

finger was straight, and this joint ankylosed. I did not think the chance of restoring and maintaining the bone in position sufficient to warrant any interference, and he was dismissed with an assurance that after a few months it would occasion him no great inconvenience.

On the 2d of March, 1851, Thomas Burton, aged about twenty-two years, by a fall dislocated the second phalanx of the middle finger of the right hand, backwards. The force of the concussion was received upon the extremity of the finger. Nine hours after the accident I found the bones unreduced; the finger nearly straight, or with only slight flexion

FIG. 317.



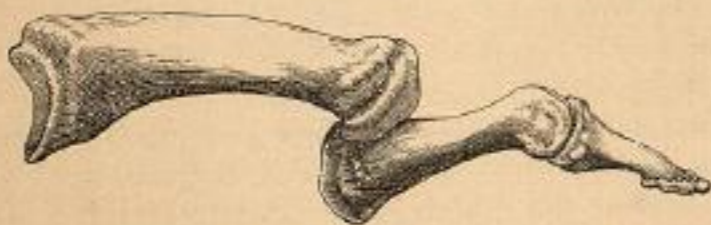
Dislocation of the second phalanx backwards.

of the second phalanx upon the first; the third phalanx forcibly straightened upon the second; all the joints rigid; finger very painful and somewhat swollen.

By moderate extension alone, applied for a few seconds, the reduction was accomplished.

James Cooper, *æt.* 23, came to me on Sunday morning, the 14th of Dec. 1851, to obtain counsel in relation to his finger which had been dislocated the day before, but which he had himself reduced by simple extension made in a straight line. His own account of it was, that he fell upon a slippery sidewalk, striking upon the end of his ring finger

FIG. 318.



Dislocation of the second phalanx forwards.

in such a way that it seemed to double under him. On examination, he found the second bone dislocated inwards, or to the ulnar side, completely, the end of the first phalanx forming a broad projection upon the opposite side; the last two phalanges fell over toward the middle finger, but they were neither flexed nor extended. Seizing upon the end of the finger with his right hand and pulling forcibly, he promptly reduced the dislocation himself.

The bones were now completely in place, but the joints were swollen, tender, and quite stiff.

In Sept. 1851, by the politeness of Dr. Briggs, the attending surgeon, I was permitted to see, in the hