is an error to suppose, that any quicker sympathy exists between the constitution and the venous, than the arterial or absorbent system. I say this, because I

have observed something like that superstitious alarm, which is excited by events that we do not expect and cannot explain, has been produced by the fatal catalogue of tied veins, and a comparison of this with the generally successful cases of tied arteries. All the mystery of veins is, as I have attempted to shew, that they are indisposed to inflame, but when excited, inflame by continuity, and therefore it is that the constitution sympathises so deeply. The same would happen if arteries were subject to a similar law; and it is fortunate for mankind that this is not the case. Tying or dividing the vein is not a cure for varix; but if it were, the cure of a disease, which is little more than an inconvenience, would be too dearly bought at a risk of life. It is not so with aneurism.

It is my intention to prosecute this investigation, and I shall feel sincerely thankful for any communications connected with a subject of so much intricacy and importance.

END OF PART I.

G. WOODFALL, PRINTER,
ANGEL COURT, SKINNER STREET, LONDON.

Fig. 1.

PLATE 10.

Fig. 2.



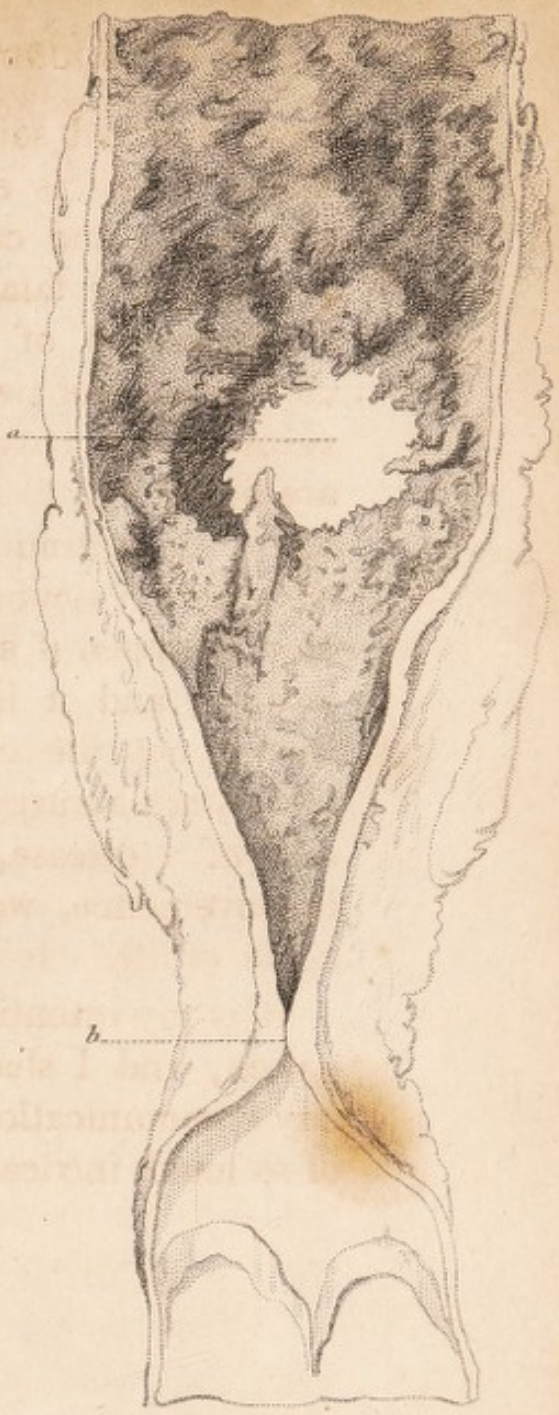


Fig. 3.

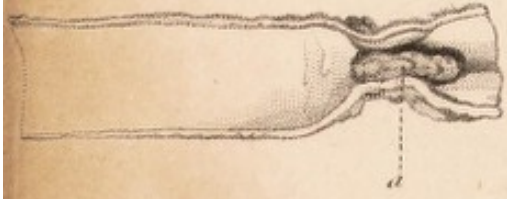
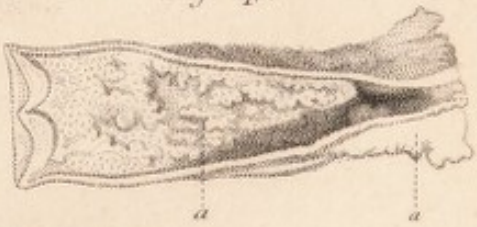


Fig. 4.



H. Thomson Del.

Kennerly Sculp.

London Published Jan.y 1.st 1818. by E. Cox & Son. St.Thomas's St.Boro' & Longman & Co.Paternoster Row.

EXPLANATION OF

PLATE X.

Fig. 1. Represents the interior of the vena cava, in the case of Crute, described page 227; *a*, *a*, point to the flakes and fringes of lymph which occupy almost the entire surface of the inflamed tunic.

Fig. 2. Shews the appearance of the jugular vein of the horse, described page 234; *a*, the circular aperture formed by ulceration of the wound made in the phlebotomy. Its internal margin and the surrounding surface is coated with adhesive matter. *b*, the obliteration of the tube nearer to the heart by an interstitial deposition or thickening of the walls of the vein. A bristle only could be passed through this portion of the condensed vein, and upon a transverse section it presented an equal circumferential thickening of the parietes, with great induration. The interior of the vein below is perfectly healthy.

Fig. 3. The tied extremity of the femoral artery in the subject of *fig.* 1; *a*, the lymph plug, occupying the contracted portion which corresponds to the ligature.

Fig. 4. The tied extremity of the femoral vein of the same subject; *a*, *a*, a bed of lymph depo-

PLATE X.

sited exterior to the coats of the vein and nearly closing its extremity, where the ligature had been applied, and a fringe-like deposition covering and intimately adhering to the inner tunic, similar to that represented in *fig.* 1.

PLATE. II.

Fig. 1.



Fig. 6.

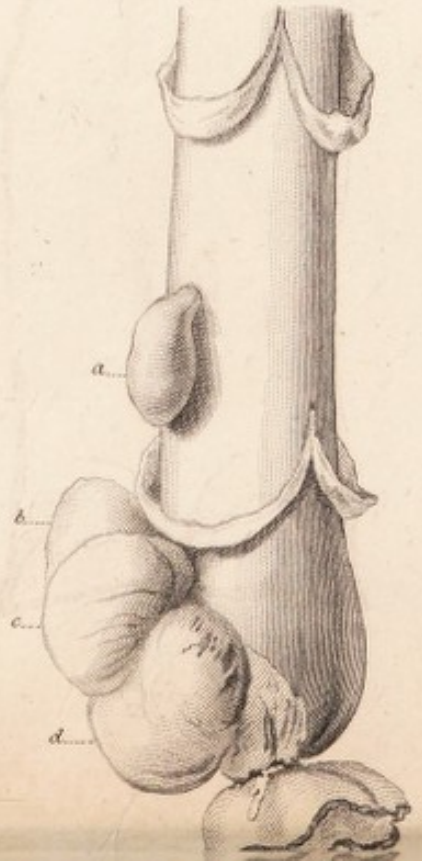


Fig. 2.

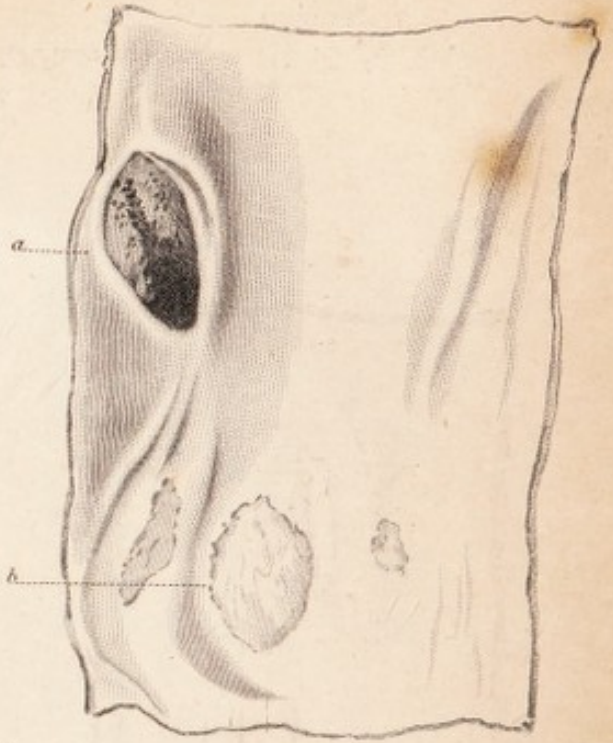


Fig. 5.

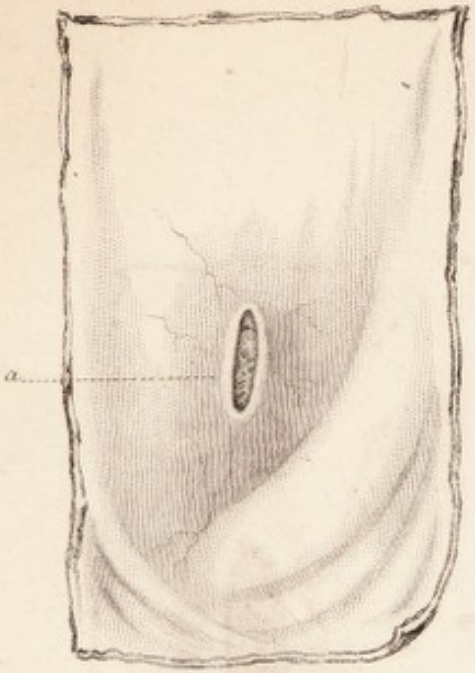
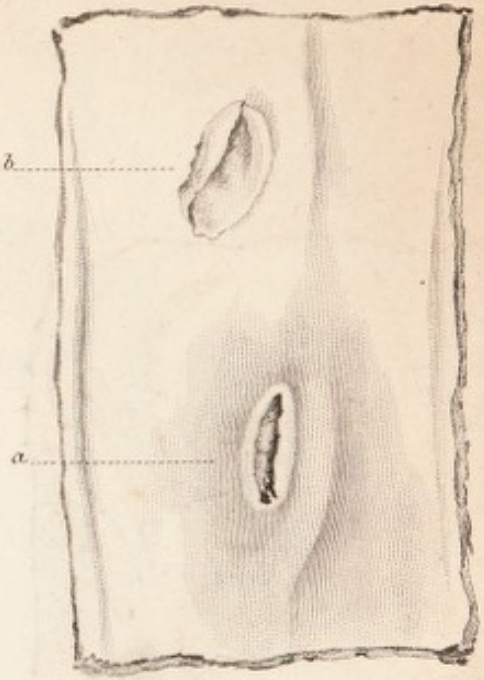


Fig. 4.



Fig. 3.



H. Thomson del.

Ja.s Mitchell jun.r

London Published Jan.y 1.st 1818 by E. Cox & Son St.t Thomass.s Borough & Longman & Co.s Paternoster Row.

EXPLANATION OF

PLATE XI.

Represents the healing of wounds in veins.

Fig. 1. The interior of the jugular vein of a horse, representing the appearance of a wound at the end of three days; *a*, the rounded sides of the wound, the cut edges being everted. The wound is filled by a compact clot of blood.

Fig. 2. Appearance of a wound at five days; *a*, the circumference of the wound, which is filled by an oval coagulum having an organizable or membraneous surface; *b*, an old cicatrix formed of membrane adventitious to the vein; smaller cicatrices are seen in the vicinity.

Fig. 3. *a*, A wound of smaller dimension at six days; the new membrane completed; *b*, old cicatrix.

Fig. 4. *a*, A wound at eight days.

Fig. 5. *a*, A wound at fourteen days; the vessels upon the interior tunic were seen through a glass to anastomose upon the new membrane.

Fig. 6. The jugular vein of the horse inverted and filled with fluid; *a*, *b*, *c*, *d*, pouches of the new-formed membrane corresponding to as many wounds.

This drawing is from a preparation in Mr. Coleman's Museum at the Veterinary College.

EXPLANATION OF

PLATE XII.

Represents the effects of ligatures of veins.

Fig. 1. Ligature applied three days; *a*, coagulum of blood filling the superior portion of the vein; *b*, the lower portion thrown into longitudinal folds, empty and entirely uninflamed.

Fig. 2. *a*, *b*, *c*, The appearances occasioned by three ligatures applied for four days.

Fig. 3. The vein divided between two ligatures examined fifth day; *a*, *b*, the lines of the ligatures; *c*, a deposition of lymph in the cellular sheath of the vein.

Fig. 4. Ligature at seven days; *a*, *b*, the ends of the ligature, which has been cut across, surrounded by adhesive matter external to the vein.

Fig. 5. Ligature removed at ten days; *a*, *a*, *b*, *b*, the angles of the vein where it has been divided by ulceration; the triangular space between the sheath and the vein was occupied by pus.

Fig. 1.

PLATE 12.

Fig. 2.



Fig. 3.

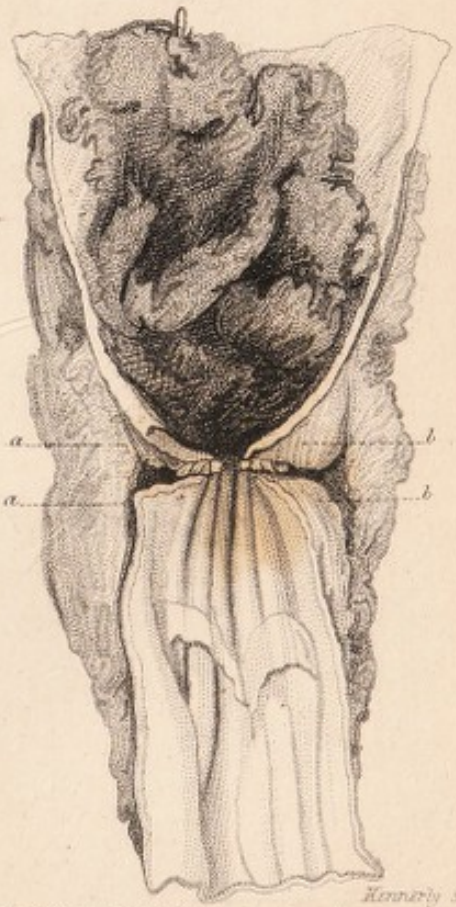




Fig. 4.



Fig. 5.



Thomson Del.t

Kennerly Sculp.t

London Published Jan.y 1.st 1818. by E. Cox & Son. St.t Thomas's St.t Boro.h & Longman & C.o Paternoster Row.

PLATE 13.



H. Thomson Del.

Kennerly Sculp.

London Published Jan.y 1.st 1818. by E. Cox & Son. St. Thomas's St. Boro. & Longman & Co. Paternoster Row.

EXPLANATION OF

PLATE XIII.

Represents the appearance of a vein divided by the ligature, which came away on the 25th day; *a*, *a*, *a*, the thin ulcerated edge of the internal tunic of superior extremity; *b*, *b*, *b*, that of the lower extremity smooth and condensed with the sheath; the upper part of the vein is filled with firm layers of coagula which so tenaciously adhered to the inner membrane as to be separated with difficulty; when separated, the surface was found to be perfectly smooth and natural.

G. WOODFALL, PRINTER, ANGEL COURT, SKINNER STREET, LONDON.

It was intended that an Essay, which Mr. Travers had prepared for this Volume, should have succeeded Mr. Cooper's; but on account of the length of the Paper on Dislocations, and of that contributed by Mr. Travers, it has been judged better to reserve it for a Third Part, which will appear in the course of a few Months, and two short Essays of Mr. Cooper's have been substituted for that of Mr. Travers.

CONTENTS.

Essay I. On Dislocations continued, and on Fractures of the Hip and Knee-Joint.

Essay II. On Unnatural Apertures in the Urethra.

Essay III. On the Encysted Tumours.

On Dislocations continued.

CASES

OF

DISLOCATIONS

OF THE

THIGH-BONE.

By Mr. ASTLEY COOPER.

IT is a curious circumstance, and one of which I was informed by Mr. Cline, that Mr. Samuel Sharpe, who was Surgeon to Guy's Hospital, and had a large share of practice in this metropolis, did not believe that a dislocation of the thigh-bone ever occurred.

This want of knowledge in a very excellent surgeon, for the time at which he lived, can only be imputed to the few opportunities which then offered of pursuing morbid anatomy, for he must frequently have seen the accident in the living subject, but never having examined it in the dead, was led to believe that the appearances of dislocation had arisen from some other cause.

Since the publication of my former essay on Dislocations of the Thigh, the following cases of this accident have occurred within my know-

ledge, the circumstances of which I shall shortly detail from my notes, before I proceed to consider the other objects of this essay.

CASE I.

Dislocation of the left Femur on the Dorsum Ilii.

James Ivory, aged 71, of Pottensend, Herts, on the 7th of February, 1810, whilst working in a clay-pit about twenty-five feet below the surface of the earth, had a large quantity of clay fall in upon him, while he was in the act of stooping with his left knee bent rather behind the other, and he was in this situation buried under the earth. He was however soon removed from his perilous situation, and, being carried home, a surgeon was immediately sent for, who, aware of the accident being a dislocation, directly employed some men to extend the limb, whilst he attempted to push the head of the bone into the acetabulum; but all his efforts were unavailing, as unfortunately for the patient pullies were not employed. The appearances of the limb at present, and it is now nine years from the accident, are these; the limb is three inches and a half shorter than the other, and the patient is obliged to wear a shoe having an additional sole of three inches on that side, which lessens, though it does not prevent, his halt in walking; when he stands, the foot of the injured limb rests upon the other; the toes are turned inwards, and the knee, which is advanced upon the other, is also inverted, and rests upon the side of the patella of the sound limb

and upon the vastus internus ; it is also bent, and cannot be completely extended. The thigh, from the unemployed state of several of the muscles, is very much wasted; but the semitendinosus, semimembranosus and biceps, owing to the shortened state of the limb, form a considerable rounded projection on the back part of the thigh. The trochanter major is seven-eighths of an inch nearer to the spine of the ileum on the injured side than on the other. On viewing him behind, the trochanter is seen to project on the injured side much further than on the other; the situation of the head of the bone on the dorsum ilii is easily perceived, and when the limb is rotated inwards it is still more obvious. The spinous processes of the ilia are of an equal height. When sitting, the foot is turned very much inwards, and the knee is placed behind the other, whilst the toe only reaches the ground. When fatigued he experiences pain in the opposite hip, and in the thigh of the injured limb. This unfortunate man has an arduous task to gain his bread by his labour, as he cannot stoop but with the greatest difficulty, and is therefore obliged to seek those employments which least require that position. When he attempts to take any thing from the ground he bends the knee of the injured limb at right angles with the thigh, and throws it far back. He can now stand for a few seconds upon the dislocated limb, but it was twelve months before he could do so. When in bed it is painful to him to lie on the injured side. His hip is, without any apparent cause, much weaker at some times than at others. When sitting down to evacuate

his fæces, he is obliged to support himself by resting the injured knee against the tendo achillis of the other leg, placing his right hand on the ground. He now walks with two sticks; at first he employed crutches, and these he used for twelve months, when he was enabled to trust to one crutch and a stick, until his limb acquired greater strength. In getting over a stile, he raises the injured leg on two steps, and then turns over the sound limb; but this he cannot accomplish when the steps are far apart, and he is frequently obliged either to turn back or to take a circuitous route. When lying with his face downwards, the dislocated hip projects very much upwards. He sometimes falls in walking, and would very frequently do so, but that he takes excessive care, as the least push against him throws him down. The knee being bent, part of the shortening of the limb depends upon that circumstance. I give this case to shew the evil that results from a dislocation of the hip remaining unreduced; and it proves that dislocation of the thigh may occur in a strong healthy man after he has arrived at the age of sixty.

CASE II.

Dislocation of the Right Thigh in the Foramen Ovale.

A gentleman was thrown from his horse on the 4th of January, 1818. The accident was occasioned by the animal suddenly starting to the right side, and endeavouring to keep his

seat by the pressure of the right thigh against the saddle, he was thrown, and from the fall received a severe contusion upon his head, which produced alarming symptoms; on the following day it was observed that the right thigh was useless, and that the knee was raised and could not be brought into a straight line with the other, having at the same time a direction outwards, rendering it necessary to tie it to the other knee; the symptoms of injury to the head precluded, at this time, the possibility of an attempt at reduction. In fourteen days he was so far recovered as to enable him to sit up, and in a month he began to walk with crutches. On November 1st, 1818, I first saw him, and the appearances of the injured limb then were as follows. The thigh was longer than the other by the length of the patella; the knee was advanced, and when in the recumbent posture, the injured leg could not be drawn down to the same length with the other. The upper part of the thigh-bone was thrown downwards, so as to render the hollow of the groin on the injured side deeper than the other. The toes were rather everted, but were capable of resting on the ground when the body was erect, though the heel could not. The head of the bone could not be felt, and the trochanter was much less prominent than usual; when the upper part of the thigh-bone was pressed against the acetabulum, and moved, there was a sensation of cartilaginous rubbing, which, although not easily described, is readily distinguished from the crepitus occasioned by a fractured bone. When sitting, the injured leg was two inches longer than the other; and to that degree

the knee was projected beyond the sound one. In progression the knee was bent, and the body being thrown forwards, he rested chiefly upon his toe, and halted exceedingly in walking. The sartorius and gracilis muscles were very much put upon the stretch. At first he suffered much from pain in the dislocated hip and thigh, but is now free from pain unless he attempts to stand on that limb only; his toe at first was with difficulty brought to the ground, but he is now improved in walking, for when he first made trial with the assistance of a crutch and stick he could not exceed half a mile, but is now capable of walking two miles. In flexion his thigh admits of considerable motion, but he cannot extend it further than to bring the ham to the plane of the other patella. The knees cannot be brought together, but he advances one before the other in the attempt; he can sit without pain, but the jolting of a carriage hurts him exceedingly; and the attempt to sit on horseback produces excessive suffering. He cannot straighten his leg when his body is erect, nor can he stoop to tie his shoe on the injured side. Pain is produced by resting on that hip in bed. No attempt was made to reduce the limb; the injury to the head might have rendered it dangerous in the commencement; and at the time I saw him there was no chance of success.

CASE III.

Dislocation on the Dorsum Ilii.

Mary Bailey, aged seven years, was admitted into Guy's Hospital June 16, 1819, under the

care of Mr. Astley Cooper, for a dislocation of the os femoris upwards on the dorsum ilii. This accident was occasioned by the child swinging on the shaft of a cart, which being insecurely propt, suddenly gave way, and she fell to the ground upon her side. The nature of the accident was exceedingly evident; the limb on the dislocated side was at least two inches shorter than the other; the toe rested on the tarsus of the opposite foot, and was turned inwards; the knee was also inverted, and rested on the other. The child was admitted into the hospital at half past five in the afternoon, the accident having happened a little more than half an hour. Where so little resistance was expected the pullies appeared unnecessary, and towels were substituted, one being applied above the knee and the other between the pudendum and thigh, then bending the knee and bringing the thigh across the other just above the knee, gradual extension was made, and in about four minutes the head of the bone suddenly snapt into its socket. On the seventh day the child was walking in her ward, and suffered little inconvenience.

To Mr. Daniel, one of Mr. Lucas's dressers, I am obliged for the foregoing particulars; he having reduced the limb in the presence of many of the students.

CASE IV.

Dislocation of the Head of the Thigh-bone into the Ischiatic Notch.

John Cockburn, a strong muscular man, aged

33, was admitted into Guy's Hospital on the 31st of July, 1819. While carrying a bag of sand at Hastings on the 24th of June, he slipped and dislocated the left hip-joint, and the following is the account he gives of the accident; that the foot on the affected side was plunged suddenly into a hollow in the road, which turned his knee inwards, when his body fell with violence forwards. Two attempts were made to reduce the dislocation by pullies on the day of the accident, which did not succeed, and it was consequently repeated on the 27th of June, which was also unsuccessful, although it was continued each time nearly an hour. He was directed to Guy's Hospital by Mr. Stewart, surgeon at Hastings. It was found upon examination, after he had been admitted, that the thigh was dislocated backwards into the ischiatic notch, the limb was a little shortened, the knee and foot were turned inwards, and the toe rested on the ball of the great toe of the other foot; the head of the bone could not be felt, the trochanter major was opposite the acetabulum, the rim of which could be distinctly perceived. The body being fixed, the thigh could be sufficiently flexed nearly to touch the abdomen. The patient was carried into the operating theatre soon after his admission, and when two pounds of blood had been taken from him, and he had been nauseated by two grains of tartarized antimony, extension was made with the pullies in a right line with the body, and the upper part of the thigh was raised while the knee was depressed; the extension was continued at least for an hour and a half, during which time he took two grains more of tartarized antimony,

by which he was thoroughly nauseated; the attempts, however, at reduction, did not succeed. On the 3rd of August, the tenth day from the accident, Mr. Astley Cooper succeeded in reducing it in the following manner: He ordered so much blood to be taken from the arm as to produce a feeling of faintness. A table was placed in the centre between two staples, upon which the patient was laid on his right side; a girt was passed between the scrotum and the thigh, and carried over the pelvis to the staple behind him; and thus the pelvis was, as far as possible, fixed: a wetted roller was carried around the lower part of the thigh just above the knee, and a leather strap buckled on it, to which the pullies were fixed, and to a staple before the limb. The body was bent at right angles with the thigh, and it crossed the upper part of the other thigh: then the extension with the pullies was begun, and gradually increased until it became as great as the patient could bear. An assistant was then directed to get upon the table, and to carry a strong band under the upper part of the thigh, by which he lifted it from the pelvis so as to give an opportunity for the head of the bone to be turned into its socket. Mr. South, who held the leg, was directed to rotate the limb inwards, and the bone, in thirteen minutes, was heard to snap suddenly and violently into its socket.

JAMES CHAPMAN,

Dresser at Guy's Hospital, to whom I am indebted for the foregoing statement.

I believe, in this case, I should not have succeeded, but from attention to two circumstances; first, I observed that the pelvis advanced within the strap which was employed to confine it, so that the thigh did not remain at right angles; and I was obliged to bend the body forwards to preserve the right angle during extension; and secondly, the extension might have been continued for any length of time, yet the limb would never have been reduced but by the rotation of the head of the thigh-bone towards the acetabulum.

CASE V.

Dislocation of the Thigh Bone into the Ischiatic Notch.

DEAR SIR,

William Dawson, aged 34, on the 15th of August, 1818, while spending his harvest-home with several of his companions, became quarrelsome with one of them, who threw him down, and trod upon him. Upon extricating himself and endeavouring to rise, he found some serious injury to his right thigh rendering him incapable of standing; and in this state he was dragged by his associates, for many hundred yards, into a stable, where he lay till the next morning. I then saw him lying upon a mattress, with the hip and thigh, on the right side, prodigiously swollen and painful; and I was particularly struck with the appearances of the knee and foot on the same side, which were very much turned inwards, but the limb was scarcely short-

ened. I ordered him to be carefully conveyed home upon a shutter supported by six men, a distance of about half a mile. From the immense swelling and general enlargement of the whole of the thigh, and of the soft parts around the pelvis, it was impossible to ascertain exactly the state of the injury; but it was fully impressed upon my mind, that there was some unusual dislocation of the head of the thigh-bone. He was accordingly ordered immediately to lose blood both by general and topical means, with emollient poultices to the whole of the swollen parts; brisk purgatives were also administered, succeeded by saline medicines, and a quiet position enjoined for eleven days; by which time the swelling began somewhat to subside. Still the precise nature of the injury was not satisfactorily evident: but it was thought by Mr. Nunn of Colchester, and Mr. Travis of East Bergholt, who had kindly come over to witness it, that there was a luxation. The only difficulty we had to reconcile this to ourselves, was the belief, in our minds, that no author had noticed this accident to have taken place without an alteration in the length of the limb, except it might be Mr. Astley Cooper, in his new publication, which we neither of us had yet seen. We accordingly had recourse to a minute examination of the skeleton; when we immediately fancied we could account for this sort of luxation not being attended with the usual marked signs of displacement of the head of the bone, excepting the knee and foot being turned inwards; for we noticed, that if the head of the bone be luxated sideways into the ischiatic

notch, it would produce scarcely any difference in the length of the limb. Trusting that a little further delay might not be attended with any material disadvantage, but give a chance for the entire subsidence of all inflammation and swelling, we proposed meeting again as soon as we conveniently could, by which time we might consult Mr. Cooper's book. On Sunday the 30th of August we accordingly met, which was fifteen days after the accident, and from the complete removal of all swelling the whole of the femoral bone was satisfactorily traced to its rounded head, which was lodged in the ischiatic notch. Upon referring to the essays which we had now before us, we had the case delineated and described; and as it was exhibited in a plate, we had only to imitate, in order to accomplish the reduction of the bone. In the presence of two or three other medical gentlemen who had now joined us, we commenced the operation; and as it would be unnecessary to state every particular, after the manner in which the position of the patient, the fixing of the pullies and towels, are demonstrated by this publication; suffice it for me to remark, that, after ten or twelve minutes' gradual extension, the reduction of the bone was most readily and admirably accomplished.

Preparatory to commencing the operation, we took thirty ounces of blood from the arm *ad deliquium*, and afterwards, while fixing the pullies, &c. we gave four grains of tartarized antimony, at intervals, to produce nausea.—Immediately after the operation we gave one grain of opium, applied sedative lotions to the parts,

and proceeding carefully for about a fortnight, the patient was enabled to move about upon crutches, and was shortly after sent home perfectly well.

I am,

JOHN ROGERS.

Manningtree,
August 15th, 1818.

REMARK.

The relation of the foregoing case, from the kind manner in which Mr. Rogers has expressed himself, may savour a little of vanity; but I shall readily suffer this imputation, as my greatest gratification will ever be to find that my humble endeavours may in the slightest degree have conduced to the advantage of my professional brethren, or to the benefit of those who may be placed under their care.

The dislocation in the ischiatic notch has been, as far as I know, in every author who has written on the subject, incorrectly described: for it had been stated, that the limb was lengthened in this accident; and I need scarcely mention the mischiefs in practice from so mistaken an opinion; but one I here must give. A gentleman wrote to me from the country, in these words: "I have a case under my care of injury to the hip; and I should suppose it a dislocation into the ischiatic notch, but that the limb is shorter instead of being longer as authors state it to be:" this error must have arisen from their having examined a pelvis separated from the skeleton, and observed that the ischiatic notch

was below the level of the acetabulum when the pelvis was horizontal—although it is above the acetabulum in the natural oblique position of the pelvis, at least as regards the horizontal axis of the two cavities. It is to be remembered that there is no such accident as a dislocation of the hip downwards and backwards.

CASE VI.

Dislocation on the Dorsum Ilii.

MY DEAR SIR,

William Sharpe, an athletic young man, in wrestling received a fall, his antagonist falling with and upon him, their legs being so entangled that he cannot say how he came to the ground. He complained of great pain in the hip, and was incapable of rising. About twenty minutes after the accident I found him lying on his belly in the field where it had occurred, and the left limb in a trifling state of abduction, shortened, and the knee and foot turned inwards, the prominency of the trochanter gone, and the head of the bone obscurely felt on the dorsum ilii. He was conveyed home, and, in order to reduce the dislocation, for such I considered it, I placed the man on his right side diagonally across a four-post bedstead. The centre of a large sheet rolled up was placed at its extremities, passing in front and behind the body, and fastened to the upper bed-post, as low as possible. The centre of a napkin, rolled in like manner, was then applied upon the dorsum ilii, between its crista and the dislocated bone; and

each extremity being brought under the sheet (forwards and backwards) was reflected over it and tied in the centre, by which means I thought to keep the pelvis secure; the counter-extending force was applied above the ancle (it appearing to me to interfere less with the muscles upon the thigh:) first, rolling round a wetted towel, and then, placing upon this the end of a long or jack-towel: three men were now directed to pull gradually and steadily; and when I perceived the head of the femur was brought down to the edge of the acetabulum, I raised it a little with my clasped hands placed under the upper part of the thigh, and immediately the head of the bone entered the cotyloide cavity with a smart snapping noise. The man had considerable pain about the hip and knee for some time, but is now quite well.

I am, Dear Sir,

Yours, truly,

HENRY OLDNOW.

Nottingham,
August 8th, 1819.

CASE VII.

Dislocation of the Ischiatic Notch.

Mr. Wickham, jun. of Winchester, had the kindness to inform me of a case of this dislocation which had been admitted into the Winchester Hospital, under the care of Mr. Mayo, one of the surgeons of that institution, whose permission I have to state the following circumstances.

John Norgott, aged 40, was brought to the hospital on 27th December, 1817, from the neighbourhood of Alton; twelve days had elapsed since the accident happened, without his being aware of the nature of the injury. He reported that his horse had fallen with him and on him, so that one leg was under the horse, whilst his body was in a half-bent position, leaning against a bank; he was of middle stature, but very muscular; the leg was but very inconsiderably shorter than the other, and but little advancing over it; in fact, the immobility of the limb was the chief criterion of the dislocation; for the head of the bone was thrown into the ischiatic notch. The mode of reduction was simple: Mr. Mayo had the limb extended by the pullies, so as to bring the head of the bone to the edge of the acetabulum, and then tilted over it by a towel fastened round the patient's thigh, and neck of an assistant. The man remained three or four weeks before he was allowed to leave the house; but on the 4th of February he was discharged, cured.

Winchester,
August 10, 1819.

CASE VIII.

Mr. Mayo also mentions the case of William Hendy, who came into the hospital in August 1812: the dislocation had taken place seven weeks before, and was reduced the day after his admission; he was discharged, cured, on the 18th of November. This was a dislocation on the dorsum ilii.

CASE IX.

Of Dislocation on the Dorsum Ilii.

Happening to be in Chester in September, 1818, I walked through the wards of the neat, and apparently, to me, excellently conducted infirmary of that city. Mr. Bagnall, surgeon in Chester, mentioned to me a case of dislocation of the thigh upon the dorsum of the ilium, which I immediately proceeded to examine. The man's name was John Chesers, and he had been admitted under the care of Mr. Rowlands; the bone was dislocated upwards, the affected thigh was shorter than its fellow, the knee was inclined inwards and forwards, and the foot pointed inwards; every attempt to rotate the foot outwards was productive of considerable pain at the hip. When I had concluded my examination of this case, I was informed by Mr. Bagnall, that a man had been admitted two months before under the care of Mr. Bennett, one of the surgeons of the infirmary, with a dislocation of the thigh; and having requested of Mr. Bennett the particulars of this accident, he was so kind as to send me the following account.

CASE X.

Dislocation on the Dorsum Ilii.

John Forster, aged 22 years, was admitted into the Chester Infirmary July 10th, 1818, with a dislocation of the thigh on the dorsum ilii,

occasioned by a cart passing over the pelvis. Upon examination I found the leg shorter than the other, and the knee and foot turned inwards. The patient being firmly confined upon a table, I extended the limb by pullies for fifty minutes without success, and he was returned to bed for three hours; after which he was put in the warm bath for twenty minutes, and the extension was repeated for fifteen minutes unsuccessfully; I therefore took twenty-four ounces of blood from him, and gave him forty drops of tinct. opii, continuing the extension, but not succeeding in producing faintness, I gave small doses of a solution of tartrite of antimony, which in a quarter of an hour produced nausea; in ten minutes afterwards I succeeded in reducing the limb, and in less than a fortnight he left the infirmary quite well.—Unfortunately, he began to work hard immediately, and brought on an inflammation in the hip, of which he has not recovered.

S. R. BENNETT.

Chester.

CASE XI.

Dislocation on the Dorsum Ilii.

Mr. Tripe, surgeon at Plymouth, has sent to the Medico-Chirurgical Society, an account of a case of dislocation of the thigh-bone on the dorsum ilii, which had happened seven weeks and one day prior to his making an extension to reduce it, by which he was so fortunate as to succeed in restoring the bone to its natural situation.

It appears then, by these examples, that in eleven cases, seven were dislocated upon the dorsum ilii; three in the ischiatic notch; and one in the foramen ovale.

It is really highly gratifying to observe the difference of knowledge in the Profession at the present period when compared with that of fifty years ago. What should we think of a surgeon in the metropolis, in the present day, with all his opportunities of seeing disease in the large hospitals of this town, who doubted the existence of a dislocation of the thigh, when we find our provincial surgeons immediately detect the nature of these injuries, and directly succeed in their attempts to reduce them. Let them never forget, however, that it is to their knowledge of anatomy that they are indebted for this superiority, and, more especially, to morbid anatomy.

In my former essay I endeavoured to describe the different situations into which the thigh-bone is thrown in the dislocations of the hip-joint, and the various appearances which these luxations produce; at the same time pointing out what I have found to be the best means for their reduction. It was then my intention to have described the dislocations of the knee-joint, but, upon more consideration, I thought it better to continue the account of the injuries incident to the upper part of the thigh-bone, before I entered into a description of those of other joints, because it would give me an opportunity of directly contrasting the symptoms which such fractures produce, with the distin-

Contrasted with dislocation.

guishing marks of dislocation, and thus enable the young surgeon readily to discriminate the one accident from the other. It must be confessed that there is some difficulty in distinguishing the fractures of the hip-joint from its luxations, and that much difference of opinion subsists as to the process nature employs in the restoration of these fractures; for whilst one surgeon maintains that all attempts to cure them are unavailing, another asserts that they admit of union like fractures of other bones of the body. I shall therefore proceed to state what has occurred to me upon these points, both from my observation on persons suffering under this accident, and my examination of those after death, in whom this accident had happened, as well as the effects which are produced by breaking the upper part of the thigh-bone, in experiments on inferior animals.

Difference of opinion.

ON

FRACTURES OF THE NECK OF THE THIGH-BONE.

Such accidents are more frequent than dislocations of the os femoris, which is evinced by the comparative number we admit into our hospitals, being seldom without an example of the fractured neck of the thigh-bone, whilst the cases of dislocation upon the average do not exceed one in a year.

Comparative frequency of the two accidents.

The fracture of the neck of the thigh-bone is of two kinds: first, that in which the bone

Fracture of two kinds,

is broken transversely through the cervix within the capsular ligament; and secondly, when it is fractured externally to the ligament, either through the root of the cervix or through the trochanter major; the former of these may be called the internal, and the latter the external fracture, as regards the relative situation of the bone with respect to the capsular ligament.

internal and external.

Of the Fracture of the Neck of the Bone within the Capsular Ligament.

The appearances which are produced by this fracture are as follow: the leg becomes from one to two inches shorter than the other, for the junction of the trochanter major being destroyed by the fracture, the trochanter is drawn up by the muscles, and carries with it the neck of the bone as high as the ligament will permit, and consequently the trochanter rests upon the edge of the acetabulum and upon the ileum above it. This difference in the length of the limbs is best observed by desiring the patient to place himself in the recumbent posture on his back, when, by comparing the malleoli, it will be found that one leg is from one to two inches shorter than the other; but the retraction thus produced is easily removed, by drawing down the shortened limb, when it will appear of the same length with the other; but immediately this extension is removed, the action of the muscles quickly forces it into its former position; and this appearance may be

Diagnostic marks of fracture within the ligament.

Length.

repeatedly produced by extending the limb. This evidence of the nature of the accident continues until the muscles acquire a fixed contraction, which enables them to resist any extension which is not of the most powerful kind. Another circumstance which marks the nature of this injury, is the foot and knee being turned outwards; and this state depends upon the numerous and strong rotatory muscles of the hip-joint, which proceed from the pelvis to be inserted into the thigh-bone, and to which, very feeble antagonists are provided, a part of the glutæus medius and minimus, the obturatores, the pyriformis, the gemini and quadratus, the pectinalis and triceps all assist in rolling the thigh-bone outwards, whilst a part of the glutæus medius and minimus, and the tensor vagina femoris are the agents of the rotation inwards. It has been denied that the muscles are the cause by which this eversion is produced, and it has been attributed to the mere weight of the limb; but any one may satisfy himself that it is in part owing to the muscles, by feeling the resistance which is made to an attempt at rotation inwards of the neck of the bone. This difficulty is also in some measure attributable to the length of the cervix femoris, which remains attached to the trochanter major, because in proportion to its length, by resting against the ileum it is prevented turning inwards. Directly the bedclothes are removed, two circumstances strongly arrest the attention of the surgeon, namely, the diminished length of the injured limb, and the eversion of the foot and knee. In the dis-

Foot turned outwards.

location upwards, the head and neck of the bone prevents the trochanter from being drawn backwards, whilst the broken and shortened neck of the thigh-bone in the fracture of this part readily admits it, and hence the reason why the foot is inverted in the one case and everted in the other.

Three or four hours must elapse before this appearance is in its most decisive state, as the muscles require some time to retract, and this is the reason that the accident has been mistaken for dislocation. The surgeon having been called directly after the accident had happened, and before the muscles had acquired that fixed state of contraction they afterwards possess, he is led to mistake the nature of the injury; and from this cause patients, even in hospital practice, have been exposed to painful and useless extensions.

Degree of pain.

The patient, when perfectly at rest in the horizontal posture, suffers but little, but any attempt at rotation is painful, and more especially the rotation inwards, because the broken extremity of the bone then rubs against the lining of the capsular ligament, upon which it is drawn by the action of the muscles. The pain which is felt in this accident is in the upper and inner part of the thigh, opposite the insertion of the iliacus and psoas muscles, into the trochanter minor, or sometimes just below this point. The perfect extension of the limb may be easily effected, but flexion is more difficult and somewhat painful, and its degree depends upon the direction in which the bone is

Degree of motion.

bent, for if the flexion be outwards, it is accomplished with ease and but little suffering; but if it be attempted by directing the thigh towards the pubes, the act of bending the limb is with difficulty accomplished, and is attended with very severe suffering, but it is easier or more difficult in proportion as the neck of the bone be shorter or longer.

Subduction of the trochanter.

In this accident the trochanter major is drawn upwards towards the ileum, but the broken neck of the bone attached to the trochanter is placed nearer the spine of the ileum than the trochanter itself, and in this situation it afterwards remains; by which alteration of position the trochanter projects less on the injured side, because it is no longer supported by the neck of the bone as in its natural state, but rests in close apposition to the ileum.

In order to form a still more decided judgment of this accident, after the patient has been examined in the recumbent posture, let him be directed to stand by his bed-side, supported by an assistant, so as to bear his weight upon the sound limb; immediately he does this, the surgeon observes most distinctly the shortened state of the injured leg, from the toes resting on the ground but the heel not reaching it, the everted foot and knee, and the diminished prominence of the hip; then ordering the patient to bear upon the injured limb, he finds himself incapable of doing it but with considerable pain, which seems to be produced by the psoas and iliacus muscles being put upon the stretch in the attempt, as well as by the pressure of

Appearances in the erect position.

the broken neck of the bone against the capsular ligament*.

A crepitus, like that which accompanies other fractures, might be expected to occur in these accidents, but that is not the case when the patient is resting on his back with the limb shortened; but if the leg be drawn down, so as to bring the limbs to the same length, the crepitus is sometimes observed by the broken ends of the bone being thus brought into contact; but the rotation inwards most easily detects it. When the patient is standing upon the sound limb, with the injured unsupported, by rotating it inwards the crepitus will sometimes be perceived. Crepitus.

To the circumstances I have already mentioned, as strongly characterizing this accident, must be added the period of life at which it usually occurs, for the fracture of the neck of the thigh-bone within the capsular ligament seldom happens but at an advanced period of life. Old age, however, is a very indefinite term; for in some it is as strongly marked at sixty as in others at eighty. That regular decay of nature which is called old age, is attended with changes that are easily detected in the dead body; and one of the principal of these is found in the bones, for they become thin in their shell, and spongy in their texture. Age. Changes in age in the bones.

The process of absorption and deposition differ at different periods of life; in youth the arteries, which are the builders of the body,

* The greater or less projection of the trochanter, however, will depend upon the length of the fractured cervix femoris.

deposit more than the absorbents remove, and hence is derived the great source of the growth of the body. In the middle period of life the arteries and absorbents so nearly preserve an equilibrium of action, that with a due portion of exercise the body remains in a stationary state, while in old age the balance is destroyed by the arteries doing less than the absorbents, and hence the person becomes diminished in weight, more from a diminution of arterial action than from an increase of the absorbent.

This is well seen in the natural changes of the bones, their increase in youth, their bulk, weight, and little comparative change during the adult period, and the lightness and softness they acquire in the more advanced stages of life; this is so obvious, that the bones of old persons may be cut with a pen-knife, which is capable of making no impression on them at the adult period. Even the neck of the thigh-bone in old persons is sometimes undergoing an interstitial absorption, by which it becomes shortened, altered in its angle with the shaft of the bone, and so changed in its form as to give an idea, upon a superficial view, of its having been the subject of fracture; but it requires very little knowledge of anatomy to distinguish in the skeleton the bone of advanced age from that of the middle period of life.

Slight causes of this fracture.

This state of bone favours much the production of fractures, and the slightest causes will often produce them in old age. In London the most frequent source of this accident is from a person, when walking on the edge of the elevated footpath, slipping upon the carriage pave-

ment; and though a distance but of a few inches, from occurring so suddenly and unexpectedly, it produces a fracture of the neck of the thigh-bone. I was informed by a person who had sustained a fracture of this kind, that being at her counter, and suddenly turning to a drawer behind her, some projection in the floor caught her foot, and preventing its turning with the body, the neck of the thigh-bone was fractured. A frequent cause of this accident is, however, a fall upon the trochanter major; but I have dwelt particularly on the slight causes which produce it, that the young surgeon may be upon his guard respecting it, as he might otherwise believe that so important an injury could scarcely be the result of so slight an accident, and that excessive violence was necessary to break the neck of the thigh-bone: such an opinion is as liable to be injurious to his reputation, as that of confounding this accident with dislocation.

It very rarely occurs under fifty years of age; and dislocation seldom at a more advanced period, although there are exceptions to this rule: for I have myself once seen this fracture at thirty-eight years of age, and a dislocation of the thigh at sixty-two; but between fifty and eighty is the most common period: for, from the different state of the bone, the same violence which would produce dislocation in the adult occasions fracture in age. But when dislocation does occur between sixty and seventy years, it is in persons whose constitutions are particularly strong, and in whom age has not produced those changes in their bones which I have already endeavoured to point out.

Union of this fracture.

Much difference of opinion has existed upon the subject of the union of the fractured neck of the thigh-bone; it has been asserted, that these fractures unite like those of other parts of the body; but the dissections which I made in early life, and the opportunities I have since had of confirming these observations, have convinced me that the transverse fracture of the cervix femoris within the capsular ligament, does not unite by bone, a circumstance which I have always taught in my lectures; this is a most essential point, as the reputation of the surgeon hinges upon it. I was called to a case of this fracture, in which the medical attendant had been promising, week after week, an union of the fracture, and the restoration to the patient of a sound and useful limb. After many weeks the person became anxious for further advice; I did all in my power to lessen the nature of the mistake this gentleman had made, by telling the patient she would probably ultimately walk, although with some lameness; and taking the surgeon into another room, asked him upon what grounds he was led to suppose there would be union; to which he replied, he was not aware but the fracture of the neck of the thigh-bone would unite like those of other bones of the body; the case, however, proved unfortunate for his character, as this patient did not recover in the degree they usually do. Young medical men find it so much an easier task to speculate than to observe, that they are too apt to be pleased with some sweeping conjecture, which saves them the trouble of observing the processes of nature; and they have afterwards, when they embark in their professional practice, not

only still every thing to learn, but also to abandon those false impressions which hypothesis is ever sure to create, before they can be safely trusted.—Nothing is known in our profession by guess: and I do not believe, from the first dawn of medical science to the present moment, that a single correct idea has ever emanated from conjecture: it is right, therefore, that they who are studying their profession should be aware that there is no short road to knowledge; and that observations on the diseased living, examination of the dead, and experiments upon living animals, are the only sources of true knowledge; and that induction from these are the sole basis of legitimate theory.

In all the examinations which I have made of transverse fractures of the cervix femoris entirely within the capsular ligament, I have never met with a bony union, or of any which did not admit of motion of one bone upon the other. To deny its impossibility would be presumptuous, under all the varieties of direction, extent of fracture, and degree of violence by which it has been produced, for there is scarcely a general rule which does not admit of exception; but, all I wish to be understood to say is, that if it ever does happen, it is an extremely rare occurrence, and that I have not yet met with a single example of it*.

Having thus stated what is the common result of these cases, as regards their want of

Cause of the want of union.

* In Mr. Cross's account of his visit to the French Hospitals, some interesting matter upon this subject will be found.

union, I shall now proceed to give the reasons which may be assigned for the absence of ossific union in the transverse fracture of the neck of the thigh-bone within the capsular ligament.

Want of proper apposition.

The first reason which I should state is the want of proper apposition of the bones; for if the broken extremities be in any part of the body kept asunder, ossific union is prevented.

A boy, who had a compound fracture of the tibia, without the fibula being broken, and having the protruded end sawn off, the two extremities were prevented from coming in contact by the fibula, and union never occurred.—My friend, Mr. Smith, an excellent surgeon at Bristol, had a similar case under his care, in which a portion of the tibia had been sawn off, and the fibula remaining whole, prevented ossific union*.

* The particulars of the case were as follows:—The boy was admitted into the Bristol Infirmary for disease of the tibia; and the diseased portion not extending more than from two to three inches in length, that part of the bone was removed by the saw. In a month the limb had acquired so much firmness, that the boy was permitted to walk about the ward, which he was able to perform tolerably well, and in six weeks no doubt was entertained of ossification having taken place in the uniting substance; at this time he sickened with the small-pox, and died.—Upon examination, the edges of the extremities of the tibia were absorbed and rounded, and on the inferior portion a bony callus had formed, about three-quarters of an inch in extent; no earthy matter was discoverable in the greater part of the space originally occupied by the diseased bone, but a tough though thin ligamentous band extended from the superior to the inferior portion of the tibia. See *Medical Records and Researches.*

This fact is easily seen by experiment on other animals; I sawed seven-eighths of an inch of the radius from a rabbit, and the ends of the bones were not united to each other, but only to the ulna. In another rabbit I took out one-ninth of an inch of the radius with the same result; I also sawed off the extremity of the os calcis, and suffered it to be drawn up by the action of the gastrocnemius muscle, and it united only by ligament. See Plate.

The neck of the thigh-bone, when broken, is under similar circumstances; for, by the contraction of the muscles it is no longer in apposition with the head of the bone, and is therefore prevented uniting; but if this were the only obstacle, it would be argued that the retraction of the thigh-bone might be prevented by bandaging and extension: and the truth of this cannot be denied, although it is extremely difficult to preserve the limb in this position, as the patient in evacuating his fæces and urine, or by the slightest change of position, produces instant contraction of the limb, by calling into action those powerful muscles which pass from the pelvis to the thigh-bone.

Absence of continued pressure.

The second reason which prevents a bony union in these fractures, is the want of pressure of one bone upon the other, even where the length of the limb is preserved; and this I consider as the principal cause, and which will operate in preventing an ossific union in all cases where the capsular ligament is not torn; and in those I have had an opportunity of examining it has not been lacerated. The circumstance to which I allude, is the secretion of

a quantity of fluid into the joint; from the increased determination of blood to the capsular ligament and synovial membrane, a superabundance of serous synovia, that is, synovia much less mucilaginous than usual, distends the ligament, and entirely prevents the contact of the bones, by pushing the upper end of the body of the thigh-bone from the acetabulum. After a time, this fluid becomes absorbed, but not until the inflammatory process has ceased, and ligamentous matter has been effused into the joint, from the interior of the synovial membrane. That pressure between the broken extremities of bones is necessary to their union is further shewn by the following circumstances. If two broken bones overlap each other, on that side on which they are pressed together, there is an abundant ossific deposit; but on the opposite side where there is no pressure, scarcely any change is observed. So also we find if the ends of the bone be drawn from each other by the action of muscles, as sometimes happens in the fractures of the Os Femoris, Tibia, Os Humeri, Radius et Ulna, that union is not effected until the surgeon, by a strong leather bandage tightly buckled around the limb, compels the bones to press upon each other, and thus support the necessary inflammation for the production of ossific union. When a fracture occurs amidst muscles, those which are inserted into the fractured part of the bone have generally a tendency to keep the extremities of the bones together, with some few exceptions; but when a fracture occurs in the neck of the thigh-bone, the muscles have only an influence upon one portion of

the fractured bone; and this influence serves to draw one part from the other.

Little action in the head of the bone.

The third reason which may be assigned for the want of union of this fracture, is the little action proceeding in the head of the thigh-bone when separated from its cervix, its life being solely supported by the ligamentum teres which has some few vessels ramifying from it to the head of the bone. Little effusion of cartilage takes place, and but little bone is thrown out to fill the cancelli; yet it is certain that when the patient begins to employ the limb, the one portion of bone is occasionally applied against the other, and it would therefore be expected that a greater change in the head of the bone should take place; but on account of its slight vital power, this is not found to be the fact. I must observe, however, from the same circumstances happening in fracture of the patella, that want of apposition and pressure are the principal causes of the absence of union in the fracture of the neck of the thigh-bone. But still it must be allowed that the changes which are taking place in the head of the bone, after this fracture, are less than those which occur in any other fracture in the body, excepting in that of the patella, and that they seem even to differ in kind, because, instead of the common cartilaginous effusion which always precedes the formation of bone, a large quantity of ligamentous matter is thrown out from the surface of the cancellated structure upon the head of the thigh-bone.

The appearances which are found on the dissection of these injuries are as follow:

Dissection of this fracture.

The head of the bone remains in the acetabulum attached by the ligamentum teres. There are, upon parts of the head of the bone, very small ossific deposits, covered by the articular cartilage.

Bone.

The cervix is sometimes broken directly transversely, at others with obliquity. The cancellated structure of the broken surface of the head of the bone and of the cervix is hollowed by the occasional pressure of its neck attached to the trochanter, and consequent absorption; and this surface is sometimes partially coated with a cartilaginous deposit, which is in some parts studded with slight depositions of ossific matter in spots, so as to fill the cancelli, and produce a structure of a yellow colour upon the bone, which is rendered firm and smooth by friction, as we see in other bones which rub upon each other when their articular cartilages are absorbed. Portions of the head of the bone sometimes are broken off, and these are found either attached by means of ligament, or floating loosely in the joint covered by a ligamentous matter; but these pieces do not act as extraneous bodies, so as to excite inflammation, and thus produce their discharge, any more than those loose portions of bone covered by cartilage, which are found so frequently in the knee, and sometimes in the hip and elbow joints. Some ossific matter is effused on the neck of the bone connected with the trochanter, which is rendered short by an absorbent process; so as in some cases scarcely to project beyond the trochanter. (See Plate.) The appearance of the cancelli of the cervix femoris

differs much after this accident, being in some cases scarcely filled, and in others partially covered by a thin pellicle of cartilage, which, receiving afterwards an ossific deposit, puts on a yellower appearance than the original bone, and is smooth on its surface; generally, however, the cancelli are also partially covered by a ligamentous structure.

Ligament and synovial membrane.

The capsular ligament enclosing the head and neck of the bone becomes much thicker than natural, but the synovial membrane which lines it undergoes the greatest change from inflammation, being very much thickened, not only where it lines the capsular ligament, but also upon the neck of the bone, as far as the edge of the fracture.

Effusion into the joint.

Within the articulation a large quantity of serous synovia is found; by which term I mean to express, that the synovia is less mucilaginous, and contains more serum than usual: this fluid, by distending the ligament, separates for a time one portion of bone from the other; it is produced by the inflammatory process, and becomes absorbed when the irritation in the part subsides. I do not know the exact period at which this change takes place, but have seen it in the recent state of the injury. Into this fluid is poured a quantity of ligamentous matter, by the adhesive inflammation excited in the synovial membrane, and flakes of it are found proceeding from its internal surface, uniting it to the edge of the head of the bone. Thus the cavity of the joint becomes distended in part by an increased secretion of synovia, and in part by the solid effusion which the adhesive inflamma-

New ligament.

tion produces: the synovial membrane reflected on the cervix femoris is sometimes separated from the fractured portions, so as to form a band from the fractured edge of the cervix to that of the head of the bone; bands also of ligamentous matter pass from the cancellated structure of the cervix to that of the head of the bone, serving to unite, by this flexible material, the one broken portion of bone with the other.

Union by ligament.

The trochanter is drawn up, more or less, in different accidents; and in those cases in which it is very much elevated, I have known a considerable ossific deposit take place upon the body of the thigh-bone between the trochanter major and trochanter minor. When the bone has been macerated, its head and cervix are much lighter and more spongy than they are in the healthy state, excepting on those parts most exposed to friction, where they are rendered hard by a slight deposition of ossific matter, which has sometimes a polished surface.

It appears then, from this account of the dissection of those whose bodies are examined after having suffered from this fracture, that no ossific union is produced; that nature makes slight attempts for its production upon the neck of the bone, and upon the trochanter major; but scarcely any upon the head of the bone; and that if any union be produced, it is by ligament only.

These circumstances, which I have stated for many years in my lectures, and supported, as far as I was able, by the dissection of these fractures in the human subject, led me to prosecute the inquiry by experiments upon other animals. I found it difficult to succeed in

Experiments.

breaking the bone in the direction I wished; and after a great number of experiments, was only in four instances successful; the preparations of which I have preserved. (See Plate.)

EXPERIMENT I.

The neck of the thigh-bone was fractured in a rabbit, on October 28th, 1818; and on December 1st, 1818, as the wound had been some time healed, I dissected the animal.

Appearances on Dissection.—The capsular ligament was much thickened, the head of the bone was entirely disunited from its neck, but adhered by ligament to the capsular and synovial membranes; the broken cervix, which was very much shortened, played on the head of the bone, and had smoothed it by attrition; the head of the thigh-bone had not undergone any ossific change.

EXPERIMENT II.

The neck of the thigh-bone was broken in a dog, November 12th, 1818, and the animal was killed on the 14th of December following.

Dissection.—The trochanter was much drawn up by the action of the muscles, so that the head and cervix were not in direct apposition. The capsular ligament was much thickened, and contained a large quantity of synovia.

The joint was lined by adhesive matter of a ligamentous appearance, adhering to the head of the bone, which did not seem to be changed by any ossific process; but the thigh-bone

around the capsular ligament, and the trochanter major, and a little below it, was enlarged; we find, therefore, by this dissection, what appears in the human subject after this accident, happens in other animals; and motion, want of apposition, and pressure, with the little ossific action, in the head of the bone under these circumstances, produce the deficiency of bony union, as in man.

Having ascertained this, I was next anxious to learn if the head and neck of the thigh-bone would unite under circumstances in which apposition and pressure were maintained; and for this purpose made the following experiment:

EXPERIMENT III.

Longitudinal fracture.

I divided the neck and head of the thigh-bone longitudinally, by placing a knife on the anterior part of the trochanter major, and striking it down towards the acetabulum. The dog was killed twenty-nine days after, and the following appearances presented themselves:

A portion of the trochanter major had been broken off, and was only united by cartilage; the head and neck of the bone which had been longitudinally broken, were united; but the neck was joined by a larger quantity of ossific deposit than that which joined the separated portions of the head of the bone, and so irregularly as to make a beautiful preparation, and shews the circumstance most clearly. (See Plate.) This bone may be seen in the collection at St. Thomas's Hospital.—Whether the union began externally to the ligament, and proceeded inwards,

or whether on the whole surface at once, it is impossible to ascertain; but the coalescence was firm, though, as I have stated, I thought more so at the neck than at the head of the bone.

Thus, then, it appears, that if the bones be applied to each other, if they be pressed together, and in a state of rest, ossific union can be produced in a longitudinal fracture, although the ossific deposition is extremely slight when compared with that of other bones. This principle will be further explained by experiments on the fracture of the patella. The great difference, between the longitudinal and the transverse fracture of the cervix femoris, consists in this, that in the longitudinal, as both parts of the head of the bone are remaining in the acetabulum, they are pressed firmly together, and this contact produces their union, even under the slightest ossific action; beside which, the broken head and neck of the bone have sources of nourishment independent of the ligamentum teres; whilst, in the transverse fracture, the actions of the muscles have a constant tendency to separate the portions of bone, and the effusion of synovia and of ligamentous matter into the joint, prevent a continued contact of the fractured surfaces of the bones. Union of these.

The fracture of the neck of the thigh-bone may be confounded with the dislocation of the os femoris upon the dorsum ilii, in the ischiatic notch, and upon the pubes; as in all of these the limb is shorter.—From the two former, it may be distinguished by the eversion of the foot, and by the flexibility of the limb in the fracture; and from the latter, by the ball of

the os femoris being felt in the groin, which happens in the dislocation on the pubis; otherwise the eversion of the foot in both cases might lead to their being confounded.—(See Essay on Dislocation, in the first Part.)

Treatment. With respect to the treatment of the fractured cervix femoris within the capsular ligament, those who believe a union can be effected after a transverse fracture, will extend the limb so as to bring the bones in apposition by drawing down the trochanter, and by applying splints upon the thigh, and straps around the pelvis, to force the cervix femoris against its head; and the best means for the purpose will consist of an apparatus described in the succeeding pages, and delineated in one of the plates. And some surgeons have thought that in this way their efforts have been effectual in producing an union: but, from the history of the cases, it is clear they have not distinguished the fracture within, from that which is external to the ligament, in which union of the bone occurs as in other bones of the body: those, on the contrary, who have observed these accidents well, who see the fracture occurring at very advanced age, who only discover a crepitus when the bone is drawn down and rotated inwards, in whom the limb is considerably shortened, and the degree of pain they suffer comparatively slight to the fracture of the body of the bone, will be disposed to avoid confining the patient to any long or continued extension as being likely to be productive of ill health, without the probability of producing union.—The mode, therefore, which we now adopt in these cases, is as follows:—We place a

pillow under the whole length of the limb, and put another across this under the patient's knee; and thus, by keeping it elevated, we procure an easy bent position of the limb: in this situation the patient remains, until the inflammatory process consequent to this accident, has ceased, which is from a fortnight to three weeks; we then allow the patient to rise from her* bed, and to sit upon a high chair, to prevent a degree of flexion which would be painful; in a few days crutches are allowed, upon which the patient is then capable of taking exercise; after a time the crutches may be laid aside, a stick substituted for them, and in a few months the person is able to use that limb without any adventitious support. The degree of recovery, in these cases, is as follows: if the patient be very corpulent, the aid of crutches will be for a long time required; if less bulky, a stick only will be sufficient; and where the weight of the body is inconsiderable, the person is able to walk without either of these aids, but drops a little at each step on that side, unless a shoe be worn having a sole of equal thickness to the diminished length of the limb. In every case, however, in which there is the smallest doubt, if it be a fracture within, or external to the ligament, it will be proper to treat the case as if it were the fracture which I shall next describe, and which readily admits of union.

Degree of recovery.

Now and then this accident is destructive to life in very old and infirm persons, from the exhausted state of their frame.

Danger of.

* This accident more frequently occurs in the female than in the male.

Surgeon careful.

The surgeon must be careful of the opinion which he gives of the result of these cases; lameness is, in the transverse fracture, sure to follow; but its degree cannot, at the first of the accident, be exactly estimated.

It is gratifying to find opinions which have been long delivered, confirmed by the observations of intelligent and observing persons; and therefore it was with pleasure I read the accounts of the dissection of several cases of fracture of the cervix femoris, by my friend Mr. Collis, (who is a man excellently informed in his profession,) and who has published in the Dublin Hospital Reports, the dissection of several of these accidents, and found a similar want of ossific union in the fracture within the ligament.

Of Fractures of the Cervix Femoris external to the Capsular Ligament.

The symptoms of this accident in some respects so closely resemble those of the fracture internal to the ligament, as to require much attention to accurately distinguish them; but the result is entirely different: so that a favourable opinion may be given as to the restoration of the bone by an ossific union.

Symptoms.

In this accident the injured leg is a little shorter than the other; the foot and toe on that side are everted, from the loss of support which the body of the thigh-bone sustains in consequence of the fracture; much pain is felt at the hip, and on the inner and upper part of the thigh,

and the joint loses its usual roundness. These, then, are all marks of similarity between the two accidents; but still there are many distinguishing signs. First; This accident occurs frequently at the earlier periods of life; for it happens in the young, and in the adult under fifty years of age; I have known it at a later period, but less frequently; therefore, when the above symptoms are seen at any age under fifty years, it will be generally found to be a fracture external to the capsular ligament, and capable of having ossific union produced in it, and, consequently, of complete recovery.—The first case of this accident I ever saw, was in a man of middle age, at St. Thomas's Hospital, under Mr. Cline, senior, who had most of the symptoms of a fractured cervix femoris within the capsular ligament. He was placed in bed with his thigh extended over a pillow, and splints were applied; the man recovered with an ossific union, which was ascertained by dissection, as he died of a fever at the period at which he was to have been discharged from the hospital; and upon examination of the limb, the thigh-bone was found united; the fracture having been external to the capsular ligament through the trochanter major.

Diagnostic marks.

Union of the bone.

These cases may be in some measure distinguished by the severity of the accident which produces them, whilst the internal fracture, as we know, happens from very slight causes, this, on the contrary, is produced either from severe blows, from falls from a considerable height, or from laden carriages passing over the pelvis.

Causes severe.

It may be also generally known by the crepitus which usually attends it upon slight motion,

Crepitus.

for it is rarely necessary to draw the limb down, to distinguish the grating of one bone upon the other, and this happens from the less retraction of the limb; I have however seen a case where the crepitus could not be discovered unless the thigh was extensively moved.

Trochanter drawn forwards more than upwards.

The broken trochanter is in these cases drawn forwards, so as to be placed before the head of the bone nearer to the spine of the ileum than it is naturally seated. When the patient is sitting,

Hollow of the groin filled.

on the healthy side, there is naturally a depression in the groin, into which the hand readily sinks, but upon the fractured side this is not the case, for that part is occupied by the extremity of the broken bone, forming a prominence there, which is very distinct.

Severe pain.

This accident is generally marked by much greater severity of suffering than the fracture within the ligament, more especially upon motion, for then the broken ends of the bone rub violently against the muscles, and produce excruciating pain, which does not happen in an equal degree in the fracture within the ligament.

Limb very little shorter.

The limb is shorter, but not to the same extent as in the internal fracture, for it rarely amounts to an inch; this, however, will greatly depend upon its obliquity, and upon the degree of laceration of the surrounding parts, admitting of a greater or less retraction of the muscles.

Rotation greater.

In the external fracture, the rotation of the limb is more extensive than in the internal, because there is no cervix remaining attached to the shaft of the bone. If the upper part of the trochanter major be fixed at the time the body of the bone is rotated, and the fracture is through

the trochanter, the rotation of the thigh may be performed without giving motion to the cervix femoris.

Lastly, this accident may be distinguished by the ossific union which occurs in it, but this can only be ascertained at the distance of from eight to twelve weeks from the time of the injury. Ossific union.

Upon the dissection of these cases, the seat of the fracture is found to vary, sometimes it is at the part at which the cervix joins the trochanter major. Mr. Travers shewed me a specimen of this accident, in which the bone was divided into several portions. First, the trochanter minor was detached from the shaft of the thigh-bone. Secondly, an oblique fracture passed through the trochanter major, so as in part to detach it from the body of the bone. Thirdly, the head and cervix femoris were broken from the trochanter, and the fracture passed in part externally and in part within the capsular ligament. Dissection.

My friend Mr. Roux, sent me from Paris one of these cases, which was broken through the junction of the cervix with the trochanter, including a part of the latter. (See Plate.) In another plate, the fracture will be seen extending obliquely from the trochanter minor through the trochanter major, and the drawing is from a bone which has been long in my possession, and which is now in the Museum at St. Thomas's Hospital; it appears in this case, the thigh had been placed on its outer side during union, as it has united with the condyles exceedingly everted. Mr. Oldnow, surgeon at Nottingham, sent for my inspection two excellent specimens of this fracture, in which the neck of the thigh-bone was broken at its junction

with the trochanter major. The trochanter major itself was also broken off; the trochanter minor formed a distinct fracture; the broken cervix femoris had become united to the shaft of the bone; the trochanter minor was reunited to the thigh-bone, but was drawn higher than its natural situation. The trochanter major was in one of the specimens, completely united to the body of the bone, but not in the other. Thus the thigh-bone, at the trochanter, was divided into four parts, viz. the head and neck as one part, the trochanter major as a second, the trochanter minor as a third, and the body of the bone making the fourth; the bones uniting with very little shortening.

Although, then, this accident has some of the marks of the internal fracture of the neck of the bone, yet it unites by bone, and it will be seen that the union is similar to that of other bones external to the joints; cartilage is first deposited, and then the matter of bone, because in this case it can be brought into apposition, and the ends of the bones are confined together by the surrounding muscles; one portion is pressed against the other, and the neck of the bone sinks deeply into the cancellated structure of the trochanter, and thus direct approach and pressure are preserved when the fracture is at the junction of the cervix with the trochanter, and the nutrition of each extremity of the bone is well supported by the vessels which proceed to it from the surrounding parts.

Difference of opinion reconciled.

We now see the reason of the difference of opinion respecting the union of the fracture of the neck of the thigh-bone. In the internal the bones are not applied to each other, and the

nutrition of the head of the bone is imperfect, but in the external the bones are held together by the surrounding parts, and easily kept so by external pressure.

Much time is required in some of these accidents to produce a complete ossific union; and the head and neck of the bone received into the cancelli move for a long period in their new situation, although so far locked in as to prevent their separation. Mr. Travers has the most valuable specimen of this state of the bone which I have had an opportunity of seeing, and of which he has had the kindness to send me the following account:

"Richard Norton, aged 60, fell upon the curb-stone of the foot pavement, and struck the upper and outer part of his left thigh with great violence. He was admitted into St. Thomas's Hospital on the 24th of January, 1818. The tension was then considerable; the line of the tensor vagina femoris formed an arch, the limb was shortened, the foot inclined outwards; the motion of the limb free in all directions; but it was painful, more especially when the knee was carried over the opposite thigh. The crepitus of the trochanter major was distinctly felt in these motions, and the swelling of the parts, with the extensive crepitus, gave an idea that the accident was a comminuted state of the trochanter, and that the base of the cervix femoris was broken, hence the shortening of the leg and the eversion of the foot. After the use of evaporating lotions, for some days the tension subsided, so as to allow of the application of the long outer splint and two thigh splints well bedded. On the 4th of March the splints

were removed, and union appeared to have taken place, for the limb had resumed its natural figure, but was a little shorter than the other. In the course of a month more he began to use his crutches. On the 15th of April he was placed under the physician, for defect in his general health; and when he was upon the point of quitting the hospital he was seized with spasms in his chest, of which he suddenly expired.

"Upon examination, some old adhesions of the pleura and water in the chest and pericardium were found. The fracture was through the trochanter, as had been supposed, extending some way down the bone, and it apparently had united, with very slight deformity; but on maceration, the head and neck of the bone became loose in the thigh bone, and a fracture was found there, which locked the head and cervix in a shell of bone formed around them.

"B. TRAVERS."

Mr. Travers having sent me the bone, the following are the appearances of this curious case. The head and cervix had been separated from the trochanter major and body of the bone. The upper part of the thigh-bone was obliquely split, so as to receive the cervix femoris into the cancelli. This fracture of the thigh-bone separated the posterior portion of the trochanter major from the body of the thigh-bone, and the trochanter minor was removed with it. An union had taken place between the fractured portions of the trochanter, at a slight distance from each other, and thus a hollow was left, into which the cervix femoris was received, and it had not yet become united by ossific deposit, for upon

maceration the neck of the bone had free play in the cavity in which it had been received, and from which it could not be removed.

Treatment.

In the treatment of this injury we used to preserve the length of the limb by applying a roller around the foot of the injured leg, and by binding the foot and the ancles firmly together to prevent their retraction, and thus render the uninjured side the splint to that which is fractured, giving it a continued support. But as this plan makes the passage of the evacuations difficult, and it does not press the fractured portions firmly together, although it renders the length of the limbs equal, I adopt the following plan:

The patient is to be placed on a mattress on his back, the thigh is to be brought over a double inclined plane composed of three boards, one below which is to reach from the tuberosity of the ischium to the patient's heel, and the two others above have a joint in the middle by which the knee may be raised or depressed; a few holes should be made in the board admitting a peg which prevents any change in the elevation of the limb but that which the surgeon directs; over these a pillow is thrown to place the patient in as easy a position as possible*. (See Plate.)

* The construction of this inclined plane is so little complicated, that it may be made at the instant of two common boards, one of which is to be sawn through nearly at the middle, and if hinges cannot be immediately procured, the boards may be lashed together by cords; for the principle of this machine, I believe we are indebted to Mr. White, of Manchester, who had one made of iron, and hollowed to adapt it to the form of the leg and thigh, but this machine was too heavy and too complicated for use. Mr. James, of Hoddesdon, improved

When the limb has been thus extended, a long splint is to be placed upon the outer side of the thigh to reach above the trochanter major, and to the upper part of this is fixed a strong leather strap which buckles around the pelvis, so as to press the one portion of bone upon the other; and the lower part of the splint is to be fixed with a strap around the knee to prevent its position being moved; the limb must be kept as steady as possible for eight weeks, at the end of

upon Mr. White's idea, by having the instrument made of wood, with moveable splints upon the sides, which were to be adapted to the limb, and this construction rendered it more portable and less complicated than before; but as the addition of splints rendered the instrument less easy of adaptation, I thought it better to have it made merely an inclined plane, and to apply splints, or not, as occasion might require. I have now been in the habit for near twenty years of employing this instrument in fractures of the thigh-bone, and also of recommending it in my lectures, and do firmly believe that it will be found the best means of keeping the limb constantly extended, and preventing that contraction of muscles which is so apt to occasion deformity. When the thigh and leg are placed upon the machine, the patient rests upon his back, the knee is slightly bent, and the foot rests upon the heel, and the position is one of great ease to the patient. Although we are ready to acknowledge the high merit of the contrivances of Dessault and Boyé for fractures of the thigh, yet upon the whole we give a preference both to this instrument and to the position which we have just described, and which we have been in the habit of adopting in these cases. The same result may be produced by a long pillow reaching from the tuberosity of the ischium to the foot, and by a second rolled up under the knee; but the extension is neither so perfect at the moment, or so continued as when the limb is on the inclined plane, and it requires infinitely more care to prevent contraction. While I strongly recommend this double inclined plane, I should think myself dishonest if I did not acknowledge the source from which it was derived.

which time the patient may be permitted to rise from his bed if the attempt does not give him much pain; he is still to retain his outer splint for a fortnight, with the straps which I have mentioned, round the pelvis, and by this treatment he ultimately recovers a very good use of his limb. The following case shews the usual results of this accident when it is very severe.

Recovery.

Case.

Mr. Peggler, of Wanstead, aged 46, on the 13th of November, 1817, fell while walking, on a glass bottle which he had in his pocket, and when he attempted to raise himself from the ground he found he was not able to stand. In a quarter of an hour he felt great pain and could not bear the slightest weight of his body on the injured limb. Mr. Constable, of Woodford, was sent for, and he gave me this account. The foot at first did not appear to turn out, but when the patient was put into bed and laid on his back it became everted, the leg appeared somewhat shorter, but was with but little difficulty pulled down to its natural length; the foot was benumbed, and continued so for twelve months. He was placed in bed with a bolster under the hip, to prevent displacement of the bone, and his knees and ancles were tied together.

On the December following, about Christmas, I met Mr. Constable to visit a patient with a severe injury of the head, and he then requested me to see Mr. Peggler, whom I found incapable of turning in his bed without assistance, and the attempt gave him great pain; his injured leg was a little shorter than the other, with the trochanter drawn forwards towards the spine of the ileum, and could be felt consider-

ably separated from that portion of the trochanter connected with the neck of the bone; the foot was turned outwards, he could not sit, and the least attempt to raise himself produced excruciating suffering; in the horizontal position I brought him to the foot of the bed to make as accurate an examination as I could of the nature of the accident, and could have no hesitation in pronouncing it a fracture through the trochanter. In less than a month he began to use his crutches, and continued their use for three months; he then laid aside one crutch and employed a stick and crutch, and in a short time needed the support of a stick only; but it was twelve months before he recovered the entire use of his limb. The leg is still nearly an inch shorter than the other; the portion of the trochanter connected with the thigh-bone, has united with the fore part of the trochanter joined to the neck of the bone, and is consequently much nearer the spine of the ilium than usual; the foot also is slightly everted, but he walks extremely well; this day week he walked ten miles from home and returned the same day, and this day, July 28, 1819, he has walked from Wanstead to my house, and intends to walk back, a distance of near twenty miles.

This history of Mr. Peggler's accident is so similar to the cases of fracture through the trochanter major, which I have had an opportunity of seeing, that their detail would only become a useless repetition, the only variations that I have seen having been in the distinctness of the crepitus accompanying them, which is

less in proportion as the fracture approaches the capsular ligament.

I have received from Mr. Oldknow, of Nottingham, an account of some cases of the fracture external to the ligament, which occurred in persons very advanced in years, so that, as age is not a certain criterion, it becomes necessary to pay the utmost attention to the other discriminating marks of this not unfrequent injury.

Of Fractures below the Trochanter.

The thigh-bone is sometimes broken just below the trochanter major and minor, and a most difficult accident it is to manage, and miserable distortion the consequence, if it be ill treated. The upper end of the bone is drawn forwards and upwards, so as to form nearly a right angle with the body of the thigh-bone; the cause of this is evidently the contraction of the iliacus internus and psoas muscles, assisted perhaps by the pectinalis and first head of the triceps, which participate in the irritation the fracture produces, and are thrown into a state of spasmodic contraction; to give a better idea of this effect, (see Plate) in which the bone will be observed to be united not only with extreme shortening, but with a hideous projection forwards. If pressure be made upon the projecting bone in this case, it only adds to the patient's suffering, and to the degree of irritation of the limb, without preserving the bone in its proper situation. It will be seen that this fracture, although uniting, exceedingly overlaps, and that the union is very feeble, shewing what I have already

mentioned, the circumstance of fracture thus placed having the ossific deposition only on that side where the inflammation was kept up by the pressure of one bone lying on the other; this preparation may be seen at the Anatomical Museum at St. Thomas's Hospital.

To prevent this horrid distortion and imperfect union, two principles are required to be strictly observed; the one is to elevate the knee very much over the double inclined plane, and the other to place the patient in a sitting position, well supporting him by pillows during the progress of its union; the degree of elevation of the body which is required will be readily ascertained by observing the approximation of the fractured extremities of the bones; and this position is demanded, to relax the psoas and iliacus muscles, and thus prevent the elevation of the upper part of the bone. In this way, and thus only, can the great deformity I have described be prevented. When by this posture the extremities of the bones are brought into proper apposition, and all projection of its upper portion is removed, either the splints may be applied which are commonly used in fracture of the thigh-bone, or, what is better, a strong leather belt lined with some soft material, should by means of several straps be buckled around the limb.

OF DISLOCATION OF THE KNEE.

The broad surfaces of bone by which the os femoris rests upon the tibia are calculated to

prevent the ready dislocation of this joint, which would be otherwise very liable to happen, from the superficial nature of the articulating cavities on the head of the tibia, and also from the great violence to which this joint is frequently exposed.

The depressions upon the head of the tibia are however rendered deeper by the addition of the semi-lunar cartilages which rest upon the bone, they receive the condyles of the os femoris, and are attached by ligaments to the edge of the tibia. The fore part of the joint is defended by the patella, which has two unequal articular surfaces to play upon the condyles of the os femoris; the head of the fibula forms no part of the knee-joint, but is attached with the tibia from an half to three-fourths of an inch below its head.

Structure of the knee.

Bone.

The junction of the os femoris, tibia and patella, is produced by means of a capsular ligament, which proceeds from the os femoris to the head of the tibia, and is attached to the edge of the patella where it divides into two portions, forms wings to that bone, and takes the name of alar ligaments. On its outer side the capsular ligament is covered and greatly strengthened by the tendinous expansions which are derived from the vasti muscles, and which proceed to the head of the tibia. Internally the ligament is lined by the synovial membrane, which is folded within the cavities on the extremities of the bones, and is reflected from the ligament to the edge of the articular cartilages, and it is believed forms a covering to the articular carti-

Ligaments.

lages. Beside the capsular there are several peculiar ligaments. *First*, the ligamentum patellæ, which is stretched from the lower part of the patella to the tubercle of the tibia. *Secondly*, the external lateral or femoro fibular ligament, which passes from the os femoris to the head of the fibula, and which divides into two external lateral ligaments. *Thirdly*, the internal lateral or femoro tibial ligament being attached to the os femoris, and to the head of the tibia. *Fourthly*, the oblique or popliteal ligament, which proceeds from the external condyle of the os femoris obliquely to be inserted into the head of the tibia. *Fifthly*, the crucial ligaments which pass from the depression between the condyles of the os femoris behind; the one to a projection between the articular surfaces of the head of the tibia, and the other to a depression behind that projection, so that these ligaments cross each other from before backwards. The patella has a muscular connection with the os femoris by the insertion of the rectus, vasti, and cruralis, and by the ligamentum patellæ it is united with the tibia, and laterally it is joined to the capsular and alar ligaments. This ligamentous junction of the three bones is very firm, but it allows of free flexion and extension with some degree of rotatory motion when the knee is bent; but although great strength of union is produced of the joint, still excessive violence and extreme relaxation will occasionally lead to its dislocation.

On Dislocations of the Patella.

The patella is liable to be dislocated in three directions; namely, outwards, inwards, and upwards. In its lateral dislocation the bone is most frequently thrown on the external condyle of the os femoris, where it produces a great projection; and this circumstance, with an incapacity of bending the knee, is the strong evidence of the nature of the injury. Three directions. Symptoms.

The most frequent cause of the accident is from a person, in walking or running, falling with his knee turned inwards, and the foot outwards, and thus, by the action of the muscles to prevent the fall, the patella is drawn over the external condyle of the os femoris, and when the person attempts to rise, he finds himself unable to bend his leg, and the muscles and ligaments of the patella are all forcibly on the stretch. This accident generally occurs in those who have some inclination of the knee inwards, which, under the action of the extensor muscles, gives a direction to the patella outwards.—The internal dislocation is much less frequent, and it happens from falls upon a projecting body, by which the patella is struck upon its outer side, or by the foot being, at the time of the fall, turned inwards. Cause. Internal.

What the state of the ligament in these cases is, I have had no opportunity of learning, having never dissected a limb in which this accident had happened.

The mode of reduction in either case con- Mode of reduction.

sists in pursuing the following plan. The patient is placed in a recumbent posture, and an assistant raises the leg by lifting it at the heel; the advantage of which is, that it extends the limb in the greatest possible degree; then the surgeon presses down that edge of the patella which is most remote from the joint, be it one luxation or the other; and this pressure raises the inner edge of the bone over the condyle of the os femoris, and it is immediately drawn, by the force of the muscles, into its situation.

My friend, Mr. George Young, informed me, that he was called to a case of dislocation of the patella outwards, in which the reduction of the patella was very difficult. The patient was a female, who, by a fall in walking, had the patella drawn over the external condyle of the os femoris, where it remained. He employed, most perseveringly, pressure upon the edge of the patella, without being able to succeed, but at last reduced it in the following manner. He placed the patient's ancle upon his shoulder, and thus most completely extended the limb, and obtained a fixed point of resistance at the knee. Then grasping the patella with the fingers of his right hand, he pressed the outer edge of the patella with the ball of his left thumb and pushed it into its place.

An evaporating lotion of spirits of wine and water is to be applied, and in two or three days the limb may be bandaged, and it is soon restored to its natural uses, although it is somewhat weaker than before.

Dislocation from relaxation.

When the bone is dislocated from relaxa-

tion, (See First Part of these Essays) the patella is drawn upon the external condyle of the os femoris from very slight accidents, or from sudden action of the muscles. My neighbour, Mr. Hutchinson, who has seen a great deal of surgery, informs me, he has very frequently seen this accident, and that the tendency to it has arisen, in a large proportion of cases, from the relaxation produced by excessive indulgence in onanism.

The reduction, in these cases, is effected in the same manner as has been before described. After the reduction, to prevent any recurrence of the accident, and to support the weakened ligament, a laced knee cap, with a strap and buckle above and below the patella is to be worn.

On the Dislocation of the Patella upwards.

Upwards.

In this dislocation the ligament of the patella is torn through by the action of the rectus femoris muscle, and the immediate effect of the injury is to draw the patella upwards upon the fore part of the thigh-bone.—The appearances which this accident presents, are very decisive of the nature of the injury; for, besides the elevation of the patella, and its easy motion from side to side, a deep depression is felt above the tubercle of the tibia from the absence of the ligament: the patient immediately loses the power of bearing upon that limb, as the knee bends under each attempt, and he would fall if he persisted in throwing the weight of his body upon it. A considerable degree of inflammation follows.

Ligament lacerated.

Symptoms.

Treatment. Local depletion and evaporating lotions are to be used for from four to seven days, and then a roller is to be applied around the foot and upon the leg, to prevent it from swelling, the leg is to be kept extended by a splint behind the knee, and a bandage composed of a leather strap is to be buckled around the lower part of the thigh; to this is to be attached another, which is to be carried on each side of the leg, and under the foot, and is to be buckled to the circular strap; thus the bone is gradually drawn down, so as to allow of an union of the ligament. In a month the knee may be slightly bent, and as much passive motion daily given as the patient is able to bear; by these means the ruptured ligament becomes united, and the patella retains its motion. With very great attention this becomes perfect: for so it happened in a case which I saw with Mr. Burrowes, in Bishopsgate Street. Mr. B. paid great attention to the case, and the patient recovered without any diminution of the natural powers of the part, the patella being gradually drawn down, until the ends of the ligament were approximated and coalesced.

On Dislocation of the Tibia at the Knee-Joint.

Four directions. These dislocations occur in four different directions; but two of them are incomplete and lateral, while the others are perfect luxations, the tibia being thrown either backwards or forwards.

The lateral dislocations are but rare. In the

dislocation inwards, the tibia is thrown from its situation, so that the condyle of the os femoris rests upon the external semilunar cartilage, and the tibia projects much on the inner side of the joint, so as at once to disclose the nature of the injury. The first case of this kind which I ever witnessed was brought to St. Thomas's Hospital whilst I was apprentice there; and I remember being struck with three circumstances in the case: the first was the great deformity of the knee from the projection of the tibia; secondly, the ease with which the bone was reduced by direct extension; and, thirdly, the little inflammation which followed upon what appeared to be so serious an injury; for the man was discharged from the hospital, having suffered little local or constitutional irritation. Internal.

The tibia is now and then thrown upon the outer side of the knee-joint, the condyle of the os femoris being placed in the situation of the inner semilunar cartilage, or rather behind it, when an equal deformity is produced, as in the other dislocation. The reduction of the limb is equally easy with the former, and the patient recovers with little diminution of the powers of the part. It seems to me, that in both these dislocations the tibia is rather twisted upon the os femoris, so that the condyle of the os femoris, with respect to the tibia, is thrown somewhat backwards, as well as outwards or inwards. External.

CASE.

One of the aldermen of the city of London, Case.

riding down Highgate-hill during the night, and not being aware of a rail being placed across a part of the road which was repairing, the horse ran against the rail, and turning quickly, threw his rider over the rail, whilst his leg was confined between it and the horse, so that his body was on one side of the rail, and his leg on the other: the result of this was, that he partially dislocated his tibia outwards, throwing the condyle of the os femoris inwards. Being immediately taken to a public-house, the tibia was easily replaced, and being, some hours after, taken home, means were used to reduce the swelling and inflammation which in him became considerable. When he attempted to bear upon the limb he found the capsular ligament very feeble, and he was obliged to have a knee-cap made of very strong leather to support and connect the bones; and by the aid of this bandage he gradually recovered, and was enabled to walk well and to do duty on horseback, as a light horse volunteer, before twelve months had expired.

CASE.

Case of dislocation inwards.

I was consulted by Mr. Richards respecting Mr. Bovill, a gentleman from Barbadoes, who had dislocated his knee. I made a few notes on the case at the moment, which were as follow. The gentleman was thrown from a gig; the tibia was dislocated, and the fibula broken a little below its head. The head of the tibia projected much on the inner side of the condyle of the os femoris. My friends, Mr. Caddell and Mr.

Richards, surgeons in Barbadoes, saw him in a quarter of an hour after the accident; the leg was extended from the thigh-bone, in a bent position of the limb; the extension was a long time continued, and the force was employed by several persons for half an hour before the luxation was reduced. It became excessively swollen, and remained so for many weeks, the climate probably being unfavourable to his recovery; but at length the inflammation and its consequences were overcome by local depletion. When I saw him, eighteen months had elapsed from the accident, and he could not then bend the joint at right angles with the thigh; there was also an unnatural lateral motion of the joint, from the injury which the ligaments had sustained. The fracture of the fibula had injured the peroneal nerve, as was evident from the numbness of which he complained in the course of its distribution.

Dislocation of the tibia forwards.

The tibia is now and then dislocated in the direction forwards. In this accident, when the person is recumbent, the external marks of the injury are these. The tibia is elevated, the thigh-bone is depressed, and is thrown somewhat to the side as well as backwards. The os femoris makes such pressure on the popliteal artery, as to prevent the pulsation of the anterior tibial artery on the foot; the patella and tibia are drawn by the rectus muscle forwards. Such were the appearances in a man of the name of Briggs, brought into Guy's Hospital in the year 1802, not only with this accident, but with a compound fracture of the tibia of the other leg, with dislocation of the head of the fibula. Mr. Lucas was obliged to

amputate the compound fracture, and the man is now living at Walworth. The limb in this case was easily reduced, by extending the thigh from above the knee, and by drawing the leg from the thigh and inclining the tibia a little downwards. Directly as it was reduced the popliteal artery ceasing to be compressed, the pulsation in the anterior tibial was restored.

Dislocation of the tibia backwards.

The head of the tibia is sometimes dislocated backwards, behind the condyles of the os femoris, producing the following appearances: a shortened state of the limb, a projection of the condyles of the os femoris, and depression at the ligament of the patella, and the leg is bent forwards. The following case, for which I am indebted to my friend Dr. Walshman, who has ever been a man of close observation in his profession, and always practised it with attention, judgment, and with honor.

CASE.

Case by Dr. Walshman.

Mr. Luland, residing near the Elephant and Castle, at Newington Butts, a very robust and muscular man, on the 4th of January, 1796, dislocated his shoulder and knee at the same instant. The accident happened in the following manner: it being a very severe frost, and the ground very slippery, he being in his cart, the horse fell. Mr. Luland was thrown under the front rail of the cart and luxated the tibia backwards, whilst his shoulder fell on the saddle and dislocated the os humeri into the axilla. The head of the tibia was completely dislocated backwards, reaching behind the condyles of

the femur into the ham; the tendinous connection of the patella to the rectus muscle was ruptured; the external condyle of the os femoris very protuberant, the leg shorter, and there was a depression just above the patella. The patient felt most excruciating pain when Case. the limb was moved, but there was not any considerable degree of suffering when it was at rest. The reduction was effected in the following manner: two men extended the limb upwards, one from the groin and the other from the axilla, whilst two others extended the leg from a little above the ancle in the opposite direction; and they gradually increased the force of their extension till the bone was reduced. The patient was placed on his back, and Dr. Walshman directed the head of the bone to its natural situation. Dr. W. then applied a flannel roller on the knee, placed the patient in bed with his limb upon a pillow, and directed the part to be kept wet with an evaporating lotion. He remained in this state a fortnight, free from pain; the Dr. slightly moved the part every other day, as far as he could without giving pain. In about a month Mr. Luland began to walk on crutches. Ten weeks after the accident he was able to sit at his dinner-table, and in five months he had given up the use of his crutches, and appeared perfectly recovered, being able to use that limb as well as the other. He died of dropsy, February 18, 1819.

Dr. Walshman's treatment of this case was highly judicious. He suffered the parts, as he observes in his letter, to remain at rest till the

adhesive inflammation had united the lacerated ligament, and then, and not till then, began with passive motion.

On partial Luxations of the Thigh-bone from the Semilunar Cartilages.

From relaxation.

Under extreme degrees of relaxation, or in cases where there has been an increased secretion into a joint, the ligaments become so much lengthened as to allow the cartilages to glide upon the surface of the tibia, and particularly when pressure is made by the thigh-bone on the edge of the cartilage. That excellent practical surgeon, Mr. Hey, of Leeds, whose death will be severely deplored in the district in which he practised, and lamented by those in the profession who have its improvement at heart, was the first who clearly described the symptoms and cause of these accidents, and suggested a mode of treatment, which is ingenious, scientific, and generally successful. The most frequent cause of the accident is from a person in walking striking his toe when the foot is everted against any projection (as the fold of a carpet), he immediately feels pain in the knee, which is unable to be completely extended. I have known this accident also happen from a person having suddenly turned in his bed, and the clothes not suffering the foot readily to turn with the body, the thigh-bone has slipped from its semilunar cartilage. I have also known it occur from a sudden twist of the knee inwards when the foot was turned out.

Mr Hey's idea.

The explanation of this accident is as follows:

The semilunar cartilages which receive the condyles of the os femoris are united to the tibia by ligaments, and when these ligaments become extremely relaxed and elongated, the cartilages are easily pushed from their situation by the condyles of the os femoris, which are then brought into contact with the head of the tibia, and when the limb is attempted to be extended the edges of the semilunar cartilages prevent it. How then is the bone to be again brought upon the cartilages? Why, as Mr. Hey has advised, by bending the limb back as far as is possible, which enables the cartilage to slip into its natural situation, from the pressure of the thigh-bone being removed in the bent position, and the leg being brought forwards it can then be completely extended, because the condyles of the os femoris are again received on the semilunar cartilages. This plan is not however invariably successful, as the following case will shew. A lieutenant in the army had this accident repeatedly happen to him, and the limb was as often reduced by the above means; but at length in turning in bed, from the pressure of the bedclothes on his foot, the accident recurred. He came to town; but bending the limb had now no effect in enabling him to extend the joint, I therefore advised him to visit Mr. Hey at Leeds; but I learnt that in this case the joint was never reduced. I also made the following notes of the case of a gentleman who came to my house. "Mr. Henry Dobley, æt. 37, has often dislocated his knee by turning the foot inwards and the thigh-bone outwards, by accidentally slipping in walking on uneven ground, or under sudden

Explanation of the accident.

Mode of reduction.

Sometimes unsuccessful.

exertions of the limb; considerable pain is immediately produced, accompanied with a great deal of swelling. His mode of reducing it is as follows: he sits upon the ground, and then bending the thigh inwards and pulling the foot outwards, the subluxation of the os femoris being external, the natural position of the limb becomes restored. A knee-cap laced tightly around the knee is the usual preventive of the return of this accident, but it is not sufficient in Mr. Dobley, without the addition of straps, and more especially of a very strong leather one just below the patella."

Different mode of reduction.

Particular bandage required.

A young lady was brought to my house who was frequently the subject of this accident, but in her the cartilages had been several times easily replaced, and the return of the accident prevented by a bandage composed of a piece of linen with four rollers attached to it, (see Plate,) which were tightly bound above and below the patella, and she said, answered its intended purpose better than any other.

Great alteration takes place in the form and size of the knees, in some of these cases, from a chronic rheumatism sometimes attending them. I made the following notes of a case of this kind, about which I was consulted, but I have seen several similar to it.

CASE.

Case.

Lady D——, a year and a half ago fell and twisted her thigh-bone inwards at the knee, producing great pain on the inner side of the joint. Her ladyship immediately restored the

parts to their situation, by pressing the thigh outwards and the leg inwards, previous to which she could not move the joint. For a fortnight she was scarcely able to bend or straighten the knee, and the muscles felt to her to be in a state of cramp. She then began to stand upon the limb by the aid of crutches, but when she bore upon it considerably it suddenly bent back, with pain and subsequent swelling, and she felt the condyles at the time slip from the semilunar cartilages upon the head of the tibia. Any sudden motion produced the same effect for fifteen months, and each of these accidents threw her back for several weeks; the pain extended from the knee to the toe. For three months previous to her last accident she walked on crutches, and even at times with only the aid of a stick; when about two months since, in endeavouring to raise herself from a sofa, and turning quickly round to take her stick, the left knee gave way, as if the bone had slipped from its place, the thigh-bone being at the time twisted outwards; pain and swelling succeeded, and she has never been able to stand upright since. Her joints are all of them remarkably flexible, as the elbow may be easily bent backwards to form an angle with the os humeri. When a girl she had frequently the sensation of putting the knees out of joint, but they soon got well. The knees are now swollen, and effusion has taken place into the joints of a considerable quantity of synovia. When she attempts to stand she cannot straighten her knees, but would fall forwards if not supported. The principal treatment is to produce

absorption of the fluid which is effused, and then to give due support to the ligaments. For the first of these she was desired to apply blisters, which were directed to be kept discharging for a considerable time, and after they were healed she was ordered to make pressure upon the joints by a strong bandage, which was to be occasionally removed to give an opportunity of employing friction.

In the dissection of these cases the ligament is found extremely thickened; little pendulous ligamentous and cartilaginous bodies are seen suspended from it, a thick edge of cartilage projects from that of the articular cartilage, and a part of the latter is absorbed. When the bone is macerated, a great addition of ossific matter is found to have been made to the edges of the condyles of the os femoris.

On Compound Dislocations of the Knee-joint.

Of this I have only seen one instance, and I conclude it to be therefore a rare occurrence; and there are scarcely any accidents to which the body is liable which more imperiously demand immediate amputation than these.

CASE.

Case. On Monday, August 26th, 1819, at eleven p. m. I was sent for by Mr. Oliver, surgeon at Brentford, to visit Mr. Pritt, who I was informed had fallen from the box of a mail-coach, and most severely injured his knee. I met, at the house to which he was carried, Mr. Oliver

and Mr. Hunter of Richmond, surgeons, and immediately proceeded to examine the knee. A large opening was found in the integuments, through which the external condyle of the os femoris projected, so as to be opposite the edges of the skin. The os femoris was thrown behind the tibia on its outer side, but not so much on the inner, so that the external condyle of the thigh-bone was dislocated backwards and outwards; and the axis of the thigh-bone was twisted, and the internal condyle advanced upon the head of the tibia. We made attempts to reduce the condyle, but it could only be effected with extreme difficulty; and the bone, directly the extension was removed, slipped into its former situation. The joint being freely opened by the accident the bone dislocated, and when reduced easily slipping from its place, accompanied with an extremely irritable constitution, decided me at once to propose the amputation of the limb, which being acceded to, it was immediately performed. The symptoms of constitutional irritation which followed the operation became extremely severe, and he being delirious on the 31st, Mr. Oliver applied leeches to his temples, a blister under the occiput, and gave the saline medicine with camphor and the pulv. ipec. comp. On the following day I was sent for to visit him, but being absent from London, my most able and excellent friend Mr. Cline, senior, visited him, and ordered him,

Tinc. Opii. gtt. v.
Pulv. Castor. gr. x.
Mist. Camphor. ℥iss. M.
Ft. Haustus 4ta quaque hora sumendus.

Soon after the second draught was administered he fell asleep, and after several hours' repose he awoke perfectly sensible. He gradually recovered, and left Brentford on the 25th of October, with a small wound still remaining on the stump.

Dissection. I brought home the limb and carefully dissected it. Under the skin there was great extravasation of blood in the cellular membrane surrounding the knee; the vastus internus muscle had a large aperture torn in it, just above its insertion into the patella; the tibia projected forwards and the patella was drawn to the outer side of the knee, being no longer in a line with the tubercle of the tibia. Looking at the joint posteriorly, both heads of the gastrocnemius externus muscle were lacerated; the capsular ligament was so completely torn posteriorly that both the condyles of the os femoris were seen projecting through the laceration in the gastrocnemius; neither the sciatic nerve, the popliteal artery and vein, the lateral nor the crucial ligaments were ruptured. (See Plate.)

It is probable that all compound dislocations of the knee-joint will require a similar practice, unless the wound be so extremely small as to admit readily of its immediate closure.

On Dislocation of the Knee from Ulceration.

In the progress of chronic diseases of the joints, inflammation beginning in the synovial membrane and proceeding to ulcerate the articular cartilages and bone, at length affect the

Ligaments ulcerated. capsular ligament and even sometimes the peculiar ligaments of the joints; the bones are

thus becoming unconnected, the muscles irritat edby participating in the inflammation draw the limb into distorted positions, and thus one bone becomes gradually displaced from the other. In the hip-joint this is most frequently seen from the oblique bearing of the thigh-bone on the pelvis. In the knee it is also not unusual that the thigh-bone shall be placed out of its natural line with the tibia, projecting either on the one side or upon the other; but now and then most remarkable distortions are produced by the irritative and spasmodic action of the muscles succeeding the ulcerative process of the ligaments, of one of which I have given a plate; it was removed by amputation by Mr. Cline, sen. in St. Thomas's Hospital, and had been the consequence of what is vulgarly called the white swelling of the knee-joint; the leg was placed forwards at right angles with the thigh, so that when walking on his crutches he had the most grotesque appearance, as the bottom of his foot first met the eye when he was advancing. Upon inspection of the patella it was found anchylosed to the os femoris, and the tibia was also joined by ossific union to the fore part of the condyles of the thigh-bone.

Excessive distortion.

Case.

This state of parts may be prevented by opposing the action of the muscles when their irritability first begins to produce distortion, by the application of splints, and by the exhibition of opium to diminish the irritability of the system. Thus I have seen in cases of ulceration of the hip-joint, the irritative action of the flexor muscles diminished, and the distortion prevented by drawing down the limb and keep-

How prevented.

ing it in the extended position, but it is a most painful extension to the patient, and should be very gradually accomplished.

On Fractures of the Knee-joint.

I shall now, pursuing my former plan, describe the fractures to which the bones entering into the composition of this part are liable, and first the

Fractures of the Patella.

Transverse or longitudinal.

This bone is generally broken transversely, but sometimes, though rarely, longitudinally. It is liable also to simple and compound fracture, but fortunately the latter is but of rare occurrence.

Symptoms.

When the patella is transversely broken, the upper part of the bone is drawn from the lower, its superior portion of the bone being elevated by the action of the rectus muscle, which is inserted into its upper part, whilst the lower portion is still retained in its natural situation by the ligament of the membrane which passes to the tubercle of the tibia.

The degree of separation thus produced depends on the extent of laceration of the ligament, for when the ligament is but little torn the separation will be half an inch, but under great extent of injury the bone is drawn five inches upwards; the capsular ligament and tendinous aponeurosis covering it, being then greatly lacerated; and this is the greatest extent of separation which I have seen. The acci-

dent may be at once known by the depression between the two portions of bone, and by the fingers passing readily down to the condyles of the os femoris into the joint as far as the integuments will permit, and by the elevated portion of bone moving readily on the lower and fore part of the thigh. The power of extending the limb is lost, and likewise that of supporting the weight of the body on that limb if the person be standing, for the knee bends forwards from the loss of action in the extensor muscles. The pain of this accident is not very severe, and a simple fracture is not dangerous, for the constitution feels it but little. In a very few hours after the accident has occurred, a considerable degree of extravasation of blood takes place upon the fore part of the joint, so that the appearance is livid, having often a gangrenous character, but this disappears in a few days. Considerable inflammation and fever succeed, and more especially there is a great degree of swelling in the fore part of the joint, both from the free secretion of synovia, and the effusion arising from inflammation. No crepitus is felt in this fracture, for the bones cannot be brought sufficiently near each other to give this general discriminating mark of other fractures.

The separation of the bones is much increased by bending the knee, as it removes the lower from the upper portion of bone, pulling down the tibia ligamentum, patellæ, and lower part of the bone from the upper.

This accident arises from two causes: first, from blows upon the bone produced by falls upon the knee, or received upon the patella in Causes.

Blows or action of muscles.

the erect position of the body; and secondly, from the action of the extensor muscles upon the bone.

A gentleman walking in the country, and not used to jumping, leaped a ditch of considerable breadth; and when he reached the opposite bank he was in danger of falling and ran forward several steps, and with difficulty recovered himself. Whilst in this attempt to save himself from a fall, he felt the patella snap, and I was sent for to him, and found his patella broken, and the portions of bone considerably separated.

A lady, descending some stairs, set her heel near the edge of one of the stairs, and was in danger of falling, when throwing her body somewhat backwards to prevent the fall and to straighten the knee, the patella became broken.

That a bone should thus break by the action of muscles appears at first sight incomprehensible, but the solution of this circumstance is easily given. When the knee is bent, the patella is drawn down on the end of the condyles, so as to bring the upper edge of the bone forwards, and at that moment it is the patella is broken, by the rectus muscle not acting in a line with the bone but at right angles with it or nearly so, and upon its upper edge more particularly.

Explanation of it.

Mode of union.

With respect to the mode of union of this bone, whether the separation be great or inconsiderable, it is effected by an intervening ligamentous substance. The bone itself undergoes but little alteration; the lower portion, joined by ligament to the patella, has its broken cancellated structure still apparent, although a little

smoothed. The upper portion of bone has its broken cancelli covered by a slight ossific deposit, so that there is more ossific action in the upper than in the lower portion of the bone, and certainly much less than in bones which do not form a part of the joints. The internal articular surface of the bone preserves its natural smoothness. Blood is immediately deposited in the place of the injured ligament, but this in a few days is absorbed. Inflammation arises and pours out adhesive matter, which extends from one edge of the lacerated ligament to the other, and even between the bones, to each of which it is firmly united. (See Plate.) Vessels shoot from the edges of the ligament and render the new substance organized, and produce a ligamentous structure similar to that from which the vessels shoot; this substance is not however always perfect, for I have seen apertures in it; but this will greatly depend upon the extent of the laceration of the ligament, and the too early use of the limb. In the dog and in the rabbit, or almost any other quadruped, it is possible by experiment to trace the mode of union of this bone.

EXPERIMENT I.

I drew the integuments much aside in a rabbit, and dividing them, placed a knife upon the patella and struck it lightly with a mallet; the bone was broken and directly drawn up. I let the integuments go, and the wound was not opposite the fracture. In forty-eight hours I killed the animal and examined the part.

The bones were separated three-quarters of an inch, and the intervening part filled with coagulated blood.

EXPERIMENT II.

I repeated the former experiment, and killed the animal on the eighth day, and found most of the blood absorbed and adhesive matter occupying the space between the bones.

EXPERIMENT III.

The former experiment repeated; the animal examined on the fifteenth day. The adhesive matter had acquired a smooth and somewhat ligamentous character.

EXPERIMENT IV.

The same division of the bone being made, it was examined on the twenty-second day, when the new ligament was complete.

EXPERIMENT V.

The same repeated in five weeks. The part was injected, and vessels were found proceeding from the edge of the ligament into the adhesive matter, now become ligamentous. So that at the end of five weeks the vascularity is complete, and some vessels proceed from the bone and find the ligament. Upon the dog these processes may be equally well observed,

but they are not quite so rapidly produced in a large dog as in the rabbit.

The parts were dissected and preserved after these experiments both in the dog and rabbit, and I have them in the collection at St. Thomas's Hospital, where they may be always seen.

EXPERIMENT VI.

In a rabbit, having divided the bone, I sewed together the two portions by conveying a needle and thread through the tendinous covering of the bone, but the ligatures separated, and the bones still united by ligament.

EXPERIMENT VII.

I divided the bone, and cut the rectus muscle through, yet the patella united by ligament.

I could not either in the dog or in the rabbit succeed in producing a bony union in the transverse fracture.

Yet I once saw in a patient of my kind friend, M. Chopart, at Paris, a case which appeared to me to be united by bone, the separation was so small, but I should now suppose I was mistaken.

A ligamentous union of the transverse fracture of the patella is, then, probably that which constantly occurs; or if there be an exception, it is very rare. But still the principle which is to guide the surgeon's conduct is, to make that ligament as short as possible. If the ligament be of great length, there is a proportionate weakness; for as soon as the accident has happened, the rectus muscle retracts and draws up the bone, and in proportion to the retraction suffered

Ligamentous union as short as is possible.

to remain, is the degree of shortening of the muscle, and consequently the diminution of its power. Those, therefore, who have had the bones widely separated, when they walk quickly, do it with a halt, and are very liable to fail, and to break the other patella. Let then the muscle be brought as nearly as it can be into its natural length, and although complete apposition of the bone is very rarely effected, yet the ligamentous union is rendered as short as circumstances will permit, and the patient will recover the entire use of the limb.

The idea which was formerly entertained of the danger of squeezing the callus into a projection in the inner side of the bone so as to destroy the smoothness of its internal surface is not at all tenable.

Treatment. When called to this accident the surgeon places the patient in bed upon a mattress, extends the limb upon a well padded splint placed behind the thigh and leg, to which it is tied, and which splint should be hollowed. An evaporating lotion is then applied upon the knee consisting of Liq. Plumbi *s.* acetat. dilut. ℥. v. with Spir. Vini ℥. i.; and no bandage should be at first employed. The body should be slightly raised in bed to relax the rectus muscle, and the heel should be raised to bring up the lower portion of the patella. If, on the succeeding day or two, there be much tension or ecchymosis, leeches should be applied, and the lotion should be continued; when, after a few days, the tension has subsided, then, and not till then, should bandages be employed. I have seen the greatest suffering and swelling produced by the early application of bandages in these cases, even so

as to threaten sloughing of the skin when there had been much contusion. The means which are most frequently employed in the treatment of this case are as follow. A roller is applied from the foot to the knee, to prevent the swelling of the leg, and the upper portion of bone is pressed downwards as far as it can be without violence, towards the lower, so as to lessen the retraction of the muscles and produce the approximation of the portions of bone. Then rollers are applied above and below the joint, confining a piece of broad tape next the skin on each side, which crosses the rollers at right angles; these portions of tape are bent down and tied over the rollers so as to bring them near each other, and thus to keep down the upper portion of bone. Sometimes, instead of the tape on each side, a broad piece of linen is bent over the rollers on the fore part of the joint, and is there confined so as to approximate the pieces of bone, and to bind down the upper portion of the patella, that its lower broken edge may not turn forwards.

But the mode I prefer is as follows: A leather strap is buckled around the thigh, above the broken and elevated portion of bone, and from this circular piece of leather, another strap is passed under the middle of the foot, the leg being extended, and the foot raised as much as possible. This strap is brought upon each side of the leg, and buckled to that which is fixed around the lower part of the thigh. The strap may be confined to the foot by a tape tied to it, and to the leg at any part in the same manner; and

this is the most convenient bandage for the fractured patella and for the patella dislocated upwards by the tear of its ligament.

In this position, and thus confined, the limb is to be kept for five weeks in the adult, and for six weeks at a more advanced age.

Then a slight passive motion is to be begun, and this must be done gently and with so much circumspection, that the ligament, if not firmly united, shall not give way, and the bones recede. If the union be found sufficiently firm to bear it, the passive motion is to be employed from day to day until the flexion of the limb be complete.

If passive motion be not used, it appears that the action of the extensor muscles would never return; for those who are kept in bed, with the joint at rest, do not in many months acquire any power of bending and extending the limb; but when passive motion has been used, the patient is placed on a high seat and directed to swing the leg, by which motion is given to the rectus, and if the mind be then directed to the contraction of that muscle, its powers will be gradually renewed. When the rectus muscle has been shortened, and the upper portion of bone is drawn from the lower, all the disposition to action in that muscle ceases; and it does not seem disposed to recover its voluntary action until it becomes again elongated, which is effected after the union of the ligament, by bending the knee; and from this point of elongation the muscle begins to contract.

State of the muscle.

A young woman was brought into my house

in her father's arms, and he said, "I am obliged to carry her, for she has lost the use of her legs, having broken both her knee-pans eight months ago, and she has never been able to use her limbs since."—Passive motion was directed, and she was ordered to try to extend her legs when they were bent. At first she could effect but little: however, by repeated trials, she gradually recovered the use of her limbs. Mr. John Hunter, who raised surgery into a science, and who seems to have been the first who attended to the principles on which the practice of surgery ought to be regulated, always dwelt most ably upon this subject in his lectures. Patients, from the pain which passive motion produces, and the slow return of action in the muscles, are indisposed to suffer the one or to make trials of the other; but without them there can be no recovery. Case.

The degree of approximation of the bone is, as I have stated, a matter of great consequence. The bone is rarely, if ever, brought into contact so as to be united in the transverse fracture by ossific union; but the less the distance between the bones, the greater is the power which the muscle reacquires: for, in proportion as the muscle is shortened is it weakened; therefore the surgeon should bring the bones as near together as he can to render the ligamentous union as short as is possible, and consequently to leave the muscle with as much of its original power as the nature of the accident permits. Degree of approximation.

Of the perpendicular Fracture of the Patella.

We have in the collection at St. Thomas's Hospital a patella, one-fourth of which has been broken off; the edge is smooth, and no ossific union of the piece from which it had been separated appeared to have been produced.

Ligamentous union.

A gentleman consulted me who had about one-third of the patella separated from the other part of the bone; it had united by ligament, for there was free motion between the fractured piece of bone and that from which it had been removed. He recovered quickly from this injury, and it influenced his power of walking very little.

These circumstances surprised me, because I saw no reason why the bone should not be united when broken perpendicularly, as I thought the muscles would have a tendency to bring the parts together. I made it therefore a subject of experiment.

EXPERIMENT I.

Union by ligament, in experiments.

July 31st, 1818, I broke the patella of a dog, by placing a knife upon it in the longitudinal direction, having first drawn the integuments aside, and on the 12th of September following I examined the part, when I found the two portions of bone considerably separated from each other, and united by ligament. The cause was as follows: when I had divided the bone, the knee became bent, the condyles of the os femoris

pressed against the inner side of the patella, and thrust the parts asunder, and only a ligamentous union had taken place. (See Plate.)

EXPERIMENT II.

August 2d, 1818, I broke in the same manner the patella of a rabbit, and examined the parts on September 3rd, when I found the two portions of bone widely separated, and united only by ligamentous matter. I now began to think it impossible for the patella to unite by bone, but determined to make another experiment to determine this point.

EXPERIMENT III.

I divided the patella longitudinally in a dog, but took care that the division should not extend into the tendon above or to the ligament below it, so that there should be no separation of the two portions. I examined it three weeks after, and found it united; no separation existing between the two portions*. (See Plate.) Union by bone.

It appears, then, that under longitudinal and transverse fracture, a ligamentous union is generally produced, and that it arises from the separation produced in the bone; and that if it cannot separate, but its parts remain in contact, then ossific union will be produced.

In the summer of 1819, Mr. M. was thrown from his gig as he was passing along the Strand,

* The bone was, under maceration, found united in part by bone, and in part by cartilage, not yet completely ossified.

and fractured his patella by the fall transversely, and the lower portion of the bone was also broken perpendicularly, so that it was divided into three pieces. The transverse fracture united as usual by ligament; but the perpendicular, by bone. Mr. Parrott, of Tooting, who also attended the case, writes in these words:—"Dear Sir, I have great pleasure in replying to your letter; the longitudinal fracture of the patella of Mr. M. has become very firmly consolidated, but there is a line or ridge to be traced upon the surface of the bone, which marks distinctly the place where it had been separated.

"JOHN PARROTT, JUN."
Tooting.

Treatment. In the longitudinal or perpendicular fracture of the patella, the best treatment is, to extend the leg, to use local depletion, and evaporating lotions; in a few days to apply a roller around the limb, and then a laced knee-cap with a strap which buckles around the knee above and below the patella.

Of compound Fracture of the Patella.

From violence or ulceration. These occur from injury, or from an ulcerative process under peculiar circumstances.

The cases which I have seen of this accident, are as follows:

CASE I.

Case. A man was admitted into Guy's Hospital, under Mr. W. Cooper, with a compound fracture of this bone; violent inflammation followed; sup-

puration ensued, with the highest degree of constitutional irritation; and no opportunity was given for amputation from the great swelling of the thigh; and this man died. The bone is in the museum of St. Thomas's Hospital, as disunited as at the first moment of the accident.

CASE II.

Case. A man was admitted into St. Thomas's Hospital, under the care of Mr. Birch, with a fracture of the patella and a small wound extending into the joint. The knee was fomented and poulticed; inflammation and suppuration followed; and this man in a few days died with the highest symptoms of constitutional irritation.

CASE III.

Case. Mr. Hawker, surgeon, called me to visit a man who was just arrived in London; who was at work at a warehouse up one pair of stairs, and hearing the signal for dinner, and seeing the doors of the warehouse open, he walked quickly out and fell into the street. By this fall he had a compound fracture of the patella. The limb was attempted to be saved. The joint suppurated, the discharge became excessively great, and the symptoms of irritation ran so high that I thought he would not recover; but he became somewhat better, and I advised him to go into the country. I afterward heard that he gradually recovered with an anchylosed joint.

CASE IV.

Case. Mr. Redhead, residing at Kennington Cross, aged 39 years, was thrown from his gig on the 18th of June, 1819, against a cart-wheel. His knee came violently in contact with the wheel, which fractured his patella and opened the joint. Mr. Dixon, of Newington Butts, was sent for, and he found that the knee had bled freely from a wound on its outer side, from which the synovia freely escaped, and which readily admitted his finger to the shattered patella. The accident happened at ten o'clock, and I was sent for by Mr. Dixon, and when I met him at four o'clock I found a wound through which I readily passed my finger into the joint, and the patella was not broken transversely, but, as I have expressed it, shattered, that is, broken into several pieces, and a small piece which was separated from the rest I removed. It was agreed between Mr. Dixon and myself that the limb should be attempted to be saved, for the patient was of a spare habit, and from his great composure shewed he was not of an irritable constitution. I passed a suture through the integuments, knowing the difficulty of keeping the wound closed on account of the continued escape of synovia, but taking the utmost care that the ligament should not be included in the suture. Adhesive plaister was also applied over the wound, and rollers, lightly put on, which were kept constantly wet with spirits of wine and water. The leg was placed in the extended position, and he was ordered not to

move it in the slightest degree, and to live on fruit.

Saturday. He had passed a very good night, and was free from pain or fever.

Sunday night. He was restless, and it was thought delirious.

Monday morning. He had a dose of Ol. Ricini, which relieved him from his feverish feelings.

Tuesday. He stated he had a good night, and he afterwards had no bad symptom. As there was no swelling, no inflammation, and scarcely any pain, the suture was not removed until the 30th of June, when the adhesive plaister was renewed. He recovered without any untoward accident. Mr. Dixon ordered him from bed in a month. At the end of five weeks Mr. D. gave the joint slight passive motion, and on the 7th of August he walked across his room.

If the laceration be extensive, or the contusion very considerable in these cases, the operation of amputation will be required; but if the wound be small, and the patient unirritable, and no sloughing of the integuments or ligament is likely to occur from the nature of the accident, it will be best to try to save the limb; and the treatment of Mr. Redhead's case is that which I should pursue. The principal object is to produce adhesion immediately, and every means in our power must be used to effect it. I know well that sutures are generally objectionable, and I never employ them, if I can possibly succeed without them, but in moveable parts, in those which are unsupported, and in those through which a secretion is liable to

force its way, they are not only justifiable but highly necessary.

A compound fracture of the patella will be sometimes produced by an ulcer in the following manner.

CASE.

Ulceration.

A woman was admitted into Guy's Hospital in 1816, with a simple fracture of the patella, which had long been united by a ligament of about three inches in extent. Ulcers were formed upon different parts of the body, and unfortunately one of these upon the integuments over the union of the patella. It became sloughy, and extended through the new ligament to the joint which it laid open; violent constitutional irritation succeeded; a copious suppuration was produced, and no opportunity was given of amputating the limb, for the inflamed and swollen state of the thigh forbad it. This woman died.

On Oblique Fractures of the Condyles of the Os Femoris into the Joint.

Rare,

These cases are of rare occurrence, but when they happen it is difficult to prevent deformity, and to restore the patient to a sound and useful limb. They are known by the great swelling of the joint with which they are accompanied, by the crepitus which is felt in moving the joint, and by the deformity with which they

if either condyle.

are attended. The fracture is sometimes of the inner and sometimes of the outer condyle, and the bone is split down into the joint.

Whether the external or internal condyle is broken, the same treatment is required. The limb is to be placed upon a pillow in the straight position, and evaporating lotions and leeches are to be used to subdue the swelling and inflammation. When this object has been effected, a roller is to be applied around the knee, and a piece of stiff pasteboard, about sixteen inches long, and sufficiently wide to extend entirely under the joint, and to pass on each side of it, so as to reach to the edge of the patella, is to be dipped in warm water, and applied under the knee and confined by a roller. When this is dry it has exactly adapted itself to the form of the joint, and this form it afterwards retains, so as best to confine the bones. Splints of wood or tin may be used on each side of the joint, but they are apt to make uneasy pressure. In five weeks passive motion of the limb may be gently begun, to prevent anchylosis. I prefer the straight position in these cases, because the tibia presses the extremity of the broken condyle into a line with that which is not injured. Treatment.

Examples of compound fractures of the condyles are very unfrequent; the following was under the care of Mr. Travers in St. Thomas's Hospital, who was so kind as to send me the following history of it. Compound fracture.

Michael Dixon was admitted into St. Thomas's Hospital, September 17th, 1816, for a fracture of the lower extremity of the femur, occasioned by his legs being entangled in the spokes of a carriage-wheel in motion. There was much displacement of the fractured bone, and a small wound opposite the external con-

dyle. Upon examination, it was evident that the fracture had extended nearly in the direction of the axis of the bone, in addition to a transverse fracture of the shaft of the bone above the joint; the external condyle was moveable and thrown out of its place during the accident, as if it had been drawn by the leg which was twisted inwards. The limb was laid in a fracture-box, in a semiflexed position on the heel; the constitutional disturbance was very slight.

Oct. 5. The external condyle is still moveable; the integuments over it are ulcerated: so as to denude the bone; the health remains good.

Nov. 5. The broken bone protrudes and appears to be dead; it is surrounded by fungous granulations, and there is but little discharge.

Nov. 18. The protruded bone was gently twisted off by forceps shewing it to be the external condyle with its articular surface; there still protruded a small portion of bone, but this soon healed over; the limb was now placed in an extended position, as anchylosis was considered unavoidable.

Dec. 1. The boy has recovered almost the perfect use of his limb, and is enabled to bend and extend it without pain.

Dec. 6. The boy was discharged from the hospital. The wound was healed, and he can walk tolerably well with a stick.

On the February following he called at the hospital, walking without any support, and having free use of the joint.

Fractures of the Body of the Femur just

above the condyles require the bent position of the knee, to prevent deformity, which is sure to follow if the limb be placed in the straight position, and most miserable union I have thus seen produced. The thigh ought to be put over the double inclined plane, to constantly extend the condyles in a line with the shaft of the bone, and a roller is to be applied around the lower parts of the thigh-bone, to assist in pressing the bones together. These cases I have seen occur in persons prior to the age of twenty years, and it has appeared to me that the epiphysis has been broken off, but I have also known it happen in very old persons, and in one instance prove destructive to life.

Fractures just above the condyles.

The Head of the Tibia is sometimes obliquely broken, and if it be fractured into the joint the treatment which it requires is similar to that which is necessary in the oblique fracture of the condyle of the os femoris, that is, first, the straight position of the limb, because the femur preserves the proper position of the fractured tibia, by being a splint to its upper portion, keeping the articular surfaces equal; secondly, a roller, to press one part of the broken surface against the other; thirdly, a splint of pasteboard, to assist in the preservation of that pressure; and fourthly, early passive motion to prevent anchylosis.

Oblique fractures of the tibia into the joint.

But if the fracture of the tibia be oblique, but not into the joint, then it is best to place the limb upon the double inclined plane; and as the cause of deformity is the elevation of the lower portion of the tibia, which is drawn up

Fracture just below the joint.

on either side of the knee-joint, as the fracture is in the inner or outer side of the tibia, the weight of the leg keeps the limb constantly extended, as it hangs over the angle of the inclined plane, and thus brings the bone into as accurate apposition as the case permits.

On Dislocations of the Head of the Fibula.

Union with the tibia.

The fibula joins the tibia, three-quarters of an inch below the articulation of the knee. Its head is inclosed in a capsular ligament which unites it to the tibia, to which it is also joined through the greater part of its length by the interosseous ligament.

Produced by violence or relaxation.

This bone is liable to dislocation both from violence and from relaxation. I have only seen one case of it from violence, and in that instance it was connected with the compound fracture of the tibia.

—— Briggs, of whose dislocation of the tibia I have given an account, had at the upper part of the other leg a compound fracture of the tibia and dislocation of the head of the fibula. The limb was attempted to be saved, but the constitutional irritation ran so high that amputation was obliged to be performed, which was done by my colleague Mr. Lucas, and the man did well.

Dislocations of the head of the fibula from relaxation are more frequent, and the head of the bone is in these cases thrown backwards, and is easily brought into its natural connection with the tibia, but it directly again slips from its position. This state produces a consider-

able degree of weakness and fatigue in walking, and the person suffers much from exercise. As in these cases there is a superabundant secretion of synovia and distension of ligament, repeated blistering is required to promote absorption, and afterwards a strap is to be buckled around the upper part of the leg, to bind the bone firmly in its natural situation, which gives support and at least prevents the increase of the malady.

ON DISLOCATIONS OF THE ANCLE-JOINT.

Structure of the joint.

The bones which enter into the composition of the ancle-joint are the tibia, fibula, and astragalus. The tibia forms an articulating surface at its lower part, which rests upon the astragalus, and there is a projection on the inner side of the lower portion of the bone which forms the malleolus internus, and this part is articulated with the side of the astragalus. The fibula projects beyond the tibia at the outer ancle, and forms there the malleolus externus, which has also an articulating surface for the astragalus. The astragalus, which is the superior tarsal bone, rises between the malleoli, and the lower part of the tibia moves upon it principally in flexion and extension.

Bones.

Thus then nature has strongly protected this part by the deep socket formed by the two bones of the leg and by the ball of the astragalus, which is received into it.

Capsular ligament.

A capsular ligament, lined by a synovial membrane, joins the tibia and fibula to the astragalus. A strong ligament unites the tibia to the fibula, but without any intervening articular cavity, as the ligament proceeds from one surface of bone and is received into the other.

Peculiar ligaments.

The peculiar ligaments joining the tibia and fibula to the tarsus consist of a deltoid ligament, which proceeds from the tibia to the astragalus, os calcis and os naviculare. The fibula is united at its lower end by three excessively strong ligaments, one anteriorly from the malleolus externus to the astragalus, one inferiorly to the os calcis, and the third to the astragalus posteriorly; and it is the strong union of this bone which leads to its being more frequently fractured than dislocated; and even when the tibia is luxated the fibula is fractured in two of the species of dislocation of the ancle, and generally in all; but when the tibia is thrown outwards I have known the fibula escape a fracture.

I have seen the tibia dislocated at the ancle in three different directions, forwards, inwards, and outwards; but a fourth species of dislocation is said to occur occasionally, viz. backwards.

Of the simple Dislocation of the Tibia inwards.

Dislocation inwards.

This is the most frequent of the dislocations of the ancle; the tibia, in this accident, has its internal malleolus thrown inwards, which is so forcibly projecting against the integuments as to

threaten their bursting. The foot is thrown outwards, and its inner edge rests upon the ground; about three inches above the outer ancle there is a deep depression, and a general tumefaction, from extravasation, surrounds the joint. Symptoms.

Upon dissection, the internal appearances are as follow: the end of the tibia rests upon the inner side of the astragalus, instead of on its upper articulatory surface, and if the accident has occurred from a person jumping from a considerable height, the lower end of the tibia, where it is connected to the fibula by ligament, is split off, and remains connected with the fibula, which is also broken from two to three inches above the joint, and the broken end of the fibula is carried down upon the astragalus occupying the natural situation of the tibia; the malleolus externus of the fibula remains in its natural situation, with two inches of the fibula and the split portion of the tibia; the capsular ligament attached to the fibula at the malleolus externus and the three strong fibular tarsal ligaments, remain uninjured. Dissection.

This accident generally happens by jumping from a considerable height, or in running violently with the toe turned outwards, when the foot is suddenly checked in its motion while the body is carried forwards upon the foot, and the ligaments on the inner side of the ancle give way.

For the reduction of this dislocation the patient is to be placed upon a mattress properly prepared, and is to rest on the side on which the injury has been sustained; he is then to bend the leg at right angles with the thigh, so as to relax the gastrocnemii muscles as much Mode of reduction.

as is possible, and an assistant grasps the foot, and gradually draws it into a line with the leg. The surgeon fixes the thigh and presses the tibia downwards, and thus forces it upon the articulating surface of the astragalus. Great force is required if the limb be placed in the extended position, from the resistance the gastrocnemii give; and it is pleasing to observe, after most violent attempts, a well-informed surgeon gently bend the limb, and, under a comparatively slight extension, return the parts to their natural situation.

Treatment. When the limb has been reduced, it is still to remain upon its outer side in the bent position, with the foot well supported; a many-tailed bandage is placed over the part to prevent it slipping from its place, and this is to be kept wet with an evaporating lotion. Two splints are then to be applied; and that upon which the outer part of the limb rests is to have a foot-piece, to give support to the foot, prevent its eversion, and preserve it at right angles with the leg. If much inflammation succeeds, leeches are to be applied to the parts, and the constitution will require relief by taking blood from the arm, and by attention to the bowels; but I shall say no more on this subject until I describe compound dislocation. A person who has had this accident may be removed from his bed in five or six weeks, long straps of plaister being passed around the joint to keep the parts together, and he may be suffered to walk on crutches; but from ten to twelve weeks elapse before he has the free motion of his foot; and much friction and passive motion are required after eight weeks to restore the motion of the joint.

Of the simple Dislocation of the Tibia forwards.

In this accident the foot appears much shortened, the heel proportionably lengthened, and the toes are pointed downwards. Upon dissection the tibia is found to rest upon the upper surface of the os naviculare and os cuneiforme internum, quitting all the articulatory surface of the astragalus, excepting a small portion on its fore part, against which the tibia is applied. The fibula is broken, and its fractured end advances with the tibia, and is placed by its side; its malleolus externus remains in its natural situation, but the fibula is broken about three inches above the joint; the capsular ligament is torn through on its fore part; the deltoid ligament is only partially lacerated, and the three ligaments of the fibula remain unbroken. This accident arises from the body falling backwards whilst the foot is confined, or from a person jumping from a carriage in rapid motion, with the toe pointed forwards. Symptoms. Dissection. Cause.

The treatment consists in attending to the following rules: the patient is placed in bed on his back; one assistant grasps the thigh at its lower part, and draws it towards the body, and another pulls the foot in a line a little before the axis of the leg, and the surgeon pushes down the tibia to bring it into its place. The same principles are held in view in this mode of reduction as in the former, with respect to the relaxation of the muscles. A many-tailed bandage must be lightly applied dipped in an evaporating Reduction. Treatment.

lotion; and the local and constitutional treatment is the same as in the dislocation inwards.

As to position, it is best to keep the patient upon the heel resting on a pillow, and to have a splint properly guarded on each side the leg, having foot-pieces to keep the foot well supported at right angles with the leg, so as to prevent the muscles again drawing it from its place. As in five weeks the fibula will be united, there will then be no danger in taking the patient from his bed; and gentle passive motion may be begun.

Of the partial Dislocation of the Tibia forwards.

Symptoms. This bone is sometimes partially luxated forwards, so as to rest half on the os naviculare, and half on the astragalus. The fibula, in this accident, is broken; the foot appears but little shortened, nor is there any considerable projection of the heel. The signs of this accident are as follow: The foot is pointed downwards, and a difficulty is experienced in the attempt to put it flat on the ground: the heel is drawn up, and the foot is in a great degree immoveable.

Case. The first case of this kind which I saw, was in a very stout lady who resided at Stoke Newington, and had by a fall, as she said, sprained her ancle. When I examined the limb, I found the foot immoveably fixed and pointed downwards, attended with great pain just above the ancle. I attempted to draw the foot forwards and bend it, but could not succeed. Some years after I saw this lady at Bishop Stortford, walking

upon crutches; her toe was pointed, and she was unable to bring any other part of the foot to the ground; the degree of distortion was less than that which occurs in the complete luxation of the bone forwards; but now all tension having been subdued, the nature of the injury was more evident, though I should not have known it decidedly, but from an examination of a foot shewn me by my friend and late apprentice, Mr. Tyrrell, who was so kind as to give me the parts, and of which I have given a plate. The articular surface of the lower part of the tibia was divided into two; the anterior part was seated upon the os naviculare; the posterior upon the astragalus; these two articulatory surfaces were formed at the lower extremity of the bone, both of which had been rendered smooth by friction. The fibula was found fractured. (See Plate.) The result of this dissection clearly proves the necessity which exists in these accidents, however slight they may at first sight appear, of not resting satisfied until the foot be returned into its natural position; for if neglected in the commencement, severe inflammation and tension will prevent even a forcible extension being afterwards useful; and if still longer neglected, the changes in the state of the muscles, and the union of the fibula will preclude the possibility of a reduction, even under the most violent attempts. The mode of reduction and after-treatment will in no respect differ from that required in the perfect dislocation of the bone, either as respects the relaxation of the muscles, the bandages, or the local and constitutional treatment.

Dissection.

Treatment.

Of the simple Dislocation of the Tibia outwards.

This luxation is the most dangerous of the three, for it is produced by greater violence, is attended with more contusion of the integuments, more laceration of ligament, and greater injury to the bone; the foot is thrown inwards, and its outer edge rests upon the ground. The malleolus externus projects the integuments of the ancle very much outwards, and forms so decided a prominence that the nature of the injury cannot be mistaken; the foot and the toes are pointed downwards.

Symptoms.

In the dissection of this accident, it is found that the malleolus internus of the tibia is obliquely fractured and separated from the shaft of the bone; the fractured portion sometimes consists only of the malleolus, at others, the fracture passes obliquely through the articular surface of the tibia, which is thrown forwards and outwards upon the astragalus, before the malleolus externus. The astragalus is sometimes fractured, and the lower extremity of the fibula is broken into several splinters. The deltoid ligament remains unbroken, but the capsular ligament is on its outer part torn; the three fibular tarsal ligaments remain whole in most cases, but when the fibula is not broken, they are ruptured; none of the tendons are lacerated, and hæmorrhages scarcely ever occur to any extent, as the large arteries generally escape injury. This accident happens either by the wheel of a carriage passing over the

Dissection.

leg, or by the foot being twisted inwards in jumping or falling.

The mode of reduction consists, in placing the patient upon his back, in bending the thigh at right angles with the body, and the leg at right angles with the thigh; the thigh is then grasped under the ham by one assistant, and the foot by another; and thus an extension is made in the axis of the leg, whilst the surgeon presses the bone inwards towards the astragalus. The limb, in the simple dislocation, is to be laid upon its outer side, resting upon a splint, with a foot-piece, and a pad is to be placed upon the fibula, just above the outer angle, and extending a few inches upwards, so as in some measure to raise that portion of the leg, and support it so as to prevent the tibia and fibula slipping from the astragalus, as well as to lessen the pressure of the malleolus externus upon the integuments, where they have sustained injury. Reduction.

The local and general treatment will be the same as in the former cases, although more depletion is required as greater inflammation succeeds; the greatest care is required that the foot does not become twisted inwards or pointed downwards, as either of these states prevents the limb from being afterwards useful. Passive motion should be given to the joint in six weeks from the accident, when the patient may rise from his bed, and be allowed to walk upon crutches, unless great swelling of the ancle prevents it. In general in these cases from ten to twelve weeks elapse before the cure is complete. Treatment.

On the compound Dislocation of the Ancle-joint.

These accidents take place in the same direction as the simple dislocations, and the bones and ligaments suffer in the same manner as in those dislocations. The only difference therefore in these cases is, that the joint is laid open by a wound in the integuments and ligaments, opposite to the laceration of the skin, by which the synovia escapes, and through which the ends of the bone protrude; this opening in the integuments is generally occasioned by the bone, but sometimes by the pressure of some uneven surface on which the limb was thrown.

Opening into the joint.

The bones being replaced by the same means as are employed in the simple dislocation, the effect of this accident upon the parts composing the joint is as follows. The synovia, as I have stated, escapes by a large wound in the membrane secreting it, and in a very few hours inflammation begins; and when an additional quantity of blood is first determined to the part an abundant secretion issues from this membrane, and is discharged through the wound; the ligaments participate in the inflammation as well as the extremities of the bones, which enter into the composition of the joint. The inflammation of the internal secreting membrane of the joint in about five days proceeds to suppuration; at first but little matter is discharged, but it continues until it becomes very abundant, and the lacerated parts of the ligaments and periosteum also secrete matter. Under this process of suppuration the cartilages become partially

Local effects.

or wholly absorbed, but generally partially only; but the ulceration of the cartilage is a very slow process and attended with severe constitutional irritation, and often lays the foundation of exfoliation of the extremities of the bones. When they are completely absorbed, granulations arise from the surface of the bones and from the inner side of the synovial membrane, and these inosculate and fill up the cavity between the extremities of the bones. Sometimes we find after accidents to joints, that the adhesive process occurs at one part and that the cartilage is not absorbed, whilst granulations are formed at others where the cartilage was removed by ulceration, and I have seen after inflammation in joints the cartilages remain and their surfaces adhere.

This inosculation of granulations nor the process of adhesion, do not lead to permanent anchylosis, for if passive motion be begun as soon as the parts from cessation of pain and inflammation will permit, motion will be restored, not always entirely, but with very little diminution; and the other parts of the tarsus will acquire such an extent of motion as to render the deficiency in the mobility of the ancle-joint but little apparent; the aperture in the ligament is filled by granulations; and with respect to the extremities of the bone, when they are joined by ossific union, it is by the deposit of cartilage and by a secretion of phosphate of lime, in the usual manner in which bones are formed and repaired.

Thus then the compound dislocation of the ancle is leading to inflammation over a very extensive secreting surface, as well of bone

as of ligament; it next produces an extended suppuration over the lining of the joint, which leads to much constitutional derangement, and further it becomes the source of an ulcerative process, more or less extensive according to the treatment pursued, by which the cartilage is partly or wholly removed, and by which the irritative fever is supported for a great length of time; and the ulceration sometimes extends over the extremities of the dislocated bones, leading to great additional constitutional irritation and continued disease from exfoliation.

Constitutional effects.

These local effects are accompanied by the common symptoms of constitutional irritation. In two or three days from the accident, or sometimes as early as twenty-four hours, the patient complains of pain in his back and in his head, shewing the influence of the accident on the brain and spinal marrow. The tongue is furred, white if the irritation be slight, yellow if greater, and brown almost to blackness if it be considerable; the stomach is disordered, there is loss of appetite, nausea, and sometimes vomiting; the intestines cease to secrete, and the glands connected with them, as the liver, &c.; costiveness is therefore an attendant sign. The skin has its secretion stopped, it is hot and dry; the kidneys also have their secretion diminished; the urine is high-coloured and small in quantity. The heart beats more quickly and the pulse becomes *hard*, which is the pulse of constitutional irritation from local inflammation, and in great degrees of it becomes irregular and intermittent; the respiration is quicker in sympathy with the quicker circulation; the

nervous system becomes additionally affected in high degrees of local irritation; restlessness, watchfulness, delirium, subsultus, and sometimes tetanus occur. These are the usual effects of local irritation upon the constitution, occurring in different degrees according to the violence of the injury, the irritability of the constitution, and the powers of restoration.

Cause of the symptoms.

The cause of the violence of these symptoms is the wound which is made into the joint, and the great efforts required for its repair, for when there is no wound, and the process of adhesion can unite the part, little local inflammation or constitutional irritation occur; and if this be the cause of the violence of the symptoms, the principle in the treatment of this accident is easily comprehended, and it consists in closing the wound as completely as is possible, to assist nature in the adhesive process by which the wound is to be closed, and to render suppuration and granulation less necessary for the union of the opened joint.

Principle of cure.

Is amputation required?

The first question which arises upon this subject is the following: *Is amputation generally necessary in compound dislocations of the ancle?* My answer is, certainly not; thirty years ago it was the usual practice to amputate limbs for this accident, and it was then thought absolutely necessary for the preservation of life by some of our best surgeons; but so many limbs have been of late years saved, indeed I may say so great a majority of cases, that such advice would now be considered not only injudicious but cruel. It is far from being my intention to state that amputation is never required, but

only to observe that in by far the greater number of these accidents, that this operation is unnecessary.

But before I give the proofs of what I have advanced, let me state the mode of treatment which is to be pursued in these cases.

Treatment. When the surgeon examines the limb, he finds a wound of greater or less size, according to the degree of the injury. The extremity of the tibia projects if the dislocation of the tibia be inwards; and the tibia and fibula are protruded, if the dislocation of the former be at the outer ancle. The ends of the bones are often covered with dirt, from their having reached the ground. The foot is loosely hanging on the inner or outer side of the leg, according to the direction of the dislocation.

Artery divided. Sometimes, though very rarely, a large artery will be divided; and it is surprising that the posterior tibial artery so generally escapes; the anterior tibial being the only vessel I have known torn. The arrest of hæmorrhage is the first object; and for this purpose, if the anterior tibial artery be wounded, it must be secured by ligature. The extremity of the bone is to be washed with warm water, as the least extraneous matter admitted into the joint will produce and support a suppurative process, and the utmost care should be taken to remove every portion of it adhering to the end of the bone.

Loose pieces of bone. If the bone be shattered, the finger is to be passed into the joint, and the detached pieces are to be removed; but this is to be done in the most gentle manner possible, so as to do

no unnecessary injury; and if the wound be so small as to admit the finger with difficulty, and small loose pieces of bone can be felt, the integuments should be divided with a scalpel upwards, to allow of such portions being removed without violence; the incision should be so made as to leave the joint with as much covering of integument as possible. The integuments are sometimes nipped into the joint by the projecting bone, and it cannot be reduced, when this is the case, without making an incision upwards, to allow of the skin being brought from under the bone; and when the edges of the incised wound are afterwards brought together, no additional evil arises from the extension of the wound. Integuments.

The mode of reducing the bone is (in other respects) similar to what we have already described, when speaking of simple dislocation, by bending the leg upon the thigh, so as to relax the muscles before the extension is made. When the bone has been reduced, a piece of lint is dipped in the blood and applied wet over the wound upon which the blood coagulates, and forms the most natural, and as far as I have seen, the best covering to the wound. A many-tailed bandage is then applied, the portions of which should not be sewn together, but passed under the leg, so that any one piece may be removed when it becomes stiff, and by fixing another to its end, it can always be applied afresh, without any disturbance to the limb; this bandage is to be kept constantly wet with spirits of wine and water. A hollow splint, with a foot-piece at right angles, is to be applied on Reduction.

the outer side of the leg, in the dislocation inwards, and the leg is to rest upon its outer side: but in the dislocation outwards it is best to keep the limb upon the heel, with a splint both upon the outer and on the inner side, with an aperture in the splint opposite to the wound.

The patient's knee is to be slightly bent in each dislocation, to relax the gastrocnemius muscle. The foot must be carefully prevented being pointed; great care being taken to keep it at right angles with the leg, otherwise the limb will be useless when the wound is healed. The patient is to be placed on a mattress, and a pillow is to reach from half way above the knee to beyond the foot, and another is to be rolled under the hip, to support the upper part of the thigh-bone.

Constitutional treatment.

Blood-letting must be had recourse to or not according to the powers of the constitution, as it is necessary to bear in mind that the patient has a great trial of his powers to undergo, and will require, in the end, all the support which his strength can receive. Purgatives must also be used with the utmost caution, for there cannot be a worse practice, when a limb has been placed in a good position, and adhesion is proceeding, than to disturb the processes of nature by the frequent changes of position which purges produce; and I am quite sure, that in cases of compound fracture, I have seen patients destroyed by their frequent administration. That which is to be done by bleeding, and emptying the bowels, should be effected at the first hour of the accident, before the adhesive inflammation arises; after which the liquor am-

moniæ acetatis and tinctura opii, form the patient's best medicine, with a slight aperient at intervals.

Secondary treatment.

If the patient complains of considerable pain in the part in four or five days, the bandage may be raised, to examine the wound; and if there be much inflammation, a corner of the lint should be lifted from the wound to give vent to any matter which may have formed; but this ought to be done with great circumspection, as it is in danger of disturbing the adhesive process if that be proceeding without suppuration. By this local treatment it will every now and then happen that the wound will be closed by adhesion, but if in a few days it be not, and suppuration take place, the matter should have an opportunity of escaping; and the lint being removed, simple dressings should be applied. After a week or ten days if there be suppuration with much surrounding inflammation, poultices should be applied upon the wound, leeches in its neighbourhood and upon the limb at a distance the evaporating lotion should still be employed; but as soon as the inflammation is lessened, the poultices should be discontinued, as they encourage too much secretion, and relax the blood-vessels of the part, so as to prevent the restorative process.

Result.

If the cure proceeds favourably, in a few weeks the wound is healed with little suppuration. If less favourably, a copious suppuration takes place, the wound is longer in healing, and exfoliation of the extremity of the bone still further retards the cure. The motion of the joint is not always lost, but is sometimes in a great degree restored; but this depends upon the greater or less

extent of suppuration or ulceration. The patient after three months walks with crutches under the most favourable circumstances, but is many months in others, and he bears upon the foot at different periods of time in different degrees of injury, as in compound fracture when adhesion is not at first produced, only that the patient is in these cases longer in recovering.

I shall now proceed to state the cases which have induced me to say amputation, as a general rule, is improper in these cases.

Cases. The first circumstance which led me to doubt the true judgment of the opinion which recommended an indiscriminate amputation of these injuries, was this—

CASE I.

I was, many years ago, going into the country with a friend of mine, and we met with a surgeon in our journey, who put this question—"What do you do in compound dislocations of the ancle joint?" I do not recollect the reply, but he proceeded to say, I have had a case of compound dislocation of the ancle joint under my care, in which I told the patient he must lose his limb; not approving this advice, his friends sent for another surgeon, who said he thought he could save it; the patient placed himself under his care, and the man, he added, was recovering.

CASE II.

More than twenty years ago I received from Mr. Lynn, of Woodbridge, now Dr. Lynn, the

astragalus of a man, broken into two pieces, which he had taken from a dislocated ancle-joint. His letter is as follows:

DEAR SIR,

J. York, aged 32 years, being pursued by some bailiffs, jumped from the height of several feet to avoid them. The tibia and a part of the astragalus protruded at the inner ancle. I immediately returned the parts into their natural situation. Suppuration ensued, and in five weeks a portion of the astragalus separated, and another piece a week afterwards, which when joined formed the ball of that bone. In three months the joint was filled with granulations; it soon afterwards healed, and the man recovered with a good use of the limb.

Yours, &c.

JAMES LYNN.

CASE III.

I attended a compound fracture of the ancle-joint, in the year 1797, with Mr. Battley, who then practised as a surgeon in St. Paul's Churchyard, and is now a chemist and druggist in Fore Street, of the first respectability and character; an account of which I shall give in the words of Mr. Battley.

In the month of September, 1797, a gentleman, lodging in Duke Street, Smithfield, in a fit of insanity threw himself from a two-pair of stairs window into the street, his feet first reaching the ground. He got up without as-

sistance, knocked violently at the outer door of the house, and ascended the stairs without the least assistance, bolted the door after him, and got into bed. He refused to open the door, and it was obliged to be forced. A neighbouring surgeon was sent for, who, on viewing the case, proposed an immediate amputation, which was not acceded to by his friends, but Mr. Cooper and myself were requested to take charge of the case. On examination there was found a compound dislocation of the ancle-joint; the tibia was thrown on the inner side of the foot, and when the finger was passed into the wound the astragalus was discovered to be shattered into a number of pieces; the loose and unconnected portions of bone were removed and the tibia replaced, after which lint, dipped in the oozing blood, was wrapped around the lacerated parts, and the limb was placed on its outer side, with the knee considerably bent. The parts were ordered to be kept cool by the frequent application of an evaporating lotion. The patient remained as quiet as could be expected, under his state of mind, until the third or fourth day, when a considerable inflammation appeared in the joint, and greatly increased the previous irritable state of his constitution. Leeches, fomentations, and poultices were applied to the limb, blood was taken from the arm, and purgative medicines were given, and afterwards saline medicines with sudorifics. Extensive suppuration ensued, and continued for six weeks or two months, when it began to lessen and healthy granulations appeared on the whole wounded surfaces; and about this time

the state of his mind began to improve, and it continued to amend as his leg advanced in recovery. At the end of four or five months the suppurated parts had filled up, the joint healed, and his mind recovered its natural tone. At the end of nine months he returned to his employment, but the ancle-joint was stiff. In two years he had so far recovered as to walk without the aid of a stick; and at the end of three or four years was able to pursue his avocations nearly as well as at any former period of his life.

RICHARD BATTLEY.

CASE IV.

On Compound Dislocation of the Tibia inwards.

I was sent for on the 11th of August, 1814, by Mr. Richards, of Seal, in Kent, to visit Mr. Knowles, a farmer, residing at TythamFarm, aged 48, who had been thrown from his chaise against the hinder wheel of a waggon, dislocated his tibia inwards, and fractured both the tibia and fibula.

Mr. Richards was immediately called to the case, reduced the dislocation, and endeavoured to heal the wound by adhesion. When I saw him, which was ten days after the accident, the wound wore a favourable aspect. The discharge was abundant, but not in a degree to excite alarm, and all I had to do was to praise the judgment which had led to the preservation of the limb, and to direct the continuance of the means which had been employed for that purpose.

Before I ventured to state the case to the public, I wrote to Mr. Richards, who informs me that Mr. Knowles's wound is perfectly healed, and that he walks without the use of a stick.

CASE V.

For the following details I am obliged to Mr. Rowley, apprentice to Mr. Chandler, surgeon to St. Thomas's Hospital.

DEAR SIR,

In answer to your inquiries, I beg leave to forward you the particulars of Elizabeth Chisnell's case, who was admitted into St. Thomas's Hospital, Saturday, May 29th, 1819, with a compound dislocation of the left ancle outwards, occasioned by her slipping from the footpath into the road-way. The wound communicating with the joint was situated upon the outer part of the leg, and was about four inches in extent, through which the fibula projected two inches, but it was not fractured; the ligaments connecting the malleolus externus and the astragalus were lacerated. From the inclination of the sole of the foot inwards, the whole articulating surface of the joint was so displaced as to allow two fingers to pass readily across, when I found the extremity of the tibia fractured. The parts were easily returned to their original situation by extending the foot, the leg having been first bent upon the thigh. During the reduction the integuments became confined between the malleolus externus and astragalus, so as to require an incision upwards by the side of the fibula, before it could be extricated; but that

being done, its lips were brought together by four sutures, and straps of adhesive plaister. Splints were applied, and the common applications to subdue the consequent inflammation used.

June 1. The adhesive plaister and sutures were removed, owing to the wound and adjacent soft parts around the ancle being in a state of slough. Poultice of linseed meal were ordered to be used daily.

June 5. The sloughs are separated, the sore is granulating, the discharge profuse; a collection of matter has formed upon the inside of the leg, which was discharged by puncture. The wound was ordered to be dressed, and a roller was gently applied. The constitution during this time was but little affected. Bark and porter were ordered by Mr. Chandler.

August 7. The wounds are almost healed; the girl sits up daily, and in a few days she will be allowed to walk. During the progress of her cure the constitutional disturbance has been trifling, indeed not more than in some favourable cases of simple fracture; it may be also well to observe that her bowels were regular during the whole time, so as to preclude the necessity of any laxative medicine, nor did she take any other medicine but the bark.

I remain, &c. &c.

R. ROWLEY,

Dresser at St. Thomas's Hospital.

The following accident I was requested to visit by Mr. Clarke, surgeon, in Great Turnstile, Lincoln's Inn Fields; and Mr. Clarke has

had the kindness to send me the following particulars.

CASE VI.

Mr. George Carruthers, aged 22 years, had a compound dislocation of the ancle-joint inwards, with fracture of the tibia, on the 6th of October, 1817. The accident had happened by the overturn of a stage-coach at Kilburn, from whence he was brought to his house at Lambeth. The end of the tibia projected through the integuments of the inner ancle to the extent of from two to three inches, and the bone was tightly embraced by the skin. The tibia was fractured, only a small portion of it remaining attached to the joint; the bleeding was stated to have been copious, but it had subsided before Mr. Clarke saw him; the fibula was badly fractured.

For the reduction of the protruded parts it became necessary to make an incision in the integuments, to loosen them on the tibia; and when the bone was restored to its place simple dressings were spread over the wound. A many-tailed bandage, wetted with an evaporating lotion and splints were applied, and the limb was placed in the slightly bent position upon a quilted pillow. Bleeding was had recourse to, gentle purgatives given, and saline medicines. Symptoms of great constitutional excitement naturally arose from so severe a local injury. Abscesses formed on the leg, and some exfoliations materially retarded the cicitrization of the wound, and produced considerable exhaustion of his strength. Openings were made into the

abscesses, adhesive straps were placed over the wounds, and lotions were applied on linen under oiled silk, which preserved the parts constantly wet. Bark and wine were given with occasional aperients. Mr. Carruthers left town on the 6th of October 1818, having then a small opening on each side of the limb, and suffering occasional pain, but his general health had been good for some months previous. In January last a considerable portion of bone came away and the sore immediately healed and has so continued; he has been ever since free from pain and is now in better health than before the accident. He employs himself in superintending a farm, around which he walks with one crutch and a stick, but if the ground be level, with a stick only, and the limb is becoming daily more and more useful.

THOMAS CLARKE.

CASE VII. and VIII.

To Mr. Somerville of the Stafford Infirmary I am indebted for the following letter.

DEAR SIR,

I take shame to myself for not having answered your obliging queries sooner, as to the cases of compound dislocation of the ancle which have fallen under my care; but the fact is, I wished to give you my answer in the most authentic form, by sending you a transcript of the cases from the minute books of the Infirmary; but after having caused the most diligent search to be made for them, I have now the mortification to learn, they are no where to be found; you will allow me therefore to plead this

circumstance as the real cause of my seeming inattention to your wish, and at the same time to offer it as an apology for the want of a more detailed account. I have a distinct recollection of two cases, though not of the manner in which the accidents were produced. The first occurred about fifteen years ago, the other a few years later. They were both dislocated inwards and were both discharged cured; the one at the end of the fifth, the latter not till the seventh or eighth week. In the first case the wound, which was lacerated so as to form a flap, healed by the first intention; in the latter it was kept open by the discharge which was at first purulent, afterwards limpid, but no untoward symptom supervened during the cure. The treatment in both cases was as follows.

After the reduction of the bone the patient was placed upon his side with the limb in a bent position; no ligature was used; but the lips of the wound were nicely approximated and retained *in situ* by straps of sticking plaister, of ample length, yet not sufficient to encircle the limb, lest they should, by causing undue pressure on the supervening tension, excite too much inflammation, and, in consequence, suppuration. To obviate, however, both tension and inflammation as much as possible, a plaister, spread moderately thick with Kirkland's Defensative, was placed round and in easy contact with the ancle, and over the whole a tailed bandage was loosely applied. A brisk purgative was given on the following morning, and low diet was ordered till all danger of inflammation was over. The adhesive plaister was removed on the second or third day and was not renewed,

but a pledget of mellilot digestive was placed over the wound, and the defensitive bandage *applied* as before. The subsequent treatment consisted merely in the daily renewal of the pledget and the proper adjustment of the plaister and bandage, both of which were gradually drawn tighter round the limb in proportion as the danger of inflammation supervening became lessened, and this with the view not only to give stability to the joint, but also to facilitate the progress of cicatrization.

The use of the plaister after the manner above mentioned, may, at first, appear to you a singular practice, but by being spread very thick, it seldom requires a renewal during the period of cure; unless the discharge from the wound should be so great as to render it necessary; but if it should not, it will appear obvious that there can be no necessity for disturbing or moving the limb from the position in which it is first placed; a circumstance which I have ever considered in cases both of compound dislocations and compound fractures, of the highest importance to facilitate the cure. It is composed of two parts of Emp. Plumbi and one each of oil, vinegar and chalk finely powdered; and is what I ever found a most powerful repellent in all cases of violent local inflammation.

I am, Dear Sir,
very respectfully,
Your obliged and most obedient servant,

HENRY SOMERVILLE.

Stafford, Aug. 31, 1819.

The following case I received from Mr. Scarr, surgeon of Bishop's Stortford.

CASE IX.

DEAR SIR,

John Plumb, who is the subject of the following statement, was in the thirty-eighth year of his age when his accident took place, which was about seven years ago. He was in the act of ascending a ladder with a sack of oats on his shoulders, and had mounted ten feet from the ground when the ladder slipped from under him and he was precipitated to the ground, lighting on his feet, but still sustaining the sack of oats on his shoulders. I was passing about two hundred yards from the place at the moment the accident took place, and was consequently in immediate attendance. On the removal of his stocking, I found that the tibia and fibula had penetrated through the integuments at the outer ancle, and were laying on the outside of the foot; the articulatory surface of the astragalus had penetrated through the integuments of the inner ancle, shewing on a view of the case the foot nearly reversed; the bottom of the foot being placed where the side of the foot is naturally situated; the wounds through which the surfaces of the bone had penetrated were free, which soon determined me in the line of conduct I should pursue, *viz.* to immediately reduce the joint to its natural situation with as little violence as possible, and which was effected with much less difficulty than I expected; the wounds were brought close by adhesive straps, the limb placed on its outer side, and cloths applied constantly moistened with

acetated lead lotion; he was then bled to about sixteen ounces, a saline diaphoretic mixture was given, and attention paid to his bowels; in short the antiphlogistic plan was persevered in with due regard to his constitutional powers, abscesses took place which were opened in the most favourable points, and after five and twenty weeks the man was convalescent; union of the articulatory surfaces took place, the wounds healed, and the man became enabled to walk and to work; he was not able to bear much on his foot to work till about twelve months after the accident, from which time he has constantly been labouring in his situation with Mr. Starkis, a gentleman of respectability of this town, and continues to do so at this time.

It is my intention to send this man up to you, that you may have a full confirmation from him of the accident, as well as from Mr. Cribb my present assistant, who was present at the time of my being called to him, being at that time with his father, Mr. Cribb, surgeon of this town, whom I consulted on the case at the time of the accident as well as during its continuance; trusting the statement and result may prove satisfactory to your inquiry,

I am, Dear Sir,
your most obedient,

August 16*th*, 1819. R. T. SCARR.

P.S. I hope Mr. Cribb and the man will be with you at the beginning of the next week.

This man was sent to town, and I had an opportunity of witnessing the happy result of Mr. Scarr's skill and attention. A. C.

CASE X.

For the following most interesting case I am indebted to a very excellent surgeon and ingenious man, Mr. Abbot, at Needham Market, Suffolk. It admirably shews what may be accomplished in these cases, by extraordinary skill and attention.

April 25, 1802, Mr. Robert Cutting, a butcher by trade, age near seventy, corpulent, very intemperate, and subject to gout from his youth. In a dispute, when in a state of intoxication, he was thrown violently to the ground, and suffered a compound dislocation of the tibia at the ancle-joint; the end of it was forced through the integuments near four inches; the wound was large and half circular; in the struggle to stand erect, he rested his weight upon the head of the bone, which was covered with sand and dirt; the cavity of the articulating surface of the joint was filled with blood and sand; the fibula fractured a few inches above the joint, and the foot completely turned outwards; in this state he was placed in an open cart, full four miles to his residence, Somersham, in Suffolk, about seven miles from Ipswich. It was near five hours, from the time the accident took place, before surgical assistance arrived, being in the middle of a cold night. I attended with a well-informed pupil of mine, Mr. John Jefferson, who now, and has, resided many years in Islington. A case so formidable, a large wound, the connecting ligaments so lacerated, the surfaces of the articulating parts, from long exposure and injured condition, led me to conclude,

that it would be impossible to save the limb, and in a constitution so disordered; however, no persuasion could prevail with a mind obstinate and inflexible, he would not submit to amputation. The surfaces were, carefully and expeditiously as possible, made clean with warm water; the reduction was easily accomplished, the lacerated parts suitably placed, the edges of the wound were nearly brought in apposition, without stitches and adhesive plaisters; the limb was laid upon a proper sized thin board, excavated so as to take the form of the leg, with an opening to receive the outer ancle; this was well padded, the foot part raised somewhat higher than the leg; plaits of lint wetted with the tinctura benzoini composita, were placed over the wound, which, in a few hours, formed a hard sealed cap, of a circumference that effectually secluded the air; a folded flannel bandage was applied; taking from the foot to the knee, the leg was laid in a flexed position. V. S. ℥xij. A saline purge every two hours until his bowels were relieved; milk broth only for his support, with common salt; sixteen hours after the dressing, his bowels had been properly evacuated, he was tranquil; heat moderate; a soft moisture was spread over the whole surface; pulse measured 86; and he had some hours of refreshing sleep. April 27th; A little active heat was raised; sleep interrupted; pulse 96; surface moist; darting uneasiness about the ancle and foot; no thirst; bowels kept cool, and the same support continued; common saline medicines were resorted to every

three hours. Upon unfolding the bandage, some swelling appeared to surround the ancle; a little gleety discharge had escaped from beneath the lower part of the dressing; the inflammation did not appear to be more than might be wished; lint, wetted with the tincture, was applied, so as to prevent the escape of any discharge, although a little distance from the wound, and to seal the covering more secure; half a dozen leeches were applied a small distance from the inflamed part; they bled freely, and afforded ease. April 29th; he passed a good night; heat lessened; free from thirst; limb easy, and free from tension; and the inflammation about the ancle abated. April 30th; a quiet good night, and every symptom appeared to promise his safety being secured. May 2nd; the pulse had regained the natural standard; upon examining the ancle, a small appearance of pus escaped from the lower part of the cap or dressing; lint wetted in the same manner, to glue the covering securely. From this time, my visits became less frequent; the tincture was used whenever the surface of the cap appeared to lose its hold. At the end of ten weeks he was taken from his bed daily, and laid upon a sofa. After the first stage of the interruptions, healthy actions became established, and he became perfectly well. Between the third and fourth month, the cap or dressing was taken from the ancle; the wound was completely cicatrised; a small abraded surface appeared over the cicatrix, occasioned by incrusted matter; simple dressing in a few days rendered the

place sound and well. During the time of the curative means, the fætor was very trifling. The thickening upon the wound was not more than might have been expected upon one or any muscular part; the form of the joint was natural, and bore the appearance of a perfect state. At the end of five months, he was allowed to go on crutches, with the frequent placing his foot upon the ground, and to allow of such a weight or pressure as his feelings could admit. For many months a long continued use of oil obtained from the joints of animals, was had recourse to, night and morning, for the space of an hour every time, by patient rubbing; and to please himself, he plunged his foot and ancle into the paunch of an ox. With these means, an imperfect motion in the joint was recovered, and within twelve months he could walk without a stick; he pursued his occupation, and lived to the age of 83. The last ten years he was able to walk as well as ever he could. Mr. Jefferson will be able to confirm this statement.

Since the case of Cutting, I have uniformly, in a variety of compound fractures, followed the curative plan of treatment by the first intention. Mr. George Lynn, of Woodbridge, my son-in-law, a deserving character in his profession, and the late Launcelot Davie, of Bungay, were pupils of mine, and attended many cases with me of a very formidable nature, successfully treated by the same means. A case of a compound fracture of the thigh, attended with considerable comminutions of the femur, occasioned by a waggon, loaded with twenty-five combs of bar-

ley, passing over it, perfectly recovered, by the same treatment, within six months.

With the greatest esteem,
I have the honour to be,
Your very much obliged
and faithful Servant,

Needham Market, Suffolk.

ROBERT ABBOTT.

To Mr. Ransome, surgeon, at Manchester, I am indebted for the following case.

CASE XI.

DEAR FRIEND,

In reply to thy letter, requesting to know the result of my experience in cases of compound dislocation of the ancle-joint, I have great pleasure in stating the following case, which has recently occurred. I take the liberty of briefly describing it, as there were some circumstances connected with it which did not afford the most flattering prospect.

In the autumn of last year, a female, aged about 45 years, of a strumous and leucophlegmatic habit, attended with a troublesome cough and occasional dyspnœa, fell from a high stool, and pitching upon the left foot, caused a compound dislocation of the ancle-joint; the foot was luxated inwards; the external malleolus was fractured; a lacerated wound extended half round the joint, and exposed the protruding portion of the malleolus, laying the cavity of the joint so open as freely to admit the finger,

and through which the synovial fluid escaped. I removed a portion of detached bone, reduced the dislocation, and brought the integuments together very slightly; the limb was laid upon the side, and kept constantly cool with the saturnine lotion combined with the liq. ammon. acet.; a small opiate, and a demulcent mixture were given at intervals. From the constitution of my patient, I must confess I feared the most serious consequences; but I was happily mistaken; but little inflammation followed, the wound healed without a copious suppuration, and she is now perfectly recovered, and walks to considerable distances. She was confined in a very small room, and in a part of the town not very famous for the purity and salubrity of its atmosphere.

I am, &c. &c.

T. A. RANSOME.

Manchester,
October 22, 1818.

Bengal Street, Canterbury.

MY DEAR SIR,

I take the earliest opportunity of complying with your request, to furnish you with the result of my observations on compound dislocation of the ancle-joint.

You will perhaps think it singular, that this division of Kent, which our hospital practice embraces, should be so destitute of causes giving rise to accidents of this nature, that only two cases have occurred, either in my private practice, or at our hospital, during the last fifteen years, or to my coadjutor, Mr. Fitch; and as these are the only occurrences, I fear it

would be deemed presumptuous in me to form an opinion upon the method to be adopted, and the probable termination of the generality of accidents of this nature. The favourable result however of these two cases, admitted under my care in the Kent and County Hospital, was so firmly impressed on my memory as to confirm unequivocally the precepts you early inculcated, to save the limb if possible in compound dislocations of the ancle-joint. In accomplishing so desirable a point, the advantages obtained in a country hospital will, I apprehend, bear a greater proportion in the scale of success than when the patient is placed in a crowded infirmary of a large manufacturing town, or in the metropolis, the constitution will in general be less impaired by excess, poverty, and other circumstances, whilst purity of air in large ventilated wards materially contributes towards recovery, even be the injury to the joint extensive; we consequently can be permitted to take greater latitude with our curative means upon an injured joint, relying on the powers of nature, without being under the immediate necessity of anticipating the issue resulting from unfavourable habits, and in situations inimical to disease.

My notes furnish me only with the brief details of one case.

July 1818. A bricklayer, æt. 36, of slender make, but of good constitution and of sober habits, fell from a height of between thirty and forty feet upon loose materials for building, and alighting upon his feet, he received a very severe shock attended with comatose symptoms, a fracture of the right thigh, a considerable

contusion and laceration of the left ancle-joint, accompanied with a dislocation of the bones inwards, (that is, the tibia rested upon the inner side the astragalus), a portion of the lower extremity of that bone fractured, and the fibula was broken about three inches above the malleolus externus, and the surrounding ligaments of the joint were lacerated, but little difficulty was found in reducing the dislocation and in replacing the fractured bones; but in consequence of the violent injury done to the joint, it became a question on the propriety of amputation. As the man had enjoyed uninterrupted health, and was of that constitution and habit least liable to the attack of inflammatory affection, I ventured to give a chance of saving the limb. An union by the first intention of the external wound, as far as practicable, was attempted, and the limb laid in the most convenient, yet relaxed and easy posture. Evaporating lotions were applied, and the strictest antiphlogistic system enjoined.

Considerable inflammatory symptoms ensued, with a copious discharge of synovial fluid; the limb and joint were much swollen, and it became necessary to vary the applications to warm spirituous and opiate fomentations and poultices, which appeared more genial to the patient's feeling, and were therefore continued. A disposition of the contused parts to gangrene appearing, muriatic acid was added to the cataplasm, and the medicines were changed according to the effect produced on the constitution by symptomatic irritation, and accruing from the discharge. Soon after the application of the muriatic acid the disposition to gangrene

ceased, (and from this medicine I have often derived, in similar states, great advantage.) After the first fortnight my hopes of saving the limb were confirmed by the pain and swelling subsiding, and the constitutional symptoms being less violent, the colour of the discharge improving, with less synovia, and granulations arising around the wound. The man continued gradually to improve till about the tenth week, when the wound was nearly healed. This man was discharged in fourteen weeks quite well, although with rather an unsightly and partial stiff joint.

The other case, of which I have no notes, was also a compound dislocation of the ancle-joint, but without the degree of injury the above had sustained; he was also discharged cured.

I have now to apologize for trespassing upon your time, in the attempt to give you the details of cases that might have been interesting if not so cursorily drawn; but as my notes were only penned to furnish me with hints for the future, from the distance of time the minutes have escaped my memory, and I doubt they are too inaccurate and too inconclusive to afford you any information; but the occasion serves me as a pretext for assuring you how much

I remain,

My Dear Sir,

Your very faithful and obliged Servant,

W. CHANDLER.

Royal Naval Hospital, Plymouth,
August 11, 1819.

MY DEAR SIR,

In answer to your letter inquiring of me whether I have had any cases of compound dislocation of the ancle-joint, with their treatment and their result, I beg leave to acquaint you that several of the above nature have fallen under my care and observation during the eight years I served as an assistant-surgeon, and the sixteen years I have been the first surgeon of this hospital, nearly the whole of which period the country was engaged in active naval warfare, and consequently this hospital was in the constant receipt of important surgical cases; and I have also witnessed a few more from other causes. The result of my observations has been, that in cases of compound dislocations of the ancle-joint there is not only a chance of saving the limb, but of that limb being at a future time useful. The dislocated bones should be replaced in their situation with as little violence and injury as possible to the surrounding parts; and should any difficulty arise in returning the bones, from the smallness of the wound, I freely enlarge it with a scalpel. After they are replaced, I lay the limb perfectly extended on very soft cushions of lint arranged on three pillows, the centre one reaching the length of the leg, the upper one crossing under the ham and inferior part of the thigh, and the lower one across under the heel, having previously placed on these pillows a fine sheet, folded so often that when its edges are turned in it might protect the limb from the pressure of the splints; under

this sheet are laid several slips of calico about eighteen inches long and three broad. When the limb is thus comfortably placed, taking care to fill up every hollow with lint, I draw the edges of the lacerated integuments as near together as they can be brought by the gentlest means, retaining them with small slips of adhesive plaister, and cover this with pledgets of soft lint; this done, I direct the foot to be kept very steady, whilst I ultimately place the slips of calico already described over the whole length of the extremity, draw up the edges of the sheet, and apply of each side of the leg, outside of all, a very broad long splint of common deal, and so long as to reach at least three inches below the foot and as far above the knee-joint, these splints being well covered with lint, and then to be so secured as to afford support (but no pressure) to the whole of the leg and foot, the breadth of the splint materially contributing to the latter purpose, and allowing the tape to pass around the limb without injury; the foot ought also to be prevented dropping or altering the least its position, by passing a broad tape through a hole in the lower ends of the splints, which tape is to be tied, securing between it the sole of the foot, which will effectually keep it up, further securing it by a stirrup bandage; when every thing is thus accomplished, the foot and leg are directed to be kept constantly wet with cold water, taking care not to sponge it immediately over the wound. The subsequent treatment of the patient, must depend upon the symptoms which arise. This is the plan pur-

sued by me, in those cases where there is a probability of saving the limb. I have seen more than one case, where, after great perseverance and risk, the limb has been saved, but when the wounds were all healed, found to be of very little or no use; as an example, a man who had had a compound dislocation of the ancle in the West Indies, from whence he was sent to England as an invalid, became my patient in this hospital, and when received, a period of thirteen months from the accident, had the whole of the lower head of the tibia (although in its proper situation) exposed, black, and carious, which at the end of a year and a half came away more than three inches in length, and at the expiration of three years and a half from the injury, quitted the hospital with the wound healed but with a shortened, deformed, and anchylosed leg, liable to break out on the slightest injury. The great point to be decided on, however, in these accidents is, in what cases the surgeon is justified in attempting to save the limb, and in what cases immediate amputation is necessary. From all I have seen, I should not hesitate the immediate removal of the limb, where the lower heads of the tibia and fibula are very much shattered; where, together with the compound dislocation of these bones, some of the tarsal bones are displaced and injured; where any large vessels are divided and cannot be secured, without extensive enlargement of the wound and disturbance of the soft parts; where the common integuments with the neighbouring tendons and muscles are considerably torn; where the

protruded tibia cannot by any means be reduced; where the constitution of the patient is enfeebled at the time of the accident, and not likely to endure pain, discharge, and length of confinement.

I have a fine specimen of injury done to the tibia, fibula, and tarsal bones, from a compound dislocation, producing amputation ten months after the accident, which occurred in the Mediterranean; it is very much at your service to see or copy, but must beg of you to have the goodness to return it, and as it forms part of a collection of bones, making by me for the last twenty years,

I am, &c. &c.

STEPHEN L. HAMMICK.

I beg Mr. Hammick to accept my thanks for his excellent letter.

The following case shews, that under the most unfavourable circumstances, these injuries are not destructive to life in persons of good constitutions.

Winchester, August 1*st,* 1819.

MY DEAR SIR,

In answer to your inquiries of my practice in compound dislocations of the ancle-joint, I can only say, that in almost every case that I have witnessed, the general injury has been so great as to require amputation. I do not recollect but one case which was not obliged to submit, and that was a patient at a distance, whom I was called to by a neighbouring practitioner,

about five weeks after the accident, to use his own words "to reduce a dislocation of the ancle, as he had reduced the fracture of the fibula." I saw the patient, but the fractured fibula was so firmly united, that the case was obliged to remain, the compound dislocation gradually got well, if you can call the greatest deformity I ever saw, well; however no bad symptoms arose, and I am persuaded, had the dislocation been reduced, that the case would have terminated in a most satisfactory manner.

I had a case of compound fracture of the elbow-joint, in the person of Dr. Wool, now head master of Rugby, which did well without leaving any perceptible degree of stiffness.

I remain, my Dear Sir,

Yours very truly,

W. WICKHAM.

28, *Park Street, Bristol,*
Oct. 20, 1818.

MY DEAR SIR,

During the twenty-two years I have been surgeon to the Bristol Infirmary, and I believe during my apprenticeship there, making in all nearly thirty years, it has been our invariable practice to endeavour to save the limb, in cases of compound dislocation of the ancle, unless where the chance was done away by some concomitant injuries or circumstances, but as a general rule it was always adhered to, and this would not have happened unless the great ma-

jority of cases had done well. We save the limb in private practice almost invariably, unless in very bad cases indeed.

I am,
My Dear Sir, &c. &c.

R. SMITH.

Sawing off the ends of the bones.

There is another mode of treatment in these accidents, which consists in sawing off the extremity of the tibia, before the bone is returned into its natural situation, and the reasons which may be assigned for pursuing this practice are as follow.

Difficult reduction.

First—That there is in some cases much difficulty in reducing the tibia, and that great violence must be employed to effect it.

Oblique fracture.

Secondly—The extremity of the bone is often broken obliquely, so that when reduced it will not remain upon the astragalus, but when the point is removed by the saw, it rests without difficulty upon the astragalus.

Spasms.

Thirdly—The spasmodic contractions of the muscles are much diminished, by shortening the bone, as they are all thrown into a state of relaxation by it; whereas when the bone is reduced by violence, when the saw has not been used, the spasm of the limb will be sometimes very violent.

Local irritation diminished.

Fourthly—The local irritation is much diminished by the greater ease with which adhesion is produced, both of the sawn extremity of the bone to the parts to which it is

applied, for it is a mistake to suppose that the sawn end of the bone will not adhere, as the contrary is seen in amputation, in sawing off a bone in exostosis, and in the union by adhesion of compound fractures; and that adhesive matter can be thrown out upon cartilaginous surfaces, is known to every person who has dissected a diseased joint; thus then the end of the tibia adheres to the surface of the astragalus.

Fifthly—When suppuration does occur it is rendered much less, and a considerable part of the ulcerative process is prevented by the cartilage being mechanically removed, for nearly half the articular surface of the joint no longer remains. Cæteris paribus; therefore the case is sooner well. Suppuration and ulceration lessened.

Sixthly—The constitutional irritation is very much lessened, both by the suppurative and ulcerative process being diminished, and the ease with which the parts are restored. In the cases which I have had an opportunity of seeing, there was not more irritative fever than in the mildest cases of compound fracture. Less constitutional irritation.

Seventhly—It has been found that in cases in which the extremities of the bones forming the joint have been broken into small pieces, and have been removed by the finger, that the irritation has suffered less, and the case more quickly recovered than when the bone has been returned whole. Bones shattered.

Eighthly—I have known no case of death when the extremities of the bones have been sawn off, although I shall have occasion to mention some No case of death.

in which the cases terminated fatally when this was not done.

Objections; limb shorter.

The objections which may be made to this mode of treatment are, that the limb becomes somewhat shorter by the removal of the cartilaginous extremity of the bone; but this I do not think an objection of any considerable weight if the danger of the case is, as I believe, lessened by it, for the diminished length, which is very slight, is easily supplied by a shoe made a little thicker than usual.

Anchylosis.

The other objection is, that the joint becomes necessarily anchylosed. I doubt very much the truth of that objection, as in two instances I have seen the motion of the part remains; but even when the joint becomes anchylosed, as it is liable to do in each mode of treatment, still the motion of the tarsal bones becomes so much increased as to be a substitute for that of the ancle; and the patient walks with much less halt than would be conjectured, and has a very useful limb.

Each mode useful.

It is not my intention however to advocate either mode of treatment to the exclusion of the other, but to state the reasons which may be justly assigned for the occasional adoption of either. It is only by a comparison of the different results of varied practice, that a safe conclusion can be drawn; and from what I have had an opportunity of observing in my own practice, and of learning from that of my friends, I feel disposed to recommend to those whose minds are not settled upon the subject, not to hastily determine against either treatment in

the different cases of this injury, as, from each mode, under varied circumstances, a strong and useful limb has been saved without any additional risk being incurred to the life of the patient.

Cases in which the one or the other should be employed.

If the dislocation can be easily reduced without sawing off the end of the bone; if it be not so obliquely broken, but that it remains firmly placed upon the astragalus when reduced; if the end of the bone be not shattered, for then the small loose pieces of bone should be removed, and the surface of the bone be smoothed by the saw; if the patient be not excessively irritable, so as to occasion the muscles to be thrown into violent spasmodic actions in the attempt at reduction, and which leads to subsequent displacement when the limb has been reduced. Under such circumstances the bones should be at once returned into their places, and by the adhesive inflammation the parts should be united; but rather than amputate the limb, if the above circumstances were present, I should certainly saw off the ends of the bones.

Cases.

I shall now proceed to state the cases which I have myself had an opportunity of witnessing, and some which have been given me by my friends, and leave the reader to judge of the propriety of the advice I have given.

CASE I.

On Compound Dislocation of the Tibia outwards, at the Ancle-Joint.

I was sent for to Guy's Hospital, to see Nathaniel Taylor, aged 13 years, and was directed

to bring my amputating instruments with me, as I was informed the boy had so bad a dislocation of the ancle, that the limb could not be saved.

As soon as I reached the hospital, I ordered the patient into the operating theatre; and making inquiries into the cause and nature of the accident, I found as follows:—The injury had been occasioned by a boat falling upon the leg. A large wound was seen at the outer ancle, through which the tibia and a fractured extremity of the fibula projected; one inch of the malleolus externus remained attached to the astragalus by its natural ligaments; the foot was turned inwards, so as to be able to be made to touch the inner side of the leg; and from the muscles being no longer on the stretch, the foot was very loose and pendulous. I tried to reduce the limb, but found that the bone could only by great violence be brought on the astragalus, and that it immediately slipped from its place. The case was, therefore, as regarded the state of the parts, the most unfavourable possible; and those around me urged an immediate amputation; but seeing the youth, and the character of health which the boy bore, I thought I should not be justified in dooming him probably to a life of mendicity, and I determined to try to preserve the limb. Finding that the lower end of the fibula, although still connected by ligament, was very loose and moveable, I removed it with the scalpel; I then sawed off half an inch of the lower extremity of the tibia. When these operations had been accomplished with the greatest care, I reduced the bones, and they maintained their situation,

as there was no force of muscular action upon them, on account of the shortening of the bones. Lint, wetted with the person's blood, was then applied, with adhesive plaisters over it, and the leg was put in splints, and placed on the heel. Scarcely any constitutional irritation occurred; the wound and ancle-joint secreted but little matter, and gradually healed. On the 17th day an abscess shewed itself on the tibia, which was suffered to burst, as it affected his constitution but little. For two months he was allowed to sit up and use his crutches. In twelve weeks the wound was healed, and the boy able to bear on his foot; and at the end of four months he walked well. I used to have inconceivable pleasure in seeing this boy walk before the students, at my desire, from one end of the ward to the other, four months after the accident, with very little lameness. There seemed to be some motion at the ancle, but the tarsal bones soon acquired sufficient mobility to give to the foot so much play as to prevent the appearance of stiffness, which a partially anchylosed state of the ancle would otherwise have produced.

CASE II.

Compound Dislocation of the Ancle inwards.

——— W., Esq. aged 40, on December 11th, 1818, jumped out of his one-horse chaise, alarmed by the horse's kicking. He fell, and when he attempted to rise, found his left ancle dislo-

cated, and the bone projecting through the skin. Mr. Mackinder, surgeon, brought him to the house of his father-in-law, in London, where Mr. Jones, of Mount Street, and myself, attended him.

Upon examination of the part, I found the tibia projecting at the inner ancle through the integuments, which were nipped under the projecting bone into the joint; the foot was loose and pendulous, and very much thrown outwards. Having prepared several pieces of linen to form a many-tailed bandage, and procured pillows and splints, he was placed on a bed on his left side, and an attempt made to reduce the bone; but finding that a most powerful extension must be made, hearing from Mr. Jones that Mr. W. was of a most irritable constitution, and finding that the integuments must be cut down opposite to the joint, so as to lessen the probability of an easy adhesion of the wound, which was placed one inch and an half above the articulation, I sawed off the end of the tibia, and the bone most easily returned into its natural situation, in which it remained without difficulty. The edges of the wound were brought together by a fine thread, so as to be very closely adapted to each other, and lint dipped in blood was applied over the wound; the many-tailed bandage was used; the limb was placed on its outer side, with the knee bent nearly at right angles with the thigh, and splints were applied. The leg was ordered to be kept constantly wet with the liq. plumbi. f. acetat. dilutus, ℥v. and spir. vini. ℥i.; a dose of opium was given him,

and ten ounces of blood were taken from his arm. In the evening more opium was given him, and a dose of infusion of senna and sulphate of magnesia, was ordered for the morning.

Dec. 12.—As the limb felt hot, the upper splint was removed, its pressure being somewhat painful, and it prevented free evaporation; opium was ordered at night.

Dec. 13.—The foot was vesicated; he had chilliness succeeded by heat; slight tension of the leg, and some pain for three hours. His mind was much agitated by seeing his children.

Dec. 14.—The limb was less inflamed, and he had scarcely any constitutional irritation.

Dec. 15.—A slight discharge of serum mixed with red particles from the wound; some pain in the foot and leg, but no irritative fever.

Dec. 16.—There was more discharge and some air passed from the wound; a poultice was applied, and a generous diet allowed, as his stomach, naturally weak, had become very flatulent; pulse 90.

Dec. 17.—A fomentation and poultice applied.

Dec. 18.—The discharge becoming purulent; but as his stomach was deranged, Dr. Pemberton saw him, who ordered him hyoscyamus with the mistura camphor in the day, and opium at night.

From this time to the 7th of January, the discharge from the limb was copious, but it then began to lessen; and when the leg was examined on the 12th of January, it had become firm; a small wound remained, on which the granulations were prominent. In the first week in February he was allowed to get upon his sofa, the limb being now firm, and only a small wound remain-

ing, from which an exfoliation will occur, as the bone can be felt bare.

In August I saw him; the wound still remained open, and the portion of bone had not separated.

This gentleman, with the worst constitution, as regarded the state of his stomach, did not suffer more, and, indeed, not so much irritation, as a compound fracture usually produces.

CASE III.

Mr. Charles Averill, dresser to Mr. Forster, surgeon of Guy's Hospital, has had the kindness to send me the following particulars of a case, the progress of which I often witnessed with pleasure.

John Williams, sailor, æt. 38, a very robust man, was brought into Guy's Hospital, under the care of Mr. Forster, August 9th, 1819, at four o'clock in the morning, with a compound dislocation of the right ancle inwards, and considerable injury to the left, occasioned by his falling from a height of about twenty-six feet, in endeavouring to escape from the Borough Compter, in which he was imprisoned. On examining the injured part, I found the tibia protruding three inches through a large transverse wound of four inches in extent, and resting on the inner side of the os calcis; the cartilaginous surface of the astragalus could be readily felt on passing my finger into the wound; the fibula was broken. I first sawed off the whole of the cartilaginous end of the tibia, when the bone was easily replaced, the edges of the wound were then brought as

much in contact as possible ; lint dipped in blood was applied, and over it straps of adhesive plaister ; the foot and leg were wrapped in cloths wet with an acetate of lead lotion, and the limb laid on its side. He complained of great pain in the left leg, which was very much swollen all round the ancle ; ten leeches were applied to it, and afterwards the liquor plumbi subacetatis dilutus, which relieved the pain ; thirty drops of laudanum were given, and he remained easy. The following day sixteen ounces of blood were taken from him, and five grains of calomel given. On the 12th, the dressings were removed, the wound looked well. On the 17th, suppuration had commenced, and the discharge having rather a fœtid smell, the nitric acid lotion was applied*. September 2nd, the matter gravitating to the outer side of the leg, an opening was made, by which it was discharged, and adhesive plaister applied to the original wound, which was healing fast ; the discharge gradually diminished, and on the 21st of September, six weeks from the accident, both wounds were quite healed. He has not yet left his bed. There is motion at the ancle ; the toe turns out but very little, and does not point downwards. He wears splints, and the strength of the limb is daily increasing. When the swelling of the left ancle diminished, a fracture of the external malleolus was also there discovered.

CHARLES AVERILL.

October 4th, 1819.

* The nitric acid lotion is the best application with which I am acquainted during the sloughing process. I order it in the proportion of fifty drops of the acid to a quart of distilled water, and apply it by linen covered with oiled silk.

A. C.

For the following letter I am indebted to Dr. Kerr, of Northampton, who, at the age of more than eighty, still continues to practise his profession with all the ardor of youth, and with a strength of intellect which has been seldom surpassed.

Northampton, July 28th, 1819.

MY DEAR SIR,

I have had the honour of your letter this morning, respecting compound dislocation of the ancle; several such cases have fallen under my care, and it has been uniformly my practice to take off the lower extremity of the tibia, and to lay the limb in a state of semiflexion upon splints; by this means a great deal of painful extension, and the consequent high degree of inflammation are avoided. The splints I use are excavated wood, and much wider than those in common use, with thick moveable pads stuffed with wool. I keep the parts constantly wetted with a solution of liquor ammoniæ acetatis, without removing the bandage. In my very early life, upwards of sixty years ago, I have seen many attempts to reduce compound dislocation without removing any part of the tibia; but, to the best of my recollection, they all ended unfavourably, or, at least, in amputation. By the method which I have pursued, as above mentioned, I have generally succeeded in saving the foot, and a tolerable articulation.

I am, with much esteem,
My dear Sir,
Your obedient humble Servant,
WILLIAM KERR.

To Dr. Rumsey, of Amersham, I am obliged for the following interesting communication.

CASE IV.

Amersham.

DEAR SIR,

I have the pleasure of forwarding to you the case of a compound dislocation of the ancle, which came under my care many years ago, and which had a fortunate termination, as the patient lived many years after the accident.

On the 21st of June, 1792, Mr. Tolson, aged 40 years, a respectable tradesman in New Bond Street, Westminster, was thrown from a curricle on Gerrard's-cross Common, eight miles from this place, in consequence of the horses taking fright, and drawing the carriage with great velocity against a tree. The injury he received from this accident consisted in a compound dislocation of the tibia and the fibula at the outer ancle of the left leg, with a fracture of the astragalus, (the superior half of which was attached to the dislocated bones of the leg,) and likewise (although, as we shall see, not immediately noticed,) a simple fracture of the os femoris on the same side. He was immediately conveyed to a friend's house on the common, where he had the advantage of an airy healthy situation, with every kind of domestic attention the family could administer. I saw him about two hours after the accident, and found the bones protruding at the ancle through a very large wound, with the foot turned inwards and upwards, and the integuments beneath the wound exceedingly

confined by the dislocated bones which descended nearly to the bottom of the foot. A considerable hæmorrhage had taken place, but was stopped by the spontaneous contraction of the lacerated vessels.

From such a formidable accident in so large a joint there appeared very little probability of the patient's recovery, without immediate amputation; I therefore requested that a consultation with some other surgeons might be expeditiously held on the case, and expresses for this purpose were accordingly sent to Mr. Pearson, surgeon, in London, and to my brother, Mr. Henry Rumsey, surgeon, at Chesham in this county. While I was waiting for their arrival, the patient requested me to examine his thigh, when I plainly discovered an oblique fracture of the os femoris at its superior part. This additional evil appeared to me a great obstacle to an amputation. My brother, when he arrived, being of a similar opinion, I attempted to reduce the fractured dislocated joint into its proper situation. This I found very difficult to effect without first separating that part of the astragalus which was pendulous to the tibia, having its capsular ligament lacerated one half way around the joint. This portion of the astragalus consists of the broad smooth head by which it is articulated to the tibia; of almost the whole of the inner and outer sides of this head, by which it moves on the inner and outer malleoli; and of about the upper half of the posterior cavity on its under surface, by which it is united to the os calcis; so that the bone was divided nearly horizontally,

and the part left behind consists of the lower half of the last mentioned cavity, and of the whole of the other or anterior cavity which connects it with the os calcis; and of the anterior portion or process by which it is articulated to the os naviculare; I therefore removed it without hesitation, being persuaded that if it had been practicable to reduce it into its original situation, so large and moveable a portion of bone would have been a source of pain and irritation, and have rendered the cure more difficult and uncertain. I then divided that portion of the integuments of the foot which was confined by the protruded end of the tibia, which enabled me with ease to reduce it and the fibula into their proper situation. I applied some dossils of lint dipped in tincture of opium to the wound, and covered the whole with a poultice of stale beer and oatmeal. We now reduced the fractured femur and placed the limb in a bent position, expecting that our greatest success would be in procuring a complete anchylosis, the failure of which I concluded would leave a useless foot. The under splinter was a firm excavated piece of deal, of the shape of the leg and foot, with a hole opposite the ancle. Mr. Pearson arrived in the evening, and approved of the preceding treatment, giving it as his opinion that it would be safer to attempt the preservation of the limb than to amputate under such complicated circumstances. The wound was concealed as much as possible from the external air, and the cataplasm renewed no oftener than the discharge rendered necessary.

22d. The preceding night had been very painful, with delirium and vomiting; the pulse was full and frequent; I took away ten ounces of blood, and gave potassæ tartras.; and manna in doses sufficient to procure stools. A common saline draught, with antimonial wine and tincture of opium, was given every four hours, and a fuller dose of tincture of opium at bed-time.

23d. The vomiting continued; the ancle and thigh had been less painful through the night; the saline draughts were continued, but without the antimony, on account of the vomiting; during this period the antiphlogistic regimen was strictly adhered to.

24th. The night had been tolerable; the vomiting had ceased; the pulse was softer; the saline draughts were continued with the opiate at bed-time; this evening the leg was very painful; he passed a pretty good night; a discharge from the wound now commenced, and the tension of the muscles of the thigh began to diminish.

26th and 27th. The same treatment was continued. The discharge increased, and the tension of the thigh still more abated.

28th. The ancle was much swelled and inflamed; I therefore exchanged the beer grounds in the cataplasm for the liquor plumbi subacetatis dilutus. The patient had this day much pain in the bowels from flatulence; from which circumstance, and that of the discharge being very thin, it was judged expedient to vary his mode of living, and likewise his medicines.

29th. He was allowed a small portion of ani-

mal food, some table-beer, and some port wine; and he took the bark liberally both in substance and decoction. This change of treatment agreed with him perfectly well. At this time I found it necessary to alter the position of the limb on account of the pressure on the wound, occasioned by its laying in the bent position, and the pain it gave in turning to dress it, which, from the copious discharge, there was now a necessity for doing night and morning. I therefore placed it on the heel, using the common deal flexible splint, of the length of the limb, and confined it in a box, whose sides and lower end let down; the space between the sides of the box and splint was filled with pieces of flannel. By these means, and the use of the eighteen tailed bandage, the dressings were applied with very little disturbance to the leg, whereby the patient escaped much pain. The upper end of the box under the ham was raised, which gave the muscles some degree of flexion, and at the same time was favourable to the discharge. The foot having a tendency to fall inward, and the end of the fibula to protrude through the wound, it required great attention to prevent the deformity the neglect of these circumstances might have occasioned. The mode of prevention I adopted, and which proved successful, consisted in employing a number of small deal wedges, about six inches long, two broad, and a quarter of an inch thick; as many of these as were found sufficient were placed opposite the inside of the foot, between it and the side of the box; others in the same manner on the outer side of the

calf of the leg; by which means the limb was kept steady, and by placing the heel easy and rather hollow, none of the usual evils arising from pressure on the heel occurred.

30th. The bark agreed very well; the opiate was continued at bed-time; the discharge was great, but more purulent; the pulse was become softer and less frequent; and the urine, which had hitherto been clear and very high-coloured, was now turbid; the pain and inflammation being much diminished, the cataplasm was discontinued, and the wound dressed with dry lint with a pledget of cerat. plumbi superacetatis over it, and a moderate compression was made by means of a bandage. From this period the wound progressively mended; the discharge diminished; granulations formed; and the surrounding skin began to heal. The use of the bark and of the opiate was continued till the beginning of August. About the end of July the progress of the cure was retarded by matter collected under the integuments, above the inner ancle, which on pressure came out at the wound. After trying the effects of permanent pressure, for the prevention of this deposit, in vain, I made an incision into the cavity, and filled it with dry lint, to produce inflammation on its internal surface, which consolidated it, and the wound became perfectly cicatrised by the middle of September, without any exfoliation of bone larger than the head of a pin having taken place. The fracture of the femur went on very well, excepting that the obliquity of it, with the impossibility of producing a permanent extension on account of the leg, occa-

sioned a degree of curvature which it otherwise would not have had. The limb gradually acquired strength, and the patient is able to walk very well with only the aid of a small stick, and even this assistance he will probably not require long. There is no anchylosis to render the ancle immoveable; but a sufficient firmness has been produced in the surrounding parts by the long continued inflammation to assist in the formation of an artificial joint, which possesses a degree of motion nearly equal to the natural one.

For the following most interesting case, I am indebted to Mr. Hicks of Baldock.

CASE V.

Baldock, August 10, 1819.

MY DEAR SIR,

In the absence of my son, I beg leave to forward you the following account of a case of compound dislocation of the ancle.

Case of John Curwan.—Early in the morning of November 10, 1812, the Stamford coach, from the guard neglecting to chain the wheel, ran with great velocity down the hill a mile below Baldock, and fell on its side a little before it reached the foot of the hill; in its fall the side of the coach caught the coachman's right leg and turned the foot upon the outside of the leg, by which the tibia became dislocated on the inner side; the tibia and fibula protruded through the integuments about four inches; the oblong end of the fibula was fractured and

several small portions of it remained within the integuments, the end of the tibia had some small portions chipped off it, appearing as if it had been ground by the side of the coach; in this state he was brought to Baldock, with his foot dangling to his leg; the wound was very large, so much so that the foot appeared almost separated from the leg, the ends of the bone were covered with dirt.

There not being the least chance of success in returning the tibia and fibula within the integuments, in this state, and as the patient was desirous of having his leg preserved if possible, which I likewise was very anxious to try, I judged it prudent to saw off the ends of the tibia and fibula, the foot at the same time laying on a pillow below the leg; after removing the ends of the tibia and fibula, I searched for the fractured portions of the fibula left within the integuments, by introducing the fore-finger of my right hand into the wound, and found its external malleolus fractured into several small pieces, but still adhering by its ligaments to the astragalus. Being fearful these shivered portions might be deprived of the properties of life, and if so, would produce much mischief, I resolved to dissect them out by means of a bistoury, through the wound. Having thus removed every fragment of the fibula, and rendered the ends of the tibia and fibula perfectly smooth by means of a saw, not only removing their fractured ends, but as high up as they were stripped of their periosteum, about one inch and a half in length, measuring from the malleolus internus, I then returned the remaining part of

the tibia and fibula that had perforated the integuments, placing it in a straight line with the leg, the lacerated integuments I brought into contact, and secured them by straps of adhesive plaister; the limb was then placed upon a soft pillow, supported by Mr. Potts' long splints placed on the outside of the pillow and fastened with tapes; compression of soft linen cloth was applied, and the leg kept constantly wet with the diluted solution of the acetate of lead, and the following draught was given for the first few days, every four hours, and afterwards every six or eight, with a regimen strictly antiphlogistic.

℞ Pulv. Ipecacuanhæ. c. gr. vj.
Magnes. Sulphat. ℥j.
Aquæ Puræ. ℥ix.
——— Menthæ. ℥iij.
Spt. Ætheris Nitros. ℥ss. M. Ft. Haust.

Through the whole of the cure the man went on remarkably well, and had little symptomatic fever; pulse constantly below the natural standard, between 60 and 70; skin soft and moist; the action of the intestines was regularly kept up by the draughts; the integuments united by the first intention, without the least secretion of pus. On the day seven weeks from the accident, the patient was removed from Baldock to his residence at Hewlington, and did not require chirurgical aid afterwards. In a few months after, he paid me a visit at Baldock, walked perfectly well, and the leg was very little shorter than the other. The last time I saw him was by chance, in April, 1815, at the

Bell New Inn about three miles below Baldock, where his coach stopped, and he descended and ascended his box with great agility.

I am, my Dear Sir,

Yours most respecfully,

GEO. HICKS.

My friend and late dresser, Mr. Cooper of Brentford, an ingenious surgeon and excellent man, sent me the following valuable communication.

CASE VI.

Case of Compound Dislocation of the Ancle-joint, by Mr. G. Cooper.

Thomas Smith, aged 36, by trade a painter, whilst at work on the 28th of October, 1818, fell with a ladder to the ground, when his leg getting between two of its steps, the foot was dislocated inwards. The fibula was broken five inches above the joint, the tibia was fractured from the ancle-joint longitudinally, about three inches; this small piece of tibia, three inches in length, remained attached to the joint at the inner malleolus, while an inch and a half of the remaining portion of tibia, with the extremity of the fibula, were thrust through an opening in the integument, at, and rather anterior to, the outer malleolus. I was passing at the time, and attempted by very moderate extension to reduce the dislocation; this not succeeding, and finding the integuments tucked under the protruding portion of bone, with a scalpel I dilated the wound anteriorly and posteriorly

about half an inch, and then by means of a metacarpal saw, removed rather more than an inch of the tibia and a small portion of fibula. The dislocation was now reduced without any difficulty. The wound was closed by two ligatures and a few straps of adhesive plaister. The patient was placed on a mattress with the limb on the heel, enveloped in an eighteen tailed bandage, which was applied just sufficiently tight to give moderate support, without producing or increasing tension; on either side was placed a splint, and the limb was kept constantly cool by means of an evaporating lotion.

Subsequent to the operation and during the whole of the night, there was some hæmorrhagy from the articular arteries, but not sufficient to induce me to undo the limb in order to secure the bleeding vessel, and I did not open it till the 31st of October, the fourth day, when considerable adhesion had taken place and the parts looked better than I could have expected; but on the eighth day there was a line of separation formed about five or six inches in circumference; the wound was now fomented, a linseed meal poultice applied to it every six hours, and the evaporating lotion was still applied to the limb above, as far as the knee. On the thirteenth or fourteenth day, the slough came away, and healthy granulations were observable, both upon the integuments and also upon the extremity of the tibia; when these granulations became exuberant, they were kept down by the nitrate of silver, and the wound slightly dressed either with Ungt. Cetacei or equal parts of Ungt. Resinæ and Cerat. Calaminæ. In five

weeks the wound was perfectly healed, and the union of the fractured portions of the tibia went on so well, and the ossific deposit at the joint became so firm, that on Christmas Day, being fifty-eight days from the time of the accident, I found the man sitting at his table dining with his family, and in three months he was in the street on crutches. This patient had repeatedly suffered much from colica pictonum, his digestive organs were unhealthy, and he was a man of nervous temperament, all which I had to discover after the accident. As early as the third day he was very restless, on the fourth his sensorium was much affected, and he was constantly vomiting; by the frequent administration, however, of the saline mixture in the act of effervescence, his stomach was quieted. I ought to have observed that, on the night of the accident, he took an opiate, and on the following day I purged him; but from the state of his pulse, and from the degree of hæmorrhagy, I did not find it requisite to take blood from the arm. By the eighth day, his stomach being tranquil, we were enabled to assist the separation of the slough, by invigorating the powers of the system with bark and port wine, from half a pint to a pint of which, with eight ounces of the decoction cinchonæ and opium, the quantity of which was regulated by his state of irritability, enabled him to support the immense suppuration at the joint, which from this time to the fourth week discharged most copiously. I may here mention that I never observed on the one hand the stimulating effects of opium, and on the other its sedative, so strikingly ex-

emplified as in this man, for if he did not take quite enough to produce sleep, he was literally mad, tearing the bed-clothes, swearing, praying, singing, and making the oddest grimaces possible; but if he had a full dose, which, by the third week, was two drachms of laudanum, he slept soundly and awoke refreshed; and I believe from his extremely susceptible state, that but for opium, which produced a directly sedative effect upon his nervous system, he would have sunk from constitutional irritation; at the end of the second week, his stomach being in a fitter state for digestion, he was allowed plentifully of animal food and good beer, with which and wine, bark and opium, continued for a week or two, he perfectly recovered.

I am, Sir, &c. &c.

GEO. COOPER.

CASE VII.

Worcester, July 30, 1819.

DEAR SIR,

I have had no case of compound dislocation of the ancle-joint under my care, since I have settled in practice; but my colleague, Mr. Sandford, gives me the following information, which I do myself the pleasure of transcribing.

A boy 15 years of age, was admitted into the Worcester Infirmary with compound dislocation of the ancle, the protruding portion of the tibia was sawn off, the anterior tibial artery was taken up, the limb placed on its outer side, the wound dressed superficially, and the dressings retained

with a many tailed bandage, kept wet with the liq. ammon. acet. Suppuration and granulation came on kindly, the boy wore tin splints for a length of time, and on his recovery had a slight motion of the ancle-joint.

I am, my Dear Sir,

Yours very respectfully,

J. CARDEN.

P. S. My late master, Mr. Trye, had under his care a case of compound luxation of the astragalus, where he cut out the luxated bone, and the patient had a good recovery, with a tolerably useful foot. This is, I believe, a very rare case.

CASE VIII.

Sept. 1, 1819.

MY DEAR SIR,

Some domestic events have delayed my reply to your letter.

I remember six cases of compound dislocation of the ancle-joint, four of which underwent immediate amputation. In the two other cases attempts were made to save the limbs and in one with success. Most of these accidents were produced by machinery, and the injury to the joints and soft parts was so great as to render all hopes of saving the limb vain.

In the limb that was not saved, though attempted to be so, there was too much mischief done, and after seven months' trial, amputation was performed.

I was called to a fine young woman of eighteen years of age, (who had been consulting me not an hour before on the case of her father) and who had fallen from her horse and suffered a compound luxation of the ancle-joint *externally*. The tibia and broken fibula protruded about an inch and a half through the wound on the outside of the limb. I sent her to the hospital, and in consultation, proposed that a sufficient quantity of the bones should be removed to admit of restoration. I advised this attempt to save the limb, from observing that the accident took place by a heavy fall with the sole of the foot to the ground, that it was unaccompanied by contusions, or violence committed by a blow or wrench, and that the patient was a very healthy country girl. There had been considerable hæmorrhage.

The extremities of the bones were removed; the reduction accomplished, and the limb supported by a tailed bandage, splints applied moderately tight, and the bandages were directed to be kept constantly soaked in a cold application; an opiate was given.

On the following day there had been considerable hæmorrhage, but the limb was not disturbed. Great suppuration took place about the joint, spread up the limb, and greatly reduced the patient, but she recovered. These collections were never opened, which I should have done early, and thus perhaps have prevented that extent of suppuration which so much reduced the patient.

Any further details I will give you if you require them, on this as on all occasions, with great pleasure, and I must hope that on all oc-

casions you will make use of me, and now accept my apology for not answering yours before.

Very faithfully yours,

R. FLETCHER.

The following I received from my friend Dr. Lynn.

CASE IX.

A man on board the Walmer Castle East Indiaman, in the year 1808, whilst the ship was off the Cape of Good Hope, fell between decks, and a cask of water rolled upon his ancle, producing a compound dislocation of the end of the tibia inwards. I sawed off the projecting portion of the tibia, brought the parts as closely as possible together, applied evaporating lotions to the limb, and the man recovered without any dangerous symptoms.

JAMES LYNN, M.D.

Cases requiring amputation.

But still cases occur, in which the operation of amputation will be rendered absolutely necessary, either to preserve the life of the patient, or to prevent his being doomed to the constant necessity of using crutches on account of the deformity and stiffness of the limb.

Does not always succeed.

It seems to me, however, to be by much too prevailing an opinion, that the amputation of the limb is a sure means of preserving life, for when this operation used to be more frequently performed in our hospitals than it now is, for compound dislocation of the ancle and compound fracture of the leg, a considerable number died,

Very lately a man at Tring had his foot torn off by a threshing machine, and the limb was obliged to be amputated at the usual place below the knee. The operation was performed by Mr. Firth, but the man died in the evening of the 6th day.

The circumstances which I have known give rise to this necessity are,

The advanced age of the Patient.

Age. Under great age the powers of the body become so much weakened, that the patient is unable to bear the constitutional excitement which the suppurative inflammation of the joint produces, and as the operation of amputation does not expose him to this process, it is better to have recourse to it. However, I ought to observe, that when in my lectures I have stated what I have now advanced, the pupils have flocked around me after lecture, and have told me of cases of recovery even of very old persons; but in the practice of hospitals in this extended city, very aged persons sink under these accidents, if the limb be not amputated.

Laceration. *A very extensive lacerated wound will give rise to a necessity for this operation.*

CASE X.

July 10th, 1806, Mr. Dudin, a gentleman residing in Horslydown, Borough, jumped out of his one-horse chair and dislocated the tibia inwards at the ancle through a large lacerated wound, and a portion of the malleolus internus

was broken off and remained attached to the astragalus. The wound bled freely, and the foot was loose and pendulous. I therefore felt myself obliged to amputate the limb.

Mr. D. after this operation, proceeded in every respect favourably, recovering without any untoward symptom.

Difficult reduction.

A difficulty in reducing the bones has been considered as a reason for amputation.

This circumstance, however, is rather a motive for removing the extremities of the bones by the saw, than for performing the operation of amputation, after which, the reduction of the tibia is easily effected, and an useful limb is preserved to the patient.

Bones shattered.

The bones are sometimes extremely shattered.

If the lower extremity of the tibia be broken into small pieces, the loose portions of bone ought to be removed and the end of the tibia be smoothed by a saw; but if in addition to this comminution, the lower extremity of the tibia be obliquely broken, and a large loose portion of bone be felt with the fingers, then it will be proper to amputate; also if the astragalus be broken, the portions of this bone should be removed or they will separate by ulceration, or occasion unnecessary local irritation. (See Dr. Lynn's and Dr. Rumsey's cases.) But if the end of the tibia and tarsal bones, as the astragalus and calcis, are broken, then the operation of amputation will be required. The following case shews well the necessity for amputation in such a state of parts.

CASE XI.

I was requested to see a lady, aged 34 years, who on August the 9th, 1819, had, in a fit of insanity, jumped out of a two pair of stairs window and produced a compound dislocation of the tibia and fibula at the outer ancle. I met at the house Mr. Stephens, a surgeon residing in Hunter Street, Brunswick Square, who had been called immediately after the accident. As she appeared almost insensible, and Mr. Stephens feared an injury to the brain, he took away twelve ounces of blood. When he examined the ancle he found the malleolus externus of the fibula projecting through the wound, but unbroken ; the tibia dislocated and broken ; the foot very much turned inwards. He extended the foot and thought that the bones had exactly returned into their natural situation ; adhesive plaister was applied upon the wound, and its edges nicely adjusted. She was placed on a mattrass with the limb upon the heel, and with a splint on each side of the leg. For seven days she complained of little pain, and had but slight constitutional disturbance ; on the day week from the accident, I was requested to see her, and finding little local or constitutional irritation, I recommended that the limb should not be disturbed, and the dressings were not removed.

On the 10th day from the accident, Mr. Stephens finding her in more pain, examined the wound, and found that it had not adhered.

On the 12th day a considerable discharge issued from the wound.

On the 16th day, a slough had separated and exposed the bones, which appeared shattered and projecting. On this day I again saw her, and upon examining the ancle, found the astragalus projecting and a portion of it broken, and as the surrounding parts were dead, I removed the projecting bone. Introducing my finger into the wound as soon as the astragalus had been separated, the tibia was found to be shattered and the os calcis broken into many pieces. As her pulse was 100 and small, and her strength was failing, I immediately recommended her to submit to the operation of amputation, to which she consented.

On the Monday following the stump was dressed by Mr. Stephens, and the greater part was adhering.

Two of the ligatures separated on the 10th day, and the other came away on the 16th day.

Sept. 29. The stump was healed, excepting about the size of the section of a pea, and she has no complaint remaining excepting a sore upon her back, and pain in the left foot.

It is proper to mention that she hurt her spine and kidneys by the fall, so as to discharge urine tinged with blood for three weeks after the accident.

The other ancle also was most severely injured, and she suffered exceedingly from pain in it.

Upon examination of the limb, the tibia was split up from the malleolus internus to the ex-

tent of three inches: the fibula was unbroken; the astragalus was broken and detached; the os calcis was fractured into several pieces.

The Dislocation of the Tibia at the outer ancle produces much more injury and danger than that at the inner, and amputation will be more frequently required for it, because both the bones and soft parts suffer more than in the dislocation inwards. Dislocation outwards.

It sometimes happens that when the bone is replaced it will not remain in its situation, and all the symptoms of the injury become removed.

This circumstance arises from the tibia in the dislocation outwards being obliquely broken, and only a small portion of the articulating surface remaining on the dislocated extremity of the tibia, it will not rest on the tibia when it is reduced. Mr. Andrews, of Stanmore, and Mr. Foote, of Edgeware, consulted me on the following case. Oblique fracture with dislocation.

CASE XII.

Mr. Andrews and Mr. Foote were sent for on August the 9th, 1817, to the Hyde, six miles from London, to visit Charles Tomlin, a higgler, 48 years of age, who, falling from intoxication, had the wheel of his cart pass over his left leg, which produced a protrusion of the bones through the integuments at the outer ancle. Mr. Andrews reduced the dislocation in the evening of the accident. On the same night Mr. Andrews and Mr. Foote visited him again, and found his pulse very quick, and

spasms in the limb, which had again displaced the bone. They gave him a large dose of opium, and succeeded in reducing the bones.

On the 10th he had a very quick pulse, accompanied with strong spasms in the limb, but not sufficiently severe to displace the bone.

On the 11th, I was requested by Mr. Andrews and Mr. Foote, as I was going through the village, to stop and see this man; and as soon as the bandages were removed a violent spasm again threw the bones from the astragalus, and all the efforts I could make would not replace them. Seeing therefore no hope of the man's recovering without the amputation of the limb, I immediately proposed it, and he readily gave his consent.

For three or four days he had a great deal of nervous irritation, which was most relieved by occasional doses of opium and æther.

On the 18th, the stump was inflamed, and in some parts sloughy, and on the 22d it bled, but not profusely.

On the 25th a poultice was applied, and from this time the appearance of the stump improved, and he proceeded without interruption in his recovery. In a month he returned to his home at Bushey, a distance of seven miles.

Upon examination of the limb, I found the cellular membrane around the ancle loaded with extravasated blood; the ligamentum annulare tarsi was torn. The muscles were all remaining whole, though some of them, as the peronei, were much put upon the stretch. The fibula was broken one inch above the lower extremity of the malleolus externus which remained in its place, still united by its ligaments

to the tarsus. The tibia was split down for two inches above the joint, leaving the greater part of the articulating surface still resting upon the astragalus, but the remaining portion of the articulating surface with the shaft of the tibia and the fibula passed through the wound at the outer ancle. If therefore the bone had been again returned to its situation, it could not have remained there from the small portion of articulating surface attached to it; and if the projecting portion had been removed by the saw it would not have adapted itself to the portion of the tibia, which remained attached to the astragalus.

Division of an artery

The division of a large bloodvessel might, with an extensive wound of the integuments, lead to a necessity for amputation,

but I should not at once proceed to the operation on that account. The case from Mr. Sandford, of Worcester, sent me by Mr. Carden, clearly shews that the division of the anterior tibial artery does not, if it be well secured, prevent the patient's recovery. I also once saw a compound fracture close to the ancle-joint, accompanied by a division of that artery; and although the patient was in the hospital, and a brewer's servant, who possessed the worst constitution to struggle against severe injuries, yet this man recovered without amputation.

The posterior tibial artery is a vessel of more importance, and is accompanied by a large nerve, which would not be likely to escape injury when the artery was divided by the dislocated bone. Yet the magnitude of the anterior tibial artery and its free anastomosis with

the posterior, would not entirely preclud ethe hope of the foot being preserved under an injury of the posterior tibial artery.

Gangrene. *Mortification of the foot*

sometimes ensues, and becomes a sufficient reason for amputating the limb; but this must be generally done when limits appear to be set to the extension of the mortification. However, it may be observed, that in the mortification which ensues from the division of a bloodvessel I have seen in the arm, where the brachial artery had been divided and the elbow-joint dislocated, the arm removed above the injured part, whilst the limb was still dying towards the seat of the wounded artery, and the patient did well. And I have also known a case of popliteal aneurism in which the artery and the surrounding parts were so compressed by the swelling, that mortification began at the foot and was extending to the knee, and although no limit was yet set to the mortification, the limb was amputated, and the patient did well. So that mortification, when it arises from injury to a bloodvessel, admits of a practice different to that which is pursued in mortification arising from constitutional causes.

Contusion. *Excessive contusion may be another reason for amputation;*

and therefore in those cases in which heavy laden carriages pass over joints, and bruise the integuments so as to lead to their forming extensive sloughs, and produce at the same time generally the worst examples of compound dislocations, as regards the state of the

bones, I should immediately amputate, for such cases are very different to those which occur from jumping from a considerable height, from a carriage rapidly in motion, or from slipping down in walking or running.

Extensive suppuration will also form a reason for amputation. Suppuration.

I have known after an attempt to save the limb, the patient have more extensive suppuration than his constitution could support, followed by an ulceration of the ligaments, by which the joint became additionally exposed, and the bones ultimately again displaced, leading to an absolute necessity to remove the limb for the preservation of his life.

A necessity for amputation may be also produced by exfoliations of portions of bone, Exfoliation.

which, locked into the surrounding parts of the bone, are incapable of becoming separated, and thus keep up a state of continued irritation. My friend, Mr. Hammick, has had the kindness to send me a specimen of this kind, which he was obliged to amputate. The loose portion of bone was seated between the lower extremity of the tibia and fibula, and reached to the ancle-joint; both the bones had been broken, and had become reunited, and the uniting medium had inclosed and incarcerated the dead portion of bone. It is probable from the appearance of the parts that this portion of bone never would have been able to have escaped from the place in which it was locked.

Deformity. *Excessive Deformity of the Foot*

will also give rise to a necessity for this operation; and this deformity will arise in three directions. First, when the foot is suffered to turn outwards at the time the leg is placed upon the heel, in the dislocation inwards. Secondly, when it turned inwards in the dislocation of the tibia outwards; and, thirdly, the foot being pointed. The first is best opposed by placing the leg upon its outer side when that is compatible with the treatment of the wound; in the second case, it is best to keep the foot on the heel, with splints having foot pieces both on the inner and outer side of the foot; and the third requires similar splints, and that a tape, as a stirrup, should be placed under the foot, and fastened to the splint on the fore and middle part of the leg to keep the foot supported.

The following case from Mr. Norwood, of Bath, shews the necessity for amputation, when great deformity is permitted to occur.

CASE XIII.

I was sent for to Bradford, some years since, to amputate a leg directly after an accident of this kind. I found the lower extremity of the tibia, with the astragalus loosely attached to it, projecting at the inner ancle. The wound was not large, and the soft parts were little injured. I removed the astragalus, and reduced the tibia, leaving it to rest upon the os calcis. I did not again see him during the healing of the wound; I believe it got well without any severe symptoms, but the os calcis became drawn up against the posterior part of the tibia, to which it firmly

united, and the foot became immoveable, with the toe pointed downwards. In this state he came to Bath two years afterwards; I amputated the leg, and the patient did well.

GEORGE NORMAN.

Bath, August 2nd, 1819.

Amputation has been recommended in those cases in which tetanus occurs after this injury.

Tetanus.

Of tetanus, I have seen one case from compound dislocation of the ancle, and have heard of another. That which I saw was in a Mr. Yare, a stable keeper, who had a compound dislocation of the tibia inwards, and in whom I reduced the bones, and placed the limb on its outer side. For a few days he proceeded without any alarming symptoms. The only circumstance in which he differed from what I expected, was in the slight inflammation which succeeded upon the joint; for the restorative process seemed to be scarcely set up in him. When I paid him my morning visit, several days after the accident, he said, "Sir, I believe I have caught cold, for my neck is stiff;" and as he said this, with his lower jaw raised and his teeth closed, I begged him to shew me his tongue, to ascertain if his jaw were locked, and he tried to open his mouth to protrude the tongue, but he was unable to do so. I then desired that Dr. Relph might see him, who did all his mind could suggest to arrest the progress of the symptoms, but unsuccessfully, as the different muscles of volition became affected in the back, extremities and the abdomen, until he was exhausted by irritation. To amputate under such circumstances, would be most unjustifiable,

as far as the experience of cases in this climate will enable me to form an opinion. I have not seen amputation performed for compound dislocation of the ancle, but I have for compound fracture just above the joint; and it seemed to me to precipitate the fatal event. I have also known, in one case, the finger amputated for tetanus arising from injury to it, but still the patient died: and I have heard of a third case in which it was also practised, but still the issue was fatal. There is a species of chronic tetanus which sometimes even succeeds wounds, and which will occasionally get well, and apparently, it recovers, even if but little be done by medicine, and nothing by surgery. And in such a case it would not be justifiable to amputate, as the patient will get well without it. If medicine does any thing in these cases, submurias hydrargyri with opium, is that under which I have seen the majority of cases recover.

Constitution irritable.

A very irritable state of constitution

will sometimes render all treatment unavailing in the attempts to save the limb, and will now and then destroy, even if the operation of amputation be performed. There are some persons originally constituted with so irritable a system, that the slightest injuries will destroy them. There are a much greater number whose constitutions, originally good, have been so much injured by habits of excess, by want of exercise, by over exertion of mind, by drinking freely of spirits, and eating but little, that they are rendered in the highest degree irritable.

CASE XIV.

One of the most curious examples of this kind which I have seen, was in a man who worked at Barclay's brewhouse, in the Borough. The circumstances were these :—

On Saturday he was turning a cask, and a splinter of wood entered his thumb, which he immediately drew out.

On Sunday night he requested his wife to rise to make him a poultice, for his thumb, he said, was painful.

On Monday he sent for Mr. John Kent, surgeon, in the Borough, who found his thumb inflamed and painful.

On Tuesday the inflammation had extended to the hand and fingers.

On Wednesday a swelling appeared at the wrist, above the ligamentum annulare carpi, and the man had a great deal of irritative fever, and was obliged to keep his bed.

On Thursday, after lecture, Mr. Kent came to me, requesting I would see this man, who had been delirious during the night, his arm much convulsed, and his body was becoming generally so. I went with him, and, feeling the thumb, discovered a fluctuation in the theca. I put a lancet into the extremity of the thumb, and a considerable quantity of pus issued. Gratified with the expectation of his being relieved by the discharge of the matter, I was going out of the room to express this feeling to his friends, when I heard a rustling at the bed behind me, and upon Mr. Kent and myself turning back,

we saw him under the influence of a convulsive fit, which raised him in part from his bed: he fell back and expired.

Living as these persons generally do, principally upon porter and spirits, they have constitutions which render them the worst subjects for accidents.

The following case shews the violent symptoms and quick dissolution which will, from the same cause, occasionally destroy in compound dislocations of the ancle.

CASE XV.

On June the 10th, 1809, I was requested to go immediately to Gracechurch Street, to see a Mr. Fenner, who, in walking opposite to the City of London Tavern, had slipped down from the foot-way, and produced a compound dislocation of the ancle. The tibia projected at the inner ancle; the fibula was broken; the skin was tucked in under the extremity of the tibia.

1st. I immediately procured a mattress for him, instead of a feather-bed.

2nd. A many-tailed bandage; splints lined with wool; pillows and tapes.

3rd. The skin was divided, and the bone reduced; but it was much opposed by violent spasm of the muscles.

4th. The edges of the wound were closely adjusted.

5th. The bandage was applied, and splints; and the limb was placed upon pillows on its outer side, with the knee bent.

6th. Bled to 14℥, and opium given; tinct. opii. gtt. xxx.

June 11th.—He reported that his night had been restless; his tongue was white; his pulse beat 110 strokes in a minute; he had violent pains in the ancle, and he had vomited.—Ordered oleum ricini, as his bowels had not been relieved. Evening; he had almost constant spasms of the muscles of the leg; he has no sleep, and has no appetite. The oleum ricini had produced him four evacuations.

June 12th.—His pulse was 120; his tongue more furred. He has violent and very frequent spasms. He has nausea, but has not vomited since the last report. He has had one evacuation. Blood is extravasated about the ancle; a sanious serum is discharged from the wound. Ordered opium.

June 13th.—Had slept three hours. There is some inflammation about the wound and swelling of the leg, with spasms, but they are less violent. A poultice was applied to the ancle, and fomentations ordered. Pulse 120; his tongue was very much furred. Evening; in most violent pain; he was ordered submurias hydrargyri five grains, with two grains of opium, and the saline medicine with antimony.

June 14th.—The spasms continue, but the pain has in a great degree ceased. He has had several evacuations, but he has been delirious during the night. The limb is but little swollen; the foot looks slightly inflamed, but there is no healthy discharge or any granulations beginning to form. The former treatment ordered to be continued.

June 15th.—He passed a bad night, being delirious through a great part of it. He had a violent spasm in the limb this morning, by which he produced a slight hæmorrhage, which was stopped by pressure. Leg swollen; wound appears to be without action. His pulse is equally quick, and he takes no nutriment.

June 16th.—He has spasms in the thigh of the same side, and in the other leg, as much as in the injured limb; in other respects he remains the same.

June 17th.—He was delirious during the last night, and bleeding was again produced by the violence of the spasms.—His pulse was considerably quicker than before.

June 18th.—He died at 4 o'clock in the afternoon.

Persons who are much loaded with adeps are generally very irritable, and bear important accidents very ill; indeed they generally die, which ever plan of treatment be pursued: to this, however, there are exceptions in those who are corpulent, and who yet take a great deal of exercise, as they will retain much vigour of constitution; and in such persons the limb may be attempted to be saved, as in the case described by Mr. Abbott, surgeon at Needham Market; but in those who have become extremely fat, and who have been addicted to habits of indolence, there is little chance of preserving life but by the operation of amputation.

Corpulent persons.

I have thus endeavoured to explain what has fallen under my observation, or have been able to learn from others upon this difficult subject; and I beg leave to express a hope, that any of

my friends, who may have had cases under their care, which would throw further light upon the subject, will have the kindness to communicate them to me, whether they make for or against the advice I have given, as I have no further wish but that all the points respecting this severe accident may be fully elucidated and established.

ON DISLOCATION OF THE TARSAL BONES.

On the Dislocation of the Astragalus.

This bone is connected above and on the sides to the tibia and fibula by its trochlea; below, it has articulatory surfaces for its junction with the os calcis, to which it is united by means of a capsular ligament; and anteriorly to the os naviculare, by a capsular, broad, and internal lateral ligament. A simple dislocation of the astragalus sometimes, but rarely, occurs; and a compound luxation is still more rare. A simple luxation is a most serious accident, being very difficult to reduce; and should the reduction not be effected, the patient is ever after doomed to a considerable degree of lameness.

Junctions with other bones.

Simple dislocation.

I was sent for into the country to visit a patient, and the surgeon who I met there requested me to see a person who had a dislocation of the foot, which had happened several weeks, but it had not proceeded to his satisfaction. Upon

Case.

examination I found the astragalus dislocated outwards, and the tibia broken obliquely at the inner malleolus. Every attempt to reduce it was made, which the surgeon, who is an extremely well informed man, could adopt; five persons kept up a continued extension where the accident first happened, but without effect; the patient was then taken home, and several persons were employed in extending the foot, and it was thought, after a time, with some success, but the reduction could not, by all their efforts, be rendered complete; for the astragalus still remained projecting upon the upper and outer part of the foot. The extension could not be carried further, for the integuments sloughed from that already made, and the wound was a long time in healing. The limb deviates much from its natural shape; the toes are turned inwards and pointed downwards; there is some little motion at the ancle, and a slight degree of it between the projecting and raised astragalus and the other bones of the tarsus. This accident, then, is of a most serious nature; for this gentleman had placed himself under the care of a most intelligent and persevering surgeon, and yet the attempts which he made at reduction were not entirely successful, merely from the nature of the accident, and not from any fault in the means which were pursued.

Compound dislocations.

Of the compound dislocations of this bone, I have only seen one instance; and in that case the operation of amputation was performed. It will be seen, however, in the preceding pages, that Mr. Trye removed the bone in this accident, and the case did well.

The five anterior bones of the tarsus are sometimes dislocated from the os calcis and the astragalus. There is a transverse joint between these bones, formed by the astragalus and os calcis posteriorly, and by the os naviculare and os cuboides upon the fore part, which support the three ossa cuneiformia. This joint is sometimes, but rarely dislocated by very heavy weights falling upon the foot, of which the following is an example.

A man working at the Southwark Bridge had the misfortune to have a stone of great weight glide gradually upon his foot. He was almost immediately brought to Guy's Hospital, and the appearance of the foot was, that the os calcis and astragalus remained in their natural situations, but the fore part of the foot was turned inwards upon those bones. When examined by the young gentlemen, the appearance was so precisely like that of a *club foot*, that they could not at first believe but it was a natural defect of that kind; but upon the assurances of the man, that his foot, previously to the accident, was not distorted, an extension was made by fixing the leg and the heel; the fore part of the foot was then drawn outwards, and thus the dislocation was reduced. This person was discharged from the hospital in five weeks quite recovered, having the complete use of his foot.

The following interesting cases were under the care of Mr. Henry Cline; and for the particulars I am indebted to his apprentice, Mr. South.

CASE I.

Thomas Gilmore, æt. 45 years, an Irish labourer, was admitted, under Mr. H. Cline, into St. Thomas's Hospital, about eleven o'clock of the morning of

March 28, 1815. Whilst walking at the New Custom House this morning, he received a blow on the heel, from the falling of a stone, (said to be half a ton weight) which made a wound on the fore part of the ancle-joint, and dislocated the foot at the astragalus.

The parts were in the following state:—a wound extended from opposite the middle of the base of the tibia, round the upper part of the instep, to the external malleolus, which exposed the articulating surface of the astragalus with the navicular bone on the fore part, as well as that for the os calcis, on the outside, from both of which bones it was displaced; its connection with the tibia and fibula, however, was undisturbed; the tuberosity of the os calcis projected outwards, but the rest of the foot turned in, so that the toes pointed much inwards towards the opposite foot.

The reduction was effected by extending the foot, and rotating it outwards; the wound was brought together with straps of adhesive plaister; the leg was covered with soap plaister and put in a fracture-box, on the heel; the parts were kept uncovered, and a slight hæmorrhage supervening, linen rags dipped in cold water were applied.

He is a robust man, has been in the habit of drinking, and says he has been subject to the gout.

March 29. Had not slept much, as on falling asleep, spasm was produced; pulse about 80; skin cool; he has taken the sulphate of magnesia, which has produced two evacuations; the part is not tumefied but has been painful.

March 30. Has passed a very restless night, having been delirious; pulse 120; skin hot and dry; fauces parched; does not now seem quite clear in intellect; in the morning he has had more than one rigor; a dose of sulphate of magnesia, with infusion of senna, had procured three loose, but healthy stools; the part has become more swollen and painful; *ordered*, fever mixture, with ten drops of antimonial wine, every six hours; in the afternoon he had three more stools.

March 31. Is still delirious, and did not sleep last night; skin very hot and dry; mouth parched; pulse about 112; has had two stools this morning, without medicine; the rigors still continue occasionally, and he is also affected with tremors; the inflammation is extending up the leg, and a bruise, which he received on the same leg, is now ulcerating; to it, wax and oil dressing is applied.

April 1, 1815. Has been less delirious than on the two former nights; pulse 122; tongue cleaner; no stools.

April 2. Has slept better than he has yet done; is not at all delirious; pulse 96 and soft; skin moist, and he has perspired freely; no

stools; urine in large quantity, but said to be high-coloured; the tremors have a good deal left him, and he feels altogether comfortable, except that there is a good deal of pain in the injured part, which he ascribes to a rheumatic affection, to which he has been subject; there is a slight erysipelatous inflammation of the leg, with some œdema.

April 3. Has passed a tolerably good night; is sensible; pulse 100; bowels costive; the ancle easy.

April 4. Pulse 96; skin moist; has had two stools; the erysipelatous inflammation has extended rather above the internal condyle of the os femoris, and small yellow vesicles have formed; this seems to have proceeded from the bruise on the calf of the leg, which has now gone into a state of superficial ulceration; soap cerate was applied to this wound, and the spirit lotion on the limb as far as the inflammation extended; the wound on the ancle was dressed, for the first time, to-day, the ligaments appear to be sloughing; the strapping was left off, and wax and oil dressing applied.

In the afternoon, his pulse 104, seems restless and says his head feels rather light; had another stool towards evening.

April 5. Has been delirious all night; skin hot and dry; pulse 108, and weak; these symptoms indicating fever, of a different kind to the preceding, *viz.* secondary and sympathetic with the erysipelas; the wound at the ancle is granulating, and secreting healthy pus; that on the leg is very painful, and has taken on a

sloughy appearance: ordered decoction of bark every four hours, with opium, if diarrhœa is produced.

April 6. Was delirious; pulse 100 and weak; skin perspirable; has had two stools; the inflammation extends nearly to the groin, and at one part of the thigh, where the cradle has accidentally pressed the skin, seems as if it would slough; takes a grain of opium twice a day.

April 7. Slept pretty well; wanders; pulse 110, but strong; skin not very hot; no stool; much pus is discharged from the wound at the ancle.

April 8. Has been restless during the night; pulse 96, with some power; skin moderately hot; is thirsty; delirious; tongue rather foul; bowels costive; his urine, of which he still voids a great quantity, scalds him; pus is forming in different parts of the limb, and the inflammation on the thigh seems now to be stationary.

April 10. Slept well; is not delirious; pulse 96, not weak; skin not very hot; has appetite; the part is painful, but the inflammation on the thigh is considerably diminished, and the sloughs are circumscribed; pus healthy; a few days since, he was ordered a pint of porter daily, which is now increased to two pints.

April 11. Says he occasionally wanders; pulse 100, rather weak; appetite tolerably good; skin moist; has had stools.

April 12. The inflammation is less; the opium which he takes gives him good nights;

the wound at the ancle is much the same; the sloughy sore on the calf of the leg, better; to-day he was moved into a clean bed, and the limb placed on the outer side, as he wishes to lay on his side.

April 13. Is composed; pulse 98; skin cool; feels weak; has not much appetite, but likes his porter; the sloughs on the leg separate slowly.

April 14. The limb returned to its old position on the heel, as he was not so comfortable when it was placed on the side.

April 17. Pulse 92, and weak; has little or no appetite; the bark and opium were left off to-day, as they seem to affect his head; a poultice was applied to the wound on the calf of the leg, and strapping on that at the ancle; it being hoped, that by the support which it might afford, it would diminish the discharge.

April 22. As his appetite does not get better, and he gets no sleep, the bark and opium were resumed, and an additional pint of porter given, so that he now takes three pints a day; his pulse is not so weak; spirits good; at times he is in great pain; strapping is applied to all the wounds; the sloughs not separated.

April 28. Continues much the same; one slough on the leg has separated; that at the ancle not yet; the part is tolerably easy; the discharge not great.

May 15, 1815. All the sloughs have separated, and the wounds are gradually healing up, but he is very weak and his appetite is bad.

May 20. Oil was ordered to be rubbed on

such parts of the leg as would bear it, and then washed off, as it was thought this would promote circulation in the limb, which was œdematous; however it was soon left off, as it occasioned inflammation. About this time his medicines were omitted.

May 29. An abscess, which had formed on the calf of the leg, was opened.

July 14, 1815. All the dressings are left off to-day; he is perfectly capable of lifting up his leg, and has slight flexion and extension of the foot.

After this time he rapidly improved; and having left his bed, in a short time was walking about the square on crutches.

Sept. 21, 1815. He went out, being able to walk tolerably with a stick.

CASE II.

Martin Bentley, æt. 30 years, a sailor, was admitted under Mr. H. Cline, into St. Thomas's Hospital, at twelve o'clock at noon of

June 21, 1815. He had been overpowered this morning by some stones which he was endeavouring to sling in a ship's hold, which knocked him down and fell on him, causing a compound fracture of the tibia and fibula of the left leg, near the middle, with dislocation of the astragalus of the other foot from the other bones of the tarsus.

As there was much laceration of the skin and muscles, Mr. H. Cline thought right to amputate the limb below the knee, which was done about three hours after his admission. He

complained of much pain during the operation, with frequent jerking of the limb; the muscles were extremely rigid; five ligatures were applied, and the wound dressed as usual.

The other foot presented the following appearance: the protuberance of the os calcis had nearly disappeared, but the os calcis laterally and on the outer side projected much beyond the outer malleolus, just under which however was a remarkable depression; just below the inner malleolus was a remarkable and unnatural projection; the whole foot seemed somewhat displaced outwards, the toes turning out; the astragalus must here have been dislocated from both the navicular bone and os calcis, and thrown inwards, so as to have its under articulatory surfaces for the os calcis resting on the inner edge of that bone.

After the amputation the dislocation was reduced by fixing the knee, having the thigh bent at right angles with the body, then laying hold of the metatarsus and protuberance of the os calcis, and drawing the foot gently and directly from the leg. During this extension Mr. H. Cline put his knee against the outside of the joint, and the foot being pressed against it the os calcis and navicular bones slipped into their place, carrying with them the rest of the foot, and the deformity disappeared. He was then carried to bed, and an outside splint, being well padded, was applied, and secured by tapes, and the leg, as far as could be, placed on the outer side. Goulard's wash was applied.

June 24. The lead wash to be left off, and soap cerate put on the right leg.

June 25. The cerate has blistered his leg in several places, and he complains of more pain than yesterday, at his ancle.

June 28. The stump, which is going on well, dressed to-day; one ligature came away; the pain in his ancle has subsided.

July 1, 1815. Complains of uneasiness about the epigastrium, and sickness; pulse 112 and hard; ℥viij. blood taken from the arm.

July 2. All untoward symptoms have disappeared.

July 4. Two ligatures came away; a sore, which is the effect of the soap cerate, on the inner malleolus, is dressed with wax and oil. He is now capable of raising his leg, which however is numb.

July 13. The ligatures not seeming disposed to come away, a piece of whalebone was fixed on the side of the stump to which they were attached, and so kept constantly tight; was put on the house diet to-day; has previously been on the milk.

July 19. One of the ligatures removed, with some difficulty, by Mr. H. Cline; the other came away easily on the following day.

Aug. 7, 1815. Walked in the square, the first time since the accident.

Aug. 26. Went out; capable of walking tolerably well.

I conversed with Mr. Henry Cline on the subject of these accidents, and Mr. Green, who saw the preceding cases in the commencement, has sent me the following letter respecting them.

Lincoln's Inn Fields, Aug. 19, 1819.

MY DEAR SIR,

In the notes of Martin Bentley's case, which I made at the time he was under Mr. Henry Cline's care, in St. Thomas's Hospital, I find it stated that the right astragalus was dislocated inwards, *i. e.* that the os calcis, with the rest of the foot, was thrown outwards; and the description which I have there given of the appearances, is—that the whole foot seemed to be somewhat displaced outwards; that the os calcis projected laterally much beyond the outer malleolus, whilst the protuberance of that bone had nearly disappeared; and that in consequence of the astragalus retaining its situation, there was a remarkable depression beneath the outer malleolus, between it and the displaced os calcis; and as remarkable a projection produced by the astragalus, below the inner malleolus. This accident, which was accompanied with a compound fracture of the opposite leg, had been produced by the fall of several large stones. The reduction of the dislocation was effected without difficulty, first, by fixing the knee, then by making extension of the foot gently and directly from the leg, by laying hold of the heel with one hand and placing the other on the dorsum of the foot; and lastly, by pressing the foot inwards, whilst a counter-pressure was made with the knee upon the lower extremity of the tibia on the opposite side. The foot was afterwards placed on its outside, and secured upon a well padded splint.

In the case of compound luxation of the tar-

sal bones, likewise under the care of Mr. Henry Cline, it appears, according to my notes, that the astragalus was displaced outwards, *i. e.* that the other tarsal bones were thrown inwards. I find that the appearances are described to have been—that the foot was turned considerably inwards; that the articular surface on the head of the astragalus, which is received into the cup of the navicular bone, was exposed through an extensive but tolerably clean cut through the integuments, and that the articulating surface of the os calcis for the astragalus might also be perceived on the outer side. The accident was said to have been occasioned by the fall of a heavy stone, which had struck his heel. Reduction of the dislocated parts was accomplished, first, by bending the leg so as to relax the muscles, and then by extending the foot in the manner described in the former case, and by rotating it at the same time outwards.

The patient was a robust, but not corpulent, labouring man, between forty and fifty years of age. He stated that he had been in the habit of drinking, and that he was occasionally subject to gout.

You have already, I believe, been made acquainted with the particulars of the progress of the case, of which the most remarkable features appeared to be, that the primary constitutional irritation was violent, but of short duration, and that his recovery was retarded by extensive erysipelatous inflammation which terminated in sloughing, and by the formation of matter at the part, accompanied by irritative

fever and loss of strength; but that his recovery, although tedious, was complete.

I remain, my dear Sir,

Your obliged and obedient Servant,

JOSEPH HENRY GREEN.

Of the Dislocation of the Os Cuneiforme Internum.

I have twice seen this bone dislocated, once in a gentleman who called upon me some weeks after the accident, and the other case occurred in Guy's Hospital very lately. In both these cases the same appearances presented themselves. There was a great projection of the bone inwards, and some degree of elevation, from its being drawn up by the action of the tibialis anticus muscle, and no longer remaining in a direct line with the metatarsal bone of the great toe. In neither case was the bone reduced, but the former patient walked with but little halting, and I believe would in time recover the use of the foot, so as not to appear lame. The cause of the accident was in this gentleman, a fall from a considerable height, by which the ligament was ruptured which connects this bone with the os cuneiforme medium, and with the os naviculare.

The case in Guy's Hospital my apprentice, Mr. Babington, informs me, happened by the fall of a horse, and the foot was caught between the horse and the curb stone.

The treatment of this accident will consist,

in confining the bone in its place, by at first binding it with a roller dipped in spirits of wine and water, with which it must be constantly kept wet. When the inflammation is subdued, a leather strap is to be buckled around the foot, to keep the bone in its place till the ligament be united with the bone in its natural position.

The metatarsal bones I have never known luxated. Their union with each other, and irregular connection with the tarsus prevent it; and if it ever happens it must be a very rare occurrence.

The toes are sometimes dislocated; but I will reserve that subject until the dislocations of the fingers are described.

ESSAY II.

OF

UNNATURAL APERTURES

IN THE

URETHRA.

By Mr. ASTLEY COOPER.

Incised wounds rarely heal.

THAT openings made into the urethra by cutting instruments are healed without difficulty, is evinced by the operation for the stone in the bladder, in which this canal is extensively opened; and in the removal by incision of a calculus lodged in any part of the urethra. But when apertures are formed in this part, either from diseased states of the constitution and of the urethra, or from disease in the canal only, and when they are accompanied by any considerable loss of substance in the urethra and corpus spongiosum, they are generally very difficult of cure.

It most frequently happens that fistulous orifices from this canal are the result of strictures in the urethra. The impediment which this disease produces to the passage of the

urine enlarges the lacunæ situated behind the stricture, and the frequent pressure of the urine upon them and upon the sides of the urethra leads to an ulcerative process, by which the urine becomes applied to a new surface; it irritates the part, occasions the formation of an abscess, into which the urine gains access; and when the matter is discharged, be it by nature or by art, the urine passes through the aperture, and continues generally to do so whilst the stricture remains. As the seat of the greater number of strictures in the urethra is beyond the middle of the canal towards the bladder, the apertures are most frequently seated in the perineum; but they are in different persons from an inch within the urethra to its extremity at the bladder. Cause.

As soon as these abscesses, which are the forerunners of the fistulæ, can be distinctly discovered to contain matter, it is the best practice to pass a lancet into them, to discharge the matter. It is advantageous in preventing extensive destruction of the parts by ulceration, and they not unfrequently immediately heal even so as to prevent the fistulous orifice, and it becomes the means of lessening the tendency those dangerous extravasations of urine into the scrotum, which if they are not early opened often prove destructive to life. Treatment.

The mode of treatment of such apertures is easily understood in principle, and their cure in most situations is readily effected in practice. It consists in principle in removing the impediment to the passage of the urine, by enlarging the urethra at the strictured part, and thus

prevents the urine from making unnatural pressure against the side of the canal, and in practice it depends on the introduction of metallic bougies, increasing their size gradually until it reaches somewhat beyond that of the natural diameter of the passage, and thus the urethra becomes stretched in a degree to admit readily the passage of the urine through what was previously a contracted canal.

Catheter. In other cases it is sometimes required, to introduce a pewter catheter of large size into the bladder, to suffer it there to remain to draw the urine through it, and thus producing the double effect of extending the stricture and preventing the passage of the urine through the opening, it often becomes the means of permanent relief.

Size. The size of the instruments employed for these purposes must be varied according to circumstances, for there is in different persons a great diversity in the natural diameter of the canal, and at different ages, even after manhood, the urethra varies exceedingly in the dilatability of its canal.

Caustic. Caustic, which was formerly much employed, is now comparatively seldom used for this purpose; yet cases do occur in which, from long neglect, the urethra and the parts surrounding the stricture become so exceedingly altered in their structure that no instrument can be passed through the part without a degree of violence which will be dangerous to life, and in which the slower influence of the caustic will be attended with less danger than the use of the metallic bougie. But it is principally in the

class of patients who are admitted into our hospitals, in whom such extensive mischief has arisen from long neglect, as to require the application of the caustic.

Case of aperture from the prostatic part of the urethra to the rectum.

But there are apertures of this description so situated and connected with other parts as to preclude the possibility of healing them by the usual means of treatment, and in which other measures are consequently obliged to be employed.

CASE.

A gentleman came to London under the following circumstances. He had an abscess formed upon the anterior and lateral part of the rectum, which had discharged itself after long continued suffering into the rectum, just above the verge of the anus. The surgeon, whom he consulted in London, discovering the aperture, divided the sinus, and he returned into the country; but the wound did not heal, and a considerable discharge proceeded from it. Observing the discharge with attention, he found that after making water the urine passed through the aperture, and that consequently there was some communication between the urethra and rectum. Alarmed at this circumstance he came to London, and placed himself under my care. I examined his urethra, and finding some obstruction at the apex of the prostrate gland, advised him to make use of large metallic bougies until the natural diameter of the urethra at that part had been re-established, hoping that in this way the opening

would be disposed to heal as the urine found a more ready course than through its natural channel. He persevered in the use of these instruments for several weeks, but with no apparent advantage, as the urine still passed by the fistulous aperture. I therefore advised the introduction of a metallic catheter of large size into the urethra, and to give it full effect, recommended that he should steadily observe the recumbent posture, which he did for a month, during which period the urine did not pass by the rectum; but as soon as the instrument was withdrawn the urine resumed its former unnatural course. He returned into the country greatly disappointed, and after remaining there for some time, and finding his complaint increasing, he again applied to me, and I advised him to undergo the following operation for his relief. I introduced a catheter into his bladder, and my finger into the rectum, and then made an incision, as in the operation for the stone, in the left side of the rhapha, until I felt the staff through the bulb. I then directed a double-edged knife across the perineum, between the prostrate gland and rectum, intending thus to divide the fistulous communication between the urethra and the bowels. A piece of lint was introduced into the wound, and a poultice was applied over it. When the lint was removed the urine was found to take its course through the opening in perineo; the aperture in the rectum gradually healed, and that of the perineum quickly closed, after which the urine took entirely its natural course. Whilst the wound which I had made was healing, one of

the testicles became enlarged and inflamed, as I supposed from the irritation on the extremity of the vas deferens, or in sympathy with an irritated vesicula seminalis on that side. This inflammation left some hardness of the epidydimis, but no further inconvenience, and the urine has never since deviated from its natural channel.

Apertures are sometimes formed in the urethra from a process of ulceration beginning in a bad constitution, without their being accompanied with stricture. Ulceration.

A person whose constitution is broken by excess, or who is naturally feeble, will have a slight discharge take place from his urethra without any previous sign of disease, or without the possibility of a well founded suspicion of gonorrheal infection; a swelling forms in a line with some part of the urethra, which proceeds to suppuration; a poultice is applied, and the abscess breaks, or it is opened by art, and the urine takes its course through the wound, whilst a considerable discharge still continues from the urethra. These circumstances arise either from ulceration in the mucous membrane of the urethra, or from abscesses in the lacunæ; and I believe more frequently from the latter than the former. It is the usual practice in these cases to begin directly with the use of bougies, but it is not judicious to do so, as they only add to the tendency to ulcerate, and increase both the local and constitutional irritation. No bougies employed.

A nobleman came to London with one of these abscesses, and with a copious discharge from the urethra. His constitution was previ-

ously much enfeebled, and it suffered extremely from the local irritation. A bougie was once passed into his bladder, but no stricture was found. He had great fear of bougies, and requested that no more might be introduced. The abscess was poulticed, and the matter discharged by the perineum, but still it continued to pass both by the urethra and by the aperture in perineo. The poultice was continued, and his constitution was endeavoured to be improved by attention to his diet, by alterative and by tonic medicines. He soon amended in his general health; the discharge from the perineum gradually lessened, and that from the urethra entirely ceased. He recovered, and has remained well with respect to this disease for several years. Contrast this with the following example. A gentleman had a slight discharge begin from his urethra. He was a married man, of excellent moral character, who had never exposed himself to the possibility of any infection. The discharge from his urethra at first appeared gleety, but it afterwards became purulent, without any pain or difficulty in passing the urine. Notwithstanding this a bougie was employed, under the use of which the irritation increased, the discharge became greater, and his general health suffered. A swelling then formed under the urethra, within the scrotum, and which after great local and constitutional irritation discharged itself, and the urine passed through the aperture in the scrotum. The bougie was again employed, to extend the urethra and to heal the opening from it into the scrotum; but in a

short time another abscess formed in perineo, and from this the urine became extravasated into the perineum and scrotum, and a free opening was obliged to be made for its discharge; but extensive sloughs followed; his constitution became extremely irritated and reduced, and he died of this complaint. Upon opening him, two ulcers were found in the urethra, without any appearance of stricture.

If this disease had been from the first constitutionally treated, instead of being irritated by the injudicious employment of bougies, this person would probably have had his life preserved.

Loss of substance in the urethra.

Apertures connected with loss of substance in the urethra are extremely difficult to heal. They are usually seated in that part of the urethra which is placed before the scrotum. They generally pass longitudinally, and reach to the extent of from half an inch to an inch; sometimes one-third of the urethra is removed; at others, half the canal, and with the membrane of the urethra, the lower part of the corpus spongiosum which adhered to it. A part of the urine passes by this unnatural opening, and sometimes the whole of the urine and semen, when the opening is large. The patient's mind suffers extremely from the defect, as he considers himself emasculated; and the greatest inconvenience arises from the direction which the stream of urine takes in its discharge. The cause of the aperture is an abscess in one of the lacunæ, attended with a disposition to the sloughing process; and when the matter is discharged, the slough which follows removes the lower portion of the

urethra opposite to the lacuna, and thus produces a large aperture.

These cases are, I know, considered by some of my professional brethren as incapable of cure, and patients labouring under them have been abandoned to despair; but the following examples may, perhaps, lead to attempts at relief which have not hitherto been made; and it is the favourable result of these which has induced me to venture to give this short essay upon this subject.

CASE I.

A gentleman who had lately returned from India had a chancre at the orifice of the urethra, accompanied by a high degree of inflammation of the glans, prepuce, and skin of the penis, to the pubes and scrotum. The urethra sloughed at the junction of the scrotum with the penis, leaving an opening by which the urine was freely discharged. This opening became healed at its margin, but a large fistulous orifice still remained in the urethra shewing not the smallest disposition to heal, and exposing the patient to great inconvenience in the discharge of the urine.

The first surgeon whom he consulted advised him to introduce bougies three or four times in the day; which he persevered in doing, without effect. The next attempt which was made to heal it was by the application of blisters, probably in the hope that excoriating the edge might give a disposition to granulation, and thus lead

to the closure of the aperture. This plan was, however, entirely unsuccessful.

The next trial consisted in paring the edges of the wound, introducing pins, and bringing the edges of the wound together by the twisted suture; but this also proved abortive.

At this time he applied to me; and conceiving that a simple suture might answer the purpose better than the pins, I pared the edges of the sinus and sewed it together by two threads; I then passed a catheter into the bladder, to discharge the urine without inflaming the cut surfaces. On the third day, however, I found that the urine had passed by the side of the catheter, destroying the adhesive process; and when the ligatures separated on the fifth day, no union had been produced. Feeling it would be quite useless to repeat these trials, and seeing that the scrotum formed two thirds of the opening, and the skin of the penis the other one third, I thought that it might be possible to heal it upon the principle of the contraction of the skin in cicatrization. In June, 1818, I applied the nitrous acid upon the edge of the fistulous orifice and upon the skin, to the extent of three quarters of an inch around it; the skin sloughed superficially, formed granulations, and healed. It soon afterwards began to contract, so as to shew that the principle would ultimately much diminish the orifice. In the month of October succeeding, I again applied the acid, and with increased effect; at the end of November the application was repeated by himself, and the opening, from the size of a pea, was reduced to that of a pin. On January the 22nd, 1819, it was

again touched, but very lightly. In March the caustic was last applied, and in a fortnight the orifice was closed, and not the smallest quantity of urine has since passed. The mental sufferings produced in the patient by this orifice, cannot be described; and the happiness he felt in his recovery was unbounded.

New urethra.

But still it is only in cases in which the skin is very loose, or the scrotum is forming a part of the fistulous orifice, that this plan would succeed; as, when the skin is tight, it would be scarcely possible to draw it together so as to produce its union. Some other plan must be therefore resorted to when this is the state of the parts; and I thought that an operation might succeed similar in principle to that which has been performed for time immemorial, in India, of making a new nose, and which has been successfully performed by my friends, Mr. Carpue and Mr. Hutchinson, in London, as well as the operation of making a new under-lip from the skin beneath the chin, which was performed by my friend Mr. Lynn, surgeon of the Westminster Hospital, and is so highly creditable to him; by which, not only a new lip was produced, but even the beard growing upon that lip. I conceived that a piece of skin might be raised from the scrotum; that the edges of the fistulous orifice might be pared, and the skin removed to a small extent around it, and that the skin thus raised from the scrotum might be turned half round, so as to apply its raw surface to the opening, and upon the edges where I was in hopes it would unite. The case which led me to contemplate this operation,

I attended first with Mr. Tipple, surgeon at Mitcham; and when the patient removed to London with Mr. Hunter of Tower Street, and his son, a very excellently well-informed surgeon and amiable man, who has had the kindness to furnish me with the following particulars of a case, the result of which has afforded me a great deal of satisfaction; and as the operation is so simple that it may be performed even by those who are not frequently in the habit of operating, and is likely generally to succeed, I hope it will be useful to many who have been deemed incurable.

CASE II.

Of Abscess in the Urethra.

In the beginning of July, 1818, Mr. H——t, æt. 56, had a violent attack of inflammation in the penis and scrotum, attended with enormous swelling, the consequence of neglected stricture; this was treated in the usual manner, by purgative medicines, fomentations, and poultices.

Aperture closed by a portion of skin.

July 9th.—A large abscess was opened opposite the bulb of the urethra, which discharged a great quantity of very fœtid matter.

July 30th.—Mr. Astley Cooper found it necessary to introduce a silver catheter, which was effected with great difficulty, on account of the resistance of two firm strictures, and the highly inflamed state of parts; this was worn for three weeks, during which time another abscess opened

at the under part of the urethra, immediately anteriorly to the scrotum; the swelling and inflammation gradually abated, and the fistulous orifice behind the scrotum closed; but that at the forepart continued to enlarge till it measured half an inch in length, and was of sufficient width to admit with ease the largest catheter; in this state it continued nearly four months without any sensible diminution in size; the edges were quite callous, and never shewed the least disposition to granulate, notwithstanding the repeated application of the nitrate of silver and other stimuli. Attempts were also made to produce union by adhesion, but from the great loss of substance it was impossible to keep the edges in contact. The urine passed almost wholly by this aperture, unless drawn off by a catheter. As there appeared no means of relief from this distressing condition, except by surgical operation, and from the extent of the wound, bringing the edges together either in the transverse or longitudinal direction, offered very little chance of success, Mr. Cooper proposed to supply the deficiency by a covering of integument from the scrotum. With this view the following operation was performed.

December 9th.—An elastic catheter being passed into the bladder, the callous edges of the opening were pared off, so as to produce an entire new surface; a portion of integument was then dissected from the scrotum (leaving it attached at the upper part) and turned over upon the wound, to which it was exactly fitted; this was held down by four sutures covered by small strips of adhesive plaister; a bandage was ap-

plied to support the scrotum, and the patient placed on his back in bed.

December 10th.—Much aching pain in the part; a slight oozing of matter by the side of the instrument at the extremity of the penis. An enema was exhibited to prevent straining during the evacuation of the bowels; a little urine was, however, forced through the wound.

December 11th to 14th.—The discharge of matter through the natural orifice of the urethra increased; scrotum swoln and inflamed; a small quantity of urine again escaped by the wound on the 12th and 13th; the bowels were kept soluble by the daily administration of clysters and mild aperient medicines. Saline medicines produced considerable inconvenience by their diuretic operation.

December 15th.—The dressings were entirely removed; the edges of the flap appeared in perfect apposition with the parts beneath, but the skin was thick and œdematous, particularly at the upper part; the sutures all retained their hold; the scrotum was much excoriated and inflamed by the acrid discharge; the wound was carefully cleaned; two straps of adhesive plaister were applied, over these a piece of lint spread with simple cerate, and the bandage to support the scrotum. After this the dressings were renewed every day in the same manner.

December 18th.—A little urine again escaped by the wound.

December 19th.—The catheter which had remained in the bladder ever since the operation, became this evening completely stopped up; it was therefore withdrawn, and another intro-

duced; the slight pressure upon the wound, in passing it, did not appear in the least to disturb the union, though it was followed by a great deal of pain at the end of the penis.

December 20th.—Much acrid discharge from the wound, (principally from a small opening on the right side); considerable excoriation of the cuticle.

December 21st.—The upper and left side of the flap appears perfectly united; the urine, which had hitherto been loaded with a thick mucus, and very offensive to the smell, assumed a more healthy appearance, and soon became perfectly natural.

December 22nd.—The two upper sutures ulcerated through the skin.

December 23rd.—The whole of the sutures were removed, as they kept up considerable irritation; the discharge from the wound passes only by the small sinus opening on the right side; the upper edge of the flap still very thick, owing perhaps to the slow circulation.

December 24th.—The wound looked less irritable.

December 25th and 26th.—Wound going on well; skin becomes rather thinner; a small pouch formed in the situation of the upper suture.

December 27th.—The catheter again withdrawn, and another introduced, which passed with very little difficulty; several hairs sprouting out on the flap of skin; the discharge still continuing from the sinus; the effect of pressure was tried in preventing it, keeping the sides together by a pad of lint bound down by adhesive plaster.

December 28th.—The compress has completely stopped the discharge by the sinus.

December 29th, 30th, and 31st.—Compress applied daily; no discharge from the sinus, but the opening does not appear perfectly closed; matter still passes through the extremity of the urethra; the edge of the flap becomes gradually thinner, beginning from that part which is least twisted.

January 1st and 2nd, 1819.—The same.

——— 3rd.—Passed a fresh catheter.

——— 4th.—He sat up; slight irritation in the urethra; matter tinged with blood.

January 5th.—Much pain and uneasiness in the bladder and penis, relieved by a dose of saline aperient medicine; a quantity of urine which passed through the urethra by the side of the instrument produced no effect upon the wound; the same thing occurred in a greater or less degree every day till this catheter was discontinued on the 18th instant, and without any apparent inconvenience.

January 10th.—Sat up without the instrument, between three and four hours; it was afterwards withdrawn daily, but he was not allowed to pass his water without it.

January 15th to 31st.—The catheter was withdrawn for a few hours every day; slight discharge from the wound.

February 1st.—Had an evacuation from the bowels during the time the instrument was out of the bladder, attended with a considerable discharge of urine by the natural passage, the first time it had occurred since the operation;

not a drop of urine passed by the wound, and no ill effects followed.

February 2nd to *March* 2nd.—As the flap of integument and adjacent parts had still rather an irritable appearance, and an occasional oozing was observed from a very small orifice on the right side of the wound, it was thought improper to hazard a repetition of this experiment; the catheter was therefore introduced twice a day, and continued in the bladder at night.

March 3d.—By the direction of Mr. Cooper, he now began to pass his urine without the aid of an instrument, using it only once a day (to prevent the return of an old stricture, of very long standing, in the membranous part of the urethra); after the first effort it came in a tolerably free stream, more so than it has done for many years. A weak solution of sulphate of zinc soon removed the irritable appearance of the integuments.

May 8th.—A common bougie was substituted for the elastic catheter, and introduced once every day till the latter end of September; since which time he has passed it but once in two days; he is now, October 14th, in perfect health, and very thankful for the operation; the stream of water becomes gradually fuller and stronger; the penis is somewhat drawn down by the contraction of the integument, and the small pouch which was formed by the ligatures at the upper part of the flap is removed. I have the greatest expectation that this operation will in others be found useful, as this gentleman's wound has remained perfectly well for seven months.

ESSAY III.

ON

ENCYSTED TUMOURS.

By Mr. ASTLEY COOPER.

Different kinds.

There are different species of encysted tumours in the body, but that to which I at present intend to confine my observations, is the tumour which is situated just under the skin, and is so frequently seen upon the head, the face, and upon the back, and occasionally, but less frequently, under the skin upon other parts of the body.

Having been myself the subject of one of these tumours, upon my back, I was led to observe it with more than common attention, and am induced to hope that I shall be able to shew from what source these swellings derive their origin.

Symptoms.

The encysted tumour is generally nearly globular, and when seated on the head feels very firm, but upon the face it possesses a fluctuation more or less obscure; the skin over it is generally

uninflamed, but it is now and then streaked with blood-vessels, which are larger than those of the surrounding parts.

In the centre of the tumour on the skin, it often happens that in this early state, a black or dark-coloured spot may be seen, which sometimes continues through the whole course of the disease, but this is by no means uniformly the case. In general they are unattended with pain, are never in themselves dangerous, and require removal from the parts in which they occur, and the defect in appearance they produce. They move readily within the cellular membrane, if they are free from inflammation, but the skin in general does not easily move over them.

Seat. The scalp is more subject to them than any other part of the body, but they also frequently are seen upon the face, and not unfrequently one is found at the outer canthus. Upon the shoulders they are often met with, more especially in men who wear braces, and in women who have very tight shoulder-straps to their stays. On the back they are occasionally formed, and sometimes, but much less frequently, upon the extremities.

Number. The greatest number which I have seen in the same individual, was in a patient of Mr. Hall's of Dulwich, who had sixteen upon his head, some of which, as large as a walnut, I removed. I have seen nine in another person, and four, five, and six, are not uncommon.

Size. The largest size I have known them acquire, has been that of a common sized cocoa-nut, and this grew upon the head of a man named

Lake, who kept the house called the Six Bells at Dartford. It sprung from the vertex and gave him a most grotesque appearance, for when his hat was put on, it was placed upon the tumour but scarcely reached his head, and this man will be, on this account, long remembered in that neighbourhood. The cyst is in the collection at St. Thomas's Hospital, and an excellent cast of his head, taken just prior to the operation. He recovered very well and I believe is now living, at least he was when I last inquired, and it is now many years since the operation was performed. In a relation of Mr. Toulmin of Hackney, I saw one on the arm of very considerable size, but in general these swellings do not exceed from one to two inches diameter.

Hereditary.

They are in some degree hereditary, for often I hear a patient observe, I have several swellings upon my head, and my father (or my mother) had several.

They also occur in several of the same family. I was asked by Dr. Pacifico to remove some of these tumours from the head of one of a family who resided near him in Bury Street, and when I had accomplished this, another said, and I will be obliged to you to do the same, and then a third made the same request.

When these cysts are opened, a curd-like substance is generally discharged from them, having a sour and sometimes a most abominably offensive smell, if the swelling has undergone any change from inflammation.

When they acquire any size, there seems to be an attempt made by nature for their removal; the skin inflames over them and the

swelling then becomes painful, ulceration slowly follows, and the curdly substance mixed with pus is discharged ; the opening sometimes closes, but often remains fistulous, occasioning some inconvenience to the patient.

Sudden decrease.

When they have acquired their usual size, from one to two inches diameter, they sometimes suddenly decrease, and then again begin to enlarge and acquire their former magnitude.

Sometimes in combing the head, the tooth of the comb is caught in the swelling, and a suppurative inflammation is in this way induced, which removes the swelling for the time and even sometimes permanently.

Dissection.

In dissecting these swellings, they are found to adhere to the skin, but not upon the whole of the surface firmly, but by the cellular membrane only on the greater part of their surfaces.

The skin being removed, a cyst is found which is embedded in the cellular membrane, and extends from the skin to different depths, according to the size of the swelling ; this cyst is composed of a membrane differing in thickness in the different parts of the body. If placed on the face or near the canthus, the cyst is thin so as to bear little pressure without bursting, but if seated on the back it is much thicker ; on the head it acquires the greatest density, for on this part it is so thick and firm as to maintain its form when its contents are discharged, and so elastic that if it be compressed, it expands itself readily to its former size.

Within the cyst there is a lining of cuticle, which adheres to its interior, and several des-

quammations of the same substance are formed within the first lining, apparently secreted at various periods of the growth of the cyst.

The substance which is contained within the bag, has the character to the eye of coagulated albumen, but as it varies much, this swelling was formerly absurdly named, according to the appearance of its contents, atheroma or meliceris, a name which only expressed different states of the substance contained in the same disease.

If the vessels which nourish these cysts are injected, they are found to be but of small size although they are numerous.

Hair.

These cysts sometimes contain hair when they are situated upon the temple and near the eyebrows, and in other hairy parts of the body; the hairs have no bulbs or canal, and differ therefore from those which are produced in those surfaces of the body which naturally form hair*.

The cyst is sometimes ossified, and of one of these I have given a view. (See Plate.)

Horny excrescences.

From these cysts horny excrescences are sometimes growing, and in the Plate I have given a view of two of these, one of the natural size taken from a preparation in our Museum, and the other a section of one which I removed from the pubes, and which is also in the Anatomical Museum. For the former of these I am indebted to my friend Dr. Roots, of Kingston, who wrote me the following letter respecting the man, and who, before he operated, had the kindness to send the patient for my inspection.

* These cysts in the sheep sometimes contain wool.

"MY DEAR SIR,

"The case of Kennedy, the gardener, is as follows:

"In the year 1796, John Kennedy, a gardener, in the service of the late Sir Richard Sullivan, Bart. of Thames Ditton, in the county of Surrey, first perceived a tumour growing on the upper part of his head, which was taken off by the knife, in about three years from its first appearance, and shortly after this operation, a horny substance began sprouting forth on the same part, which continued increasing during the four following years, till it accidentally fell to the ground, whilst the patient was taking off his hat to some company walking in the gardens, at which time it was not more than three inches in length, and it was particularly observed by myself and others, that the surface from which it dropped, was perfectly smooth and free from any discharge whatever. In a few months from this time, a new horn began to appear, putting on the figure and resemblance of a ram's horn, which I suffered to continue growing during the seven following years, keeping a constant watch upon its progress, and expecting it would drop off *de se*, when it had arrived at a certain stage of maturity, and which process had taken place under my own observation in its former period.

"But in the year 1811, the poor man suffering greatly from its increasing inconvenience, and becoming, in a measure, the laughing-stock of his ignorant neighbours, I was induced, *after having shewn it in its living state to yourself*, to put

an end to his misery, not only by amputating the horn, but by dissecting out every portion of the cyst, so as to prevent any fresh formation of the horny matter, and in consequence of the entire extirpation of the part, there has been *no appearance of the disease recurring up to this date*, which embraces an interval of eight years. For a further account of this curious case, I refer you to the article of *Horny Excrescence* in *Dr. Rees's New Cyclopædia.* It has been stated, that this identical gardener had another formation of the same nature, *after the operation I have just mentioned*, but this statement is erroneous, as I have not lost sight of the man up to the present time.

And I have the pleasure to be,
My Dear Sir,
much and truly yours,
W. ROOTS."

Kingston on Thames,
Oct. 15th, 1819.

Sir Everard Home has, in the Philosophical Transactions for the year 1791, given an excellent account of the growth of these horny excrescences, and has clearly shewn they owe their origin to these cysts.

The manner in which these horny excrescences grow is as follows:—The horn begins to grow from the open surface of the cyst; at first it is soft, but soon acquires considerable hardness; at first it is pliant, but after a few

weeks, it assumes the character of horn: sometimes several of these grow from the same scalp.

In their removal it is necessary, to prevent their recurrence, that the cyst as well as the horn should be dissected out.

Origin. With respect to their origin, I believe this tumour arises from a follicle extremely enlarged and incapable of discharging its contents from an obstruction of the orifice, by which it opens on the surface of the skin.

A follicle is a glandular pore which are found in numbers on the surface of the skin, more especially about the face and head.

These follicles appear upon superficial examination to be only pores in the skin, but upon the introduction of a fine probe they are found to proceed through the skin into the cellular membrane beneath it. They are productions from the skin, and are lined naturally by cuticle, and their internal surfaces secrete a sebaceous matter, which lubricates and defends the surface of the skin upon which they are found. This matter may be pressed from the follicles of the nose in the form of worms, very considerably longer than the skin is deep; and therefore proving that these pores extend beyond the skin.

The first circumstance which induced me to believe that an encysted tumour was an obstructed follicle, was examining a tumour of this kind situated upon my own back. It had acquired a diameter of about two inches, and was situated at the lower part of the dorsal vertebræ. I thought of requesting a friend to remove it, but examining it by means of two mirrors, I saw a small black spot in the centre

of the swelling; and picking this, I brought out a piece of sebaceous matter with a black head, like those seen on the nose. I then squeezed the tumour, and through the orifice occupied by the black sebaceous matter I emptied the tumour, by squeezing out a large quantity of sebaceous substance. This was effected without pain, and without succeeding inflammation, but gradually the secretion became renewed; but by frequent pressure I have now for several years kept it empty.

A lady applied to me with one of these swellings upon her shoulder. It had a small black spot upon its centre, through which I could squeeze its curdly contents. I removed it with the skin over it, and found that the opening was a follicle leading into the hollow of an encysted tumour, which contained sebaceous matter and lined with cuticle, and having a cyst of the usual character. (See Plate.)

Often have I since seen the follicular aperture over these swellings, by which the point of a tent probe was readily admitted into the cavity of the cyst, and through which I could immediately squeeze its contents. The follicle is however generally entirely obstructed at its orifice, and a depression only is seen, (and not always even this) when the sides of the swellings are compressed.

These encysted tumours begin as follows:— A follicle becomes obstructed at its termination upon the skin. The secretion still proceeding, its sides become extended in the cellular membrane, where it can most easily yield; and this obstruction of its secretion produces a swelling of greater or less magnitude, according to the

degree of obstruction and the duration of the disease. If it be said, how is it possible that a follicle can be thus extended? the answer is this, other membranes expand to much greater comparative magnitude. An ovarium, which would not contain within its membrane more than two drachms of water, will expand to a magnitude capable of containing ninety-seven pints, for of such an ovarium I have a preparation in our collection.

The cysts forming these swellings are more or less dense according to the nature of the follicle: as the skin of the head is very firm, so is the cyst; the skin of the back also produces cysts of considerable thickness, but that on the face is thin and delicate.

The cyst also acquires density according to its duration, for constant pressure of it does not produce high inflammation, and is known to add to the density of parts.

Pressure is very frequently the cause of these swellings, as is seen upon the shoulders, where the braces produce them. I have also seen them in the circle pressed upon by the hat, probably from some obstruction being thus produced at the extremity of the follicle. But in a diseased state of the secretions, a want of due moisture will produce the same effect, by inspissation of the substance secreted, and by its incapacity to pass the orifice of the follicle.

When parts are exposed to pressure I have seen the follicle obstructed at its mouth, dilating a little, but elongating still more, forming a black head, and a worm of sebaceous matter is thus formed of considerable magnitude. (See Plate.)

The reason that these cysts do not inflame when opened will now be seen; they are naturally external surfaces, that is, the follicles have an aperture through the skin; down this the cuticle is reflected, and on its outer side is the secreting portion of skin which forms the follicle. All that is done then by opening them, is to make their communication with the surface of the skin more free, and the cuticle is exposed, but not a new surface, and the cyst will continue to secrete so long as any part of it remains, just as the original follicle did.

Now also will be seen the reason for their sudden diminution. They open at the follicle, discharge and lessen, but the follicle becomes again stopped, and the swelling is renewed.

Treatment.

With respect to their treatment, it consists in adopting the following rules. If the follicle can be seen only as a black spot filled by hardened sebaceous matter, a probe may be passed through it, and the sebaceous matter squeezed from the tumour, which is done with little inconvenience.

But if violence would be required to squeeze out the contents, inflammation will follow, and the best plan is to make the opening larger, and to squeeze out the contents of the cyst. The relation of Mr. Toulmin, of Hackney, had an encysted tumour upon her arm. I thought too large for removal, and from this the follicle was seen opening of considerable size. I pressed out the contents of the swelling by the aperture; but finding the contents less curdly than usual, I made a large opening, and thus in a great degree emptied the swelling, and directed her to continue to do so.

Removal. The common mode adopted for their removal is, to dissect them out, but the best manner of doing it is not to dissect them out whole, but first to make an incision into them, and then by pressing the sides of the skin together the cysts may be easily everted and removed. If attempted to be removed whole, the dissection is most tedious, and before it is completed the cyst is either cut or burst; so many incisions and so much pain may be readily avoided by opening it freely by one incision, and taking it between forceps to dissect it from its adhesion to the surrounding cellular membrane. When a swelling of this kind in the scalp is to be removed, make an incision from one side of the tumour to the other, directly through its centre, and its contents, which are very solid in this case, are directly discharged in form similar to the tumour; then put a tenaculum into the cyst, raise it, and it becomes most easily separated. In half a minute the operation may be accomplished, and with scarcely any pain. The hair is then braided together from each edge of the wound, and the edges are thus approximated being clotted together by means of blood. Pressure upon the little vessels which are divided in this simple operation will be sufficient to stop the bleeding.

The swelling of this description which takes place at the outer canthus is the most difficult of these encysted tumours to remove; it passes within the orbit, and often adheres to its periosteum, and the inner part of the cyst is with great difficulty reached in the operation. This operation is always very tedious and painful. The removal of cysts is not entirely

unattended with danger; I have seen three instances of severe erysipelatous inflammation succeed the operation of removing these swellings upon the scalp, and I believe it is owing to the tendon of the occipitis frontalis being wounded when they are attempted to be dissected out whole. It is well known in cases of injury of the head, that when this tendon is contused and inflamed, the inflammation extends often over the head and face. Trifling as the aperture appears, occasioned by this operation, care must be taken for a few days after it, when the swelling is seated upon the head. A lady had an encysted tumour on the scalp removed; three days after she went into a cold bath; soon after she left the bath she was seized with a rigor and severe pain in the head; an erysipelatous inflammation succeeded upon the head and face; and notwithstanding she had promptly the most able medical assistance in Dr. Baillie, she fell a victim to this inflammation.

Fig. 1.



Fig. 2.



Drawn by H. Thomson.

Engd by I.T. Wedgwood

EXPLANATION OF THE PLATES.

PLATE I.

Shews fractures of the neck of the thigh-bone; the one from a wet, and the other from a dried preparation.

FIG. 1.

Is a view of a fractured cervix, preserved in the collection at St. Thomas's Hospital.

a, Pubes.
b, Ischium.
c, Foramen ovale.
d, Trochanter major.
e, Trochanter minor.
f, Os femoris.
g, Head of the bone broken at its cervix; little ossific projections seen on it; and ligament, effused by inflammation, adheres to the bone.
h, Fractured cervix absorbed in part, and therefore much shortened.
i, Capsular ligament extremely thickened.
k, Ligament adhering to the broken cervix.
l, Ligament effused from the synovial membrane.

PLATE I.

Fig. 2.

Is a view of a dried preparation in the anatomical collection at St. Thomas's Hospital.

a, Pubes.
b, Ischium.
c, Foramen ovale.
d, Os femoris.
e, Fractured cervix, shewing the shortening of the neck of the bone by absorption, and the cancelli unfilled by bone.
f, The head and neck of the bone shews the cancelli filled, and the broken bone quite smooth.
A portion of the capsular ligament remains connecting the os femoris to the acetabulum.

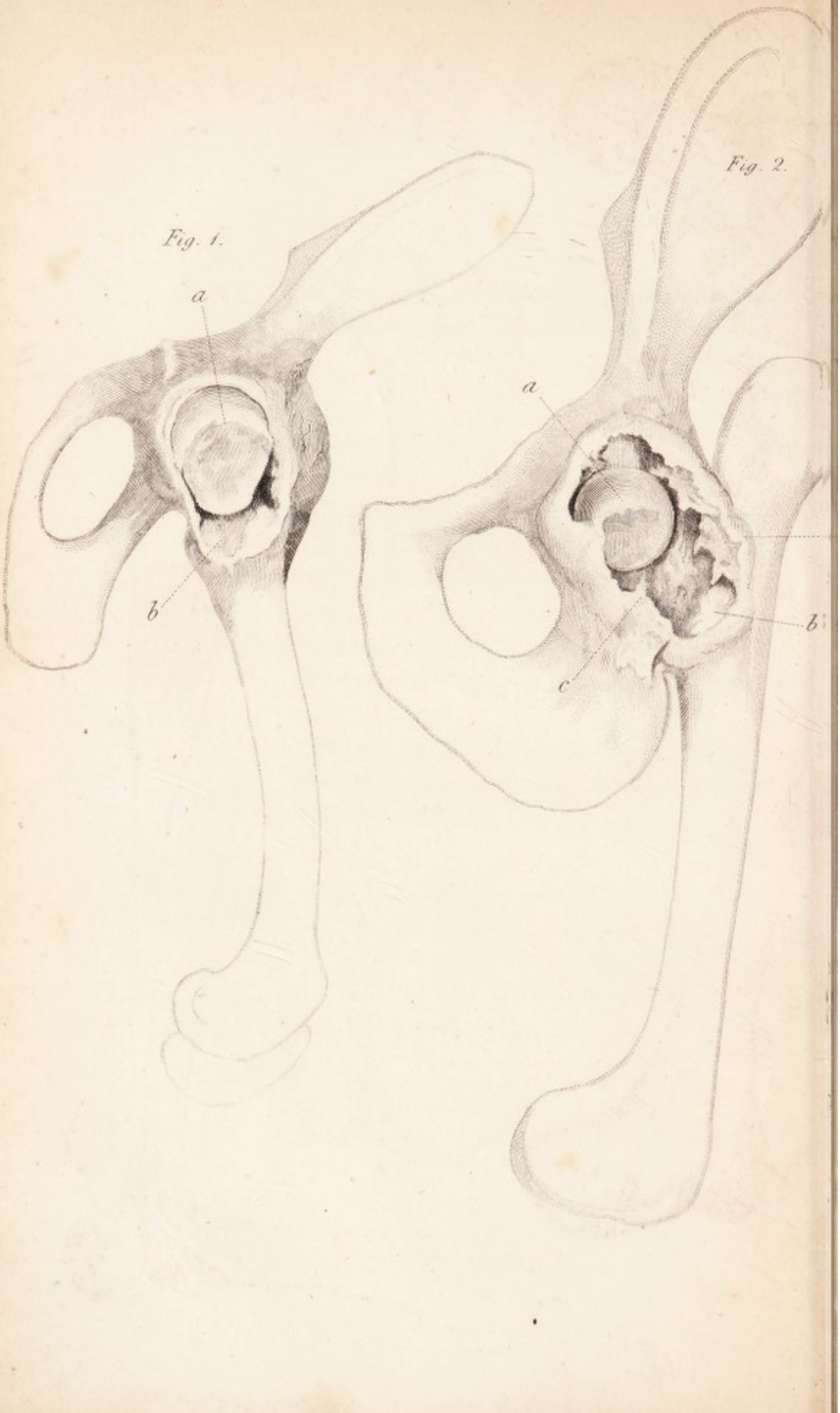

Fig. 1.
a
b
Fig. 2.
a
b
c

Fig. 5.



Fig. 4.



Fig. 3.



Engd by I.T. Wedgwood.

PLATE II.

Containing views of fractures of the neck of the os femoris, from preparations which I have sent to the collection at St. Thomas's Hospital.

FIG. 1.

Fracture of the neck of the thigh-bone within the capsular ligament in the rabbit.

a, Head and neck of the thigh-bone.
b, Neck and shaft of the thigh-bone; surfaces smoothed, and some ligament secreted upon them; capsular ligament thickened.

FIG. 2.

Fracture of the neck of the thigh-bone in the dog.

a, Head of the bone.
b, Its cervix.
c, Capsular ligament thickened and inflamed; the synovial membrane lining it having the adhesive inflammation proceeding in it, and throwing out ligament, which adheres to the head of the bone; a considerable quantity of fluid was formed on this joint.

FIG. 3.

Shews the os calcis broken near the insertion of the tendo achillis, and the bone drawn up by the action of the muscles.

a, Os calcis.
b, Broken and elevated portion of bone.

PLATE II.

c, Ligament formed instead of bone, to unite the elevated portion to that from which it had been separated.

Fig. 4.

Os femoris of the human subject broken through the trochanter and neck externally to the capsular ligament.

At *a*, the oblique union is seen, and if the condyles are compared with the head of the bone, it will be seen that the knee and foot had been suffered to be turned much outwards, which, without care in this fracture, is very liable to happen.

Fig. 5.

Head and neck of the thigh-bone of a dog split down and afterwards united, but unevenly; the union has been effected at the cancelli with scarcely any change upon the surface of the bone; and the union at the neck of the bone is firmer than at its head.

a, Head of the bone.
b, Broken head of the bone and its cervix.

Part of the fracture was within a part external to the capsular ligament.


a
b
c
d
e
f
g

PLATE III.

Shewing a dislocation of the knee-joint; in which the thigh-bone was thrown outwards and backwards.

a, Patella.
b, Head of the tibia.
cc, Semilunar cartilages.
d, Articular surface of the os femoris.
e, Capsular ligament.
f, Lacerated vastus internus muscle.
g, Place of amputation.

PLATE IV.

Views of transverse and longitudinal fractures of the patella.

FIG. 1.

Shews the patella broken transversely in the human subject and united by ligament.

a, Upper portion of the bone.
b, Lower portion.
c, Ruptured ligament.

From *b* to *c* is the new ligament uniting the bones.

FIG. 2.

A transverse fracture of the patella, which I produced in the dog, shewing the new and uniting ligament.

FIG. 3.

Shews the appearance for the first week after this experiment. Blood is effused, which is gradually absorbed.

FIG. 4.

Is a view of the fracture after a fortnight, shewing the adhesive matter producing the ligamentous union.

FIG. 5.

Shews the new ligament after three weeks, extending from *a* to *b*.

FIG. 6.

Is a view of a longitudinal fracture of the patella which I produced in the dog; from *a* to *b* is the new ligament by which the bone was united.

Fig. 1.

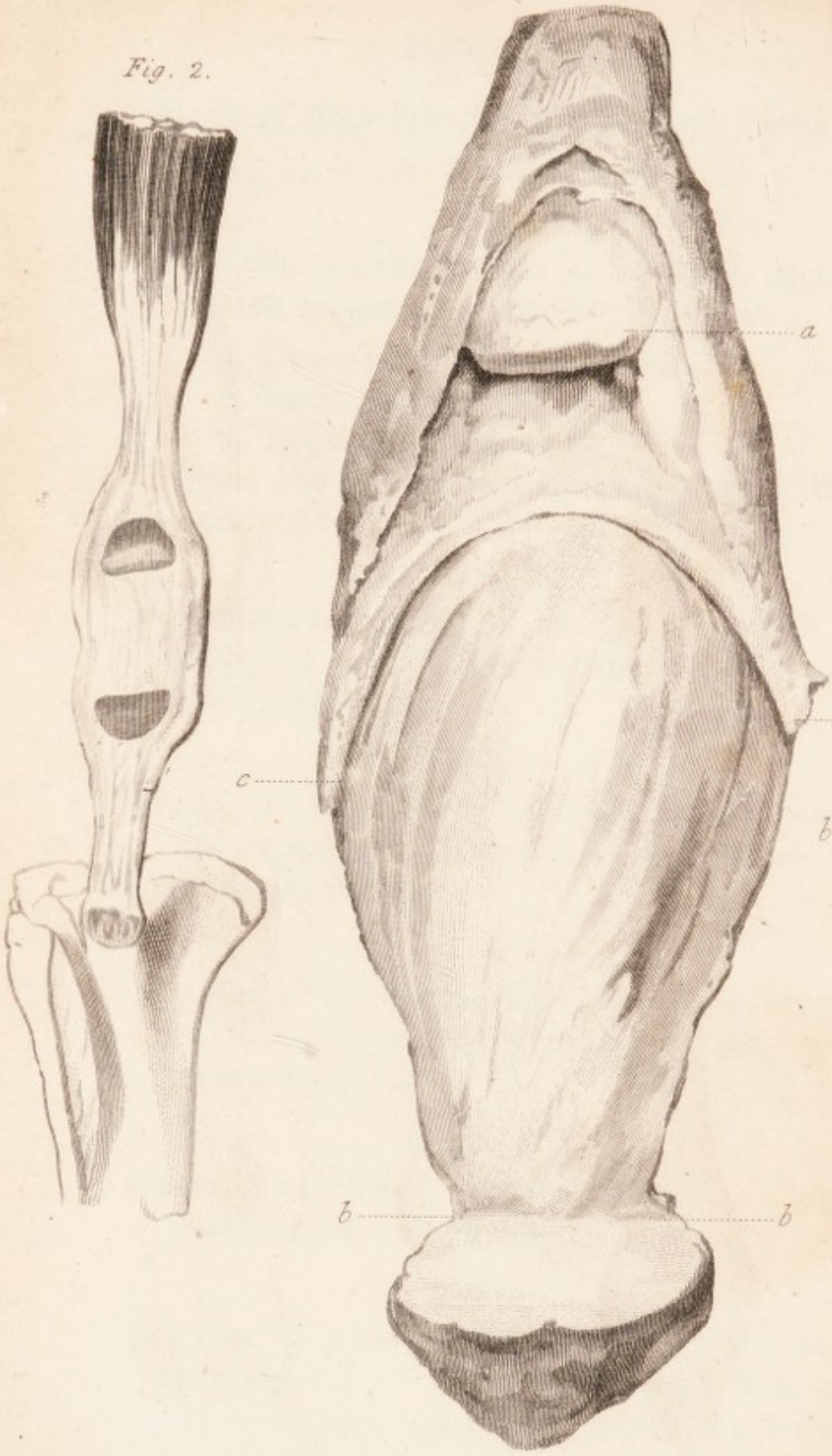


Fig. 2.

Fig.



Fig. 8.

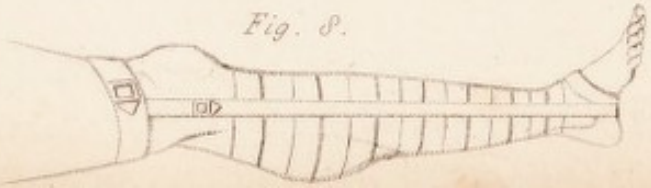




Fig. 3.



Fig. 4.

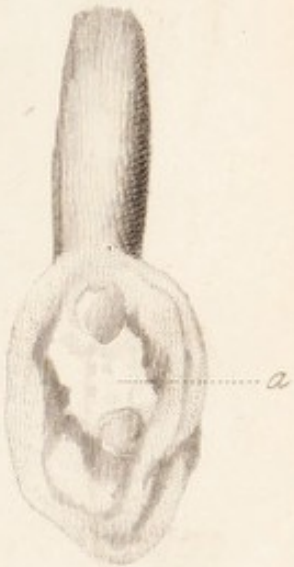


Fig. 5.

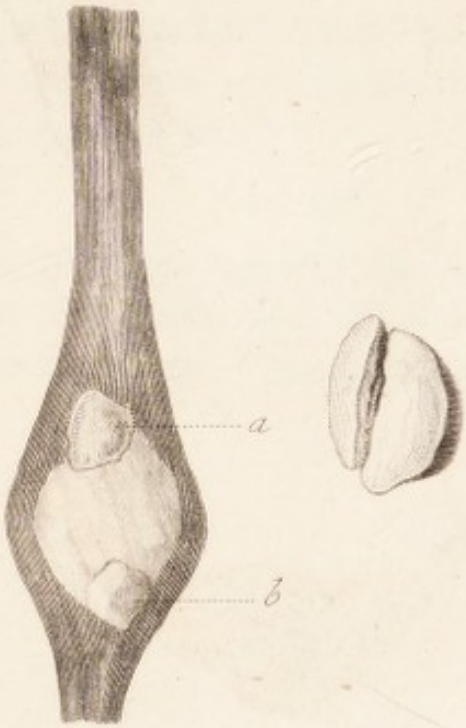


Fig. 7.

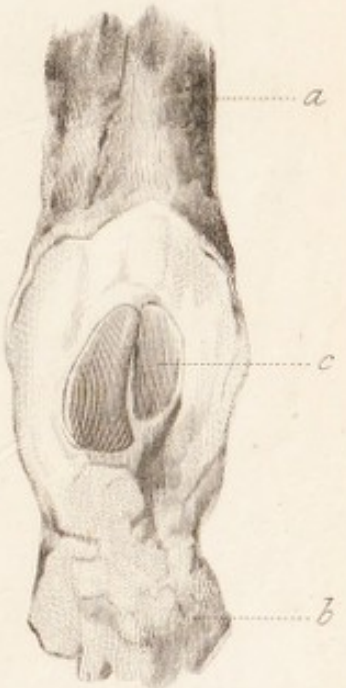


Fig. 9.



Fig. 10.

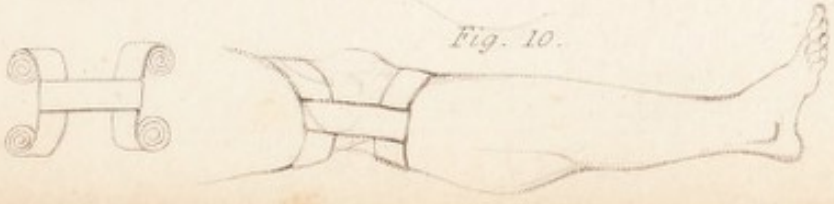


PLATE IV.

FIG. 7.

Shews the longitudinal fracture of the patella united by bone; the parts having remained in contact because the division had not been extended to the muscles *a* or ligament *b*; *c* is the ossific union; some cartilage remained not yet ossified. By the side of this Fig. is seen the patella after maceration, to shew the ossific union when the cartilage was macerated away.

FIG. 8.

Shews the leather strap for the fractured patella.

FIG. 9.

Exhibits other bandages for the fractured patella. The lateral, the most frequently used, confined by rollers above and below, which are approximated by tying the lateral tapes. The broader tape used in the fore part of the patella is also seen.

FIG. 10.

Shews the bandage applied for partial dislocations of the knee, and the rollers unapplied to shew the form of the bandage.

PLATE V.

Exhibits the partial dislocation of the tibia forwards upon the astragalus, which I have described.

FIG. 1.

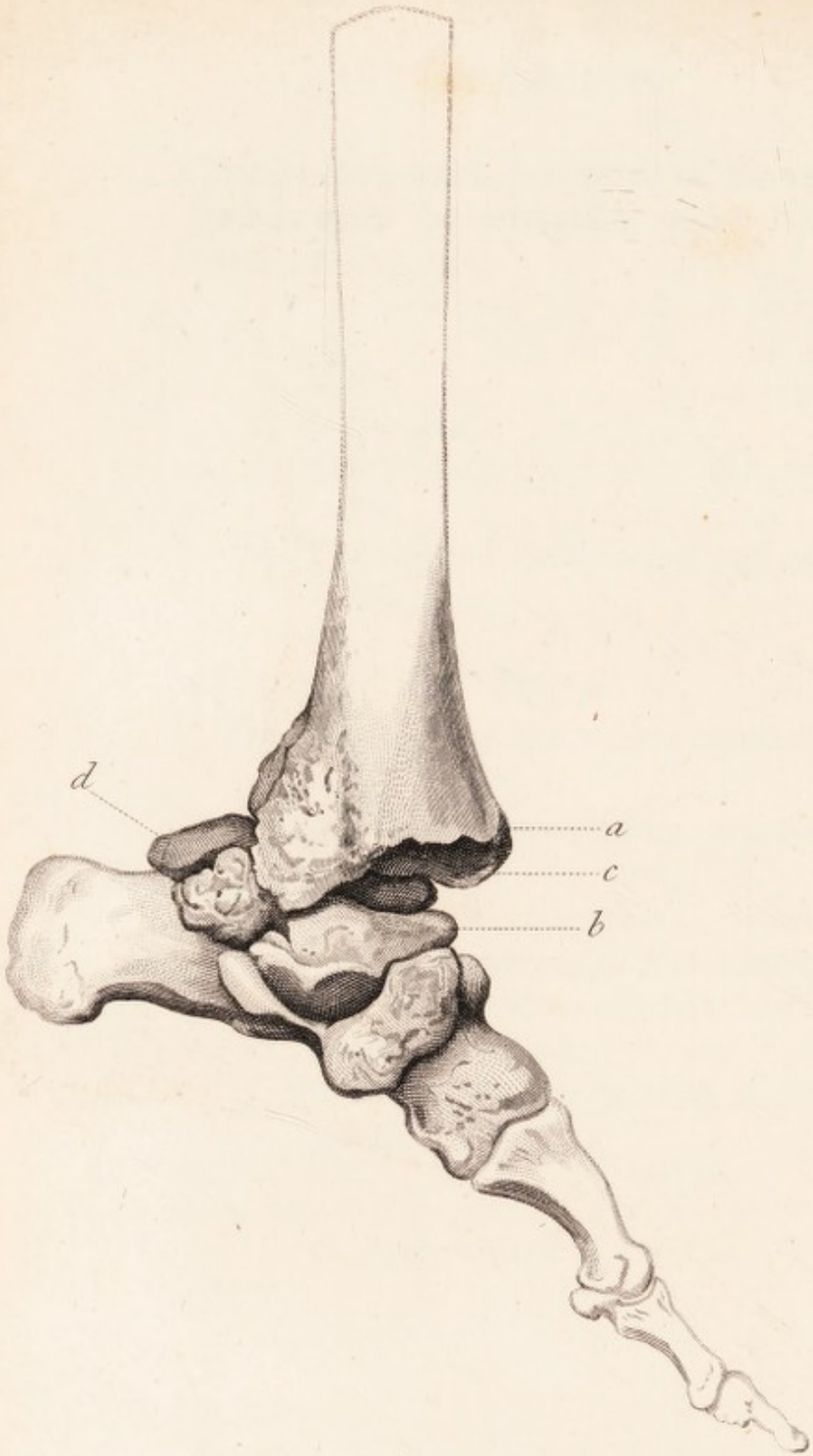
a, Tibia.
b, Astragalus.
c, New articulatory surface and end of the tibia.
d, The original articulating surface of the astragalus.

FIG. 2.

Opposite view of the same preparation.

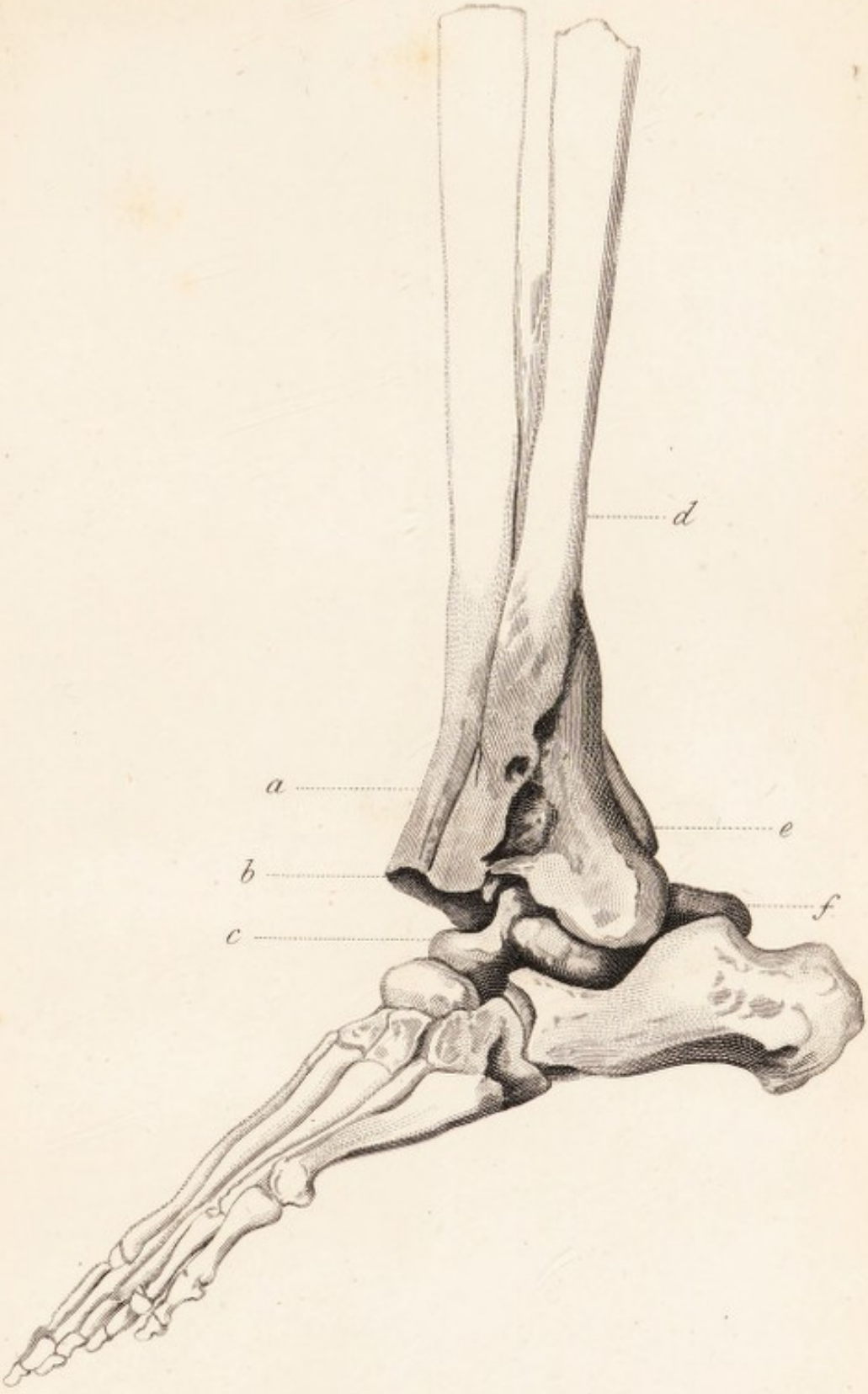
a, Tibia.
b, New articulatory surface of the tibia.
c, Astragalus.
d, Fibula.
e, Malleolus externus of the fibula, which had been broken off, and has been irregularly united.
f, Former articulating surface of the astragalus.

Fig. 1.



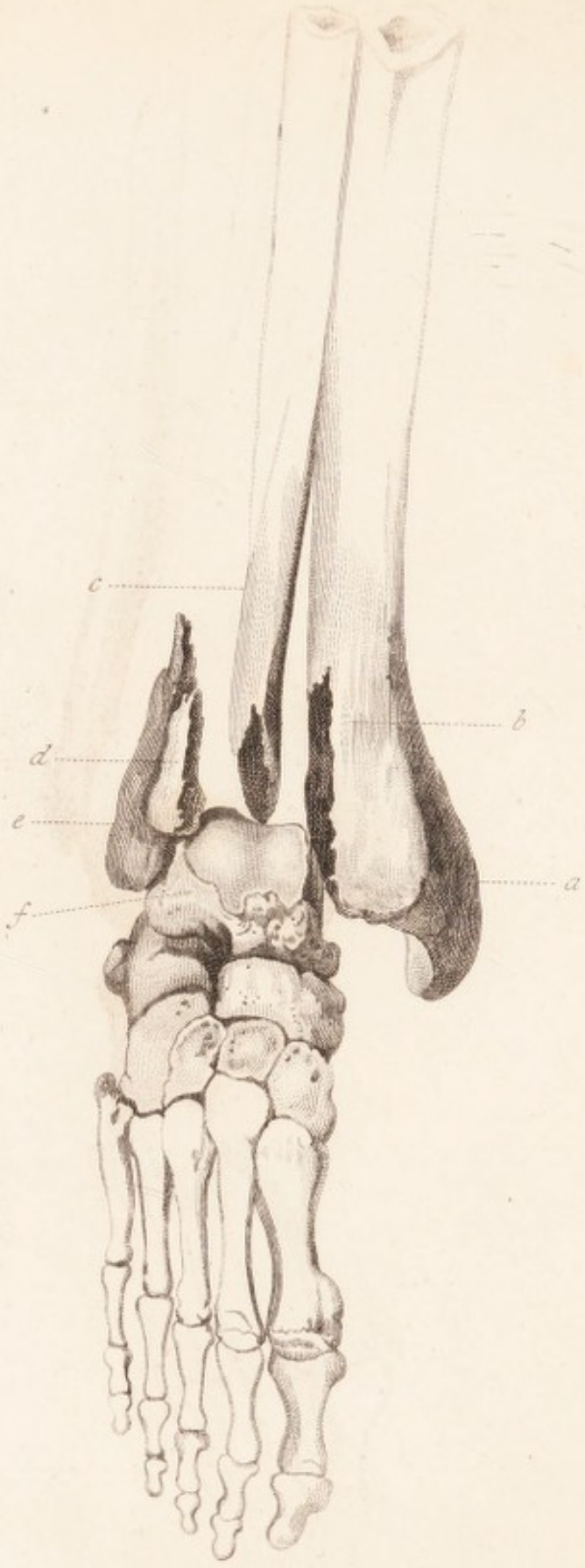
Drawn by H. Thomson.

Fig. 2.



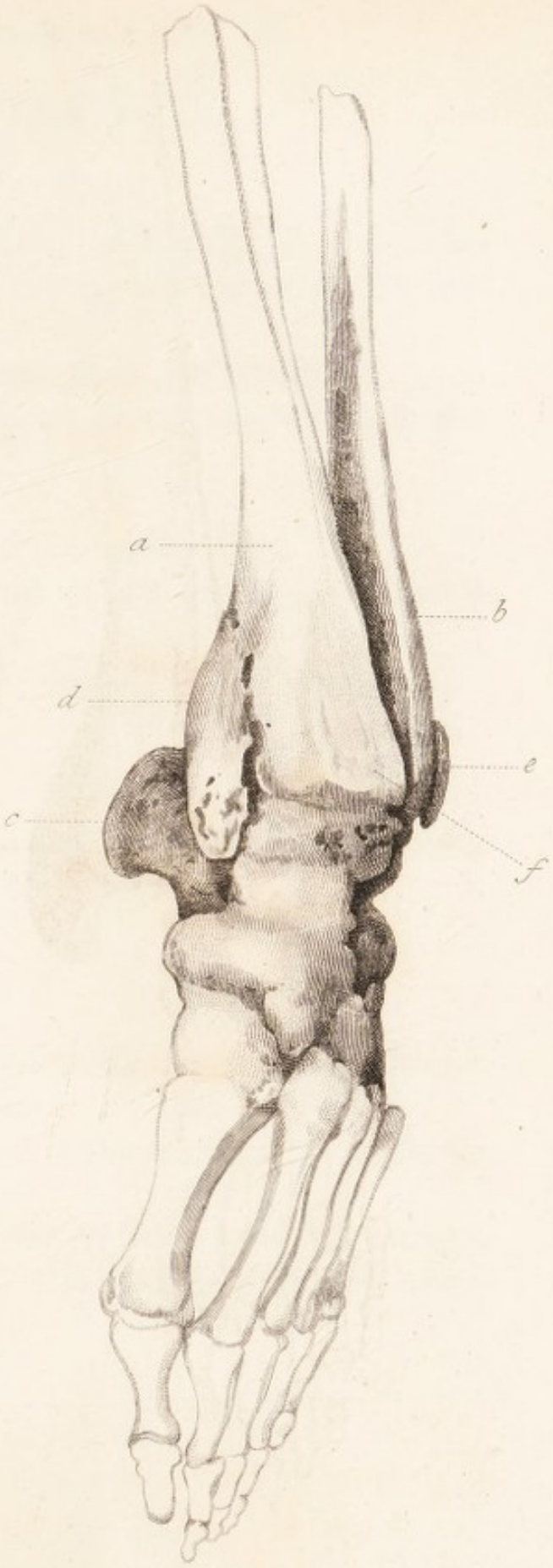
Engd by I.T. Wedgwood.

Fig. 1.



Drawn by H. Thomson.

Fig. 2.



Engd by I. T. Wedgwood.

PLATE VI.

Fig. 1.

Shews the dislocation of the tibia at the ancle-joint inwards; the leg was amputated for this accident.

a, Tibia thrown from the astragalus.

b, Tibia, broken at its junction with the fibula.

c, Fibula.

d, Portion of the broken tibia.

e, Broken end of the fibula or malleolus externus.

f. Articulatory surface of the astragalus.

Fig. 2.

Shews a dislocation of the tibia outwards; this accident had been partially reduced.

a, Tibia.

b, Fibula.

c, Os calcis.

d, Broken end of the tibia at the malleolus internus.

e, Broken end of the fibula at the malleolus externus.

f, Tibia thrown on the side of the astragalus, and it is anchylosed in that situation.

PLATE VII.

Exhibits views of encysted tumours and their productions.

FIG. 1.

Shews an encysted tumour of the usual size.

a, The cuticular lining of the cyst.

b, A flap of the cyst turned back to shew its interior.

FIG. 2.

Shews one of these tumours from the head with the cyst opened to shew its thickness, and its lining in part peeled off.

FIG. 3.

Is a cyst which shews hairs in its interior; this cyst was growing just at the outer end of the eyebrow.

FIG. 4.

Shews the cyst ossified, which sometimes happens in those which have existed long.

FIG. 5.

A cyst with a follicle over it, filled with dried sebaceous matter, and this follicle directly opens into the interior of the cyst, of which it is a part.

FIG. 6.

A portion of the skin with a cyst adhering to it. In the skin the follicle is seen which opens into the cyst, and a bristle is introduced to shew its passage into the cyst.

Fig. 5.



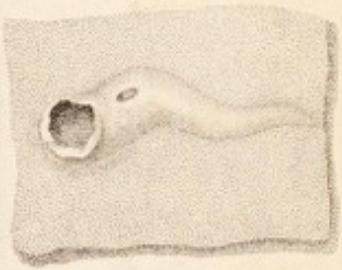
Fig. 4.



Fig. 6.



Fig. 7.



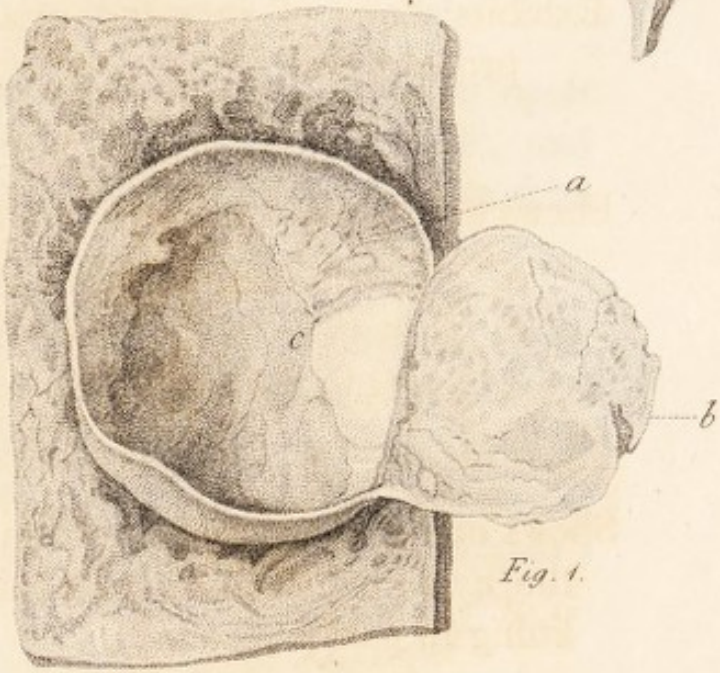


Fig. 1.

Fig. 3.



Fig. 9.



Fig. 2.

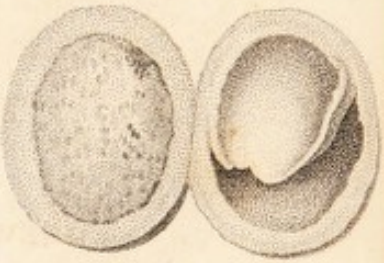
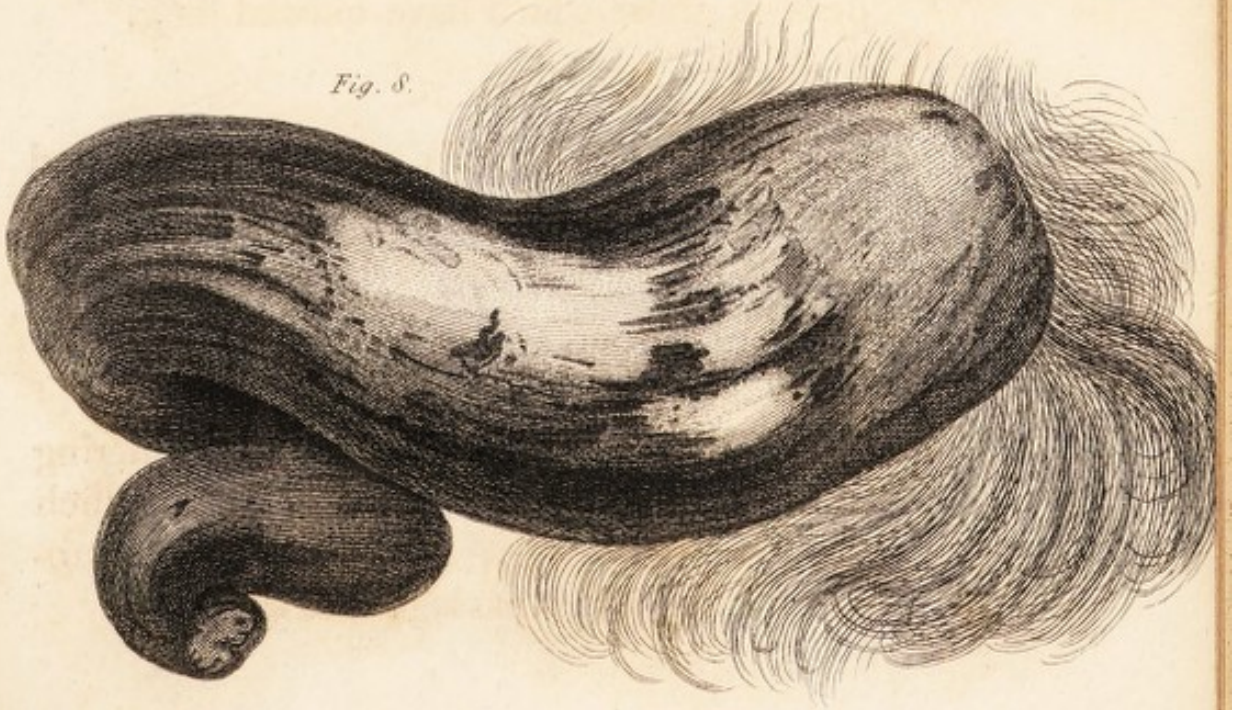


Fig. 8.



Drawn by H. Thomson.

Engd by I.T. Wedgwood.

PLATE VII.

FIG. 7.

A follicle beginning to enlarge, and its open extremity filled with sebaceous matter, and the distended follicle stretched under the skin.

FIG. 8.

A horn of the size which it had acquired when removed from the head, (See Dr. Root's Case,) the hair of the scalp surrounding its root; the horn curled at the end. This is preserved in the collection at St. Thomas's Hospital.

FIG. 9.

Section of a horn I removed, which was laminated internally, as is here shewn.

PLATE VIII.

FIG. 1.

Sketch of a fracture of the cervix femoris, within the capsular ligament.

a, Head of the bone.
b, Cervix, broken.
c, Capsular ligament.

FIG. 2.

Fracture of the neck of the bone and trochanter externally to the ligament.

a, Head of the bone.
b, Thigh-bone.
c, Fracture through the trochanter.

FIG. 3.

View of a preparation sent me by Mr. Oldknow.

a, Head of the bone.
b, Trochanter broken off.
c, Trochanter minor broken.
d, Cervix femoris broken at its junction with the trochanter.
e, Thigh-bone.

FIG. 4.

Section of a broken cervix at the trochanter, given me by Mr. Roux.

a, Head of the bone.
b, Trochanter major.
c, Thigh-bone.
d, *d*, Broken cervix sinking into the cancelli, and there united by bone.

PLATE 8.

FIG. 6



FIG. 7



FIG. 1



FIG. 3



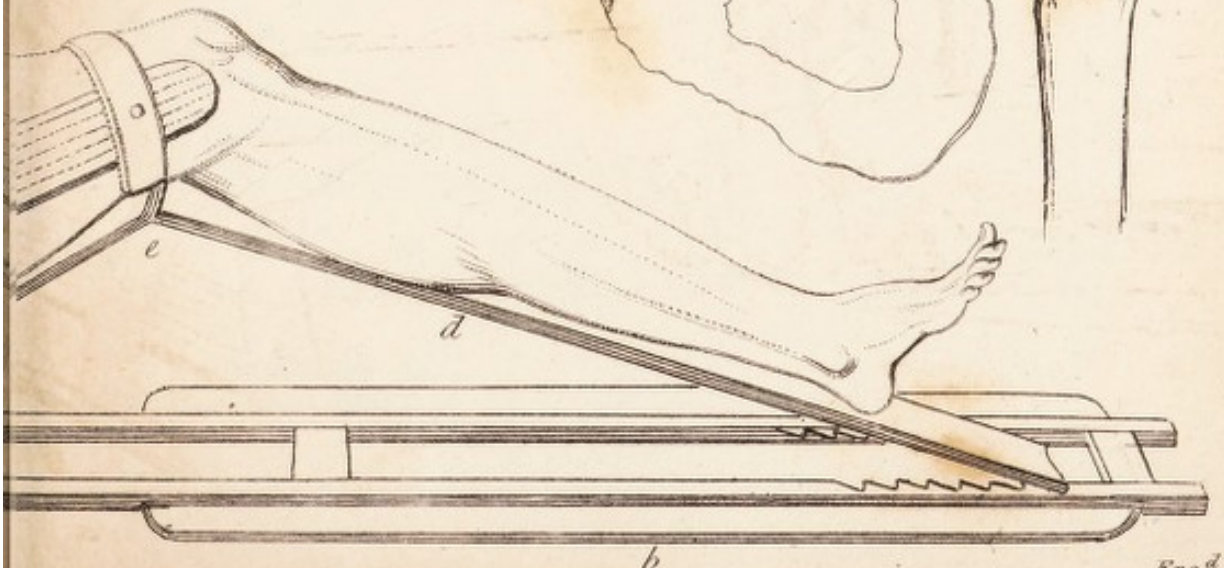
F. 4



FIG. 2



FIG. 5



Eng.d by J. Kenne

PLATE VIII.

FIG. 5.

The machine which has been for near twenty years used in Guy's Hospital, for fractured thighs, simplified from the invention of Mr. White of Manchester, and Mr. James of Hoddesdon.

a, Stand.
b, Additional pieces to it to give firmness.
c, One portion of the inclined plane.
d, The other portion.
e, The joint.

FIG. 6.

Shews a fracture of the os femoris, a little below the trochanter minor, and a most miserable union of the bone from inattention to position. This is the case in which the knee must be much raised, and the body preserved in a sitting position, as far as the patient can bear it.

FIG. 7.

Dislocation of the knee from ulceration, in which the tibia is thrown forwards at right angles with the os femoris.

a, Os femoris.
b, Tibia.
c, Fibula.
d, Patella anchylosed.
e, Ligament of the patella.

END OF PART II.

G. WOODFALL, PRINTER,
ANGEL COURT, SKINNER STREET, LONDON.

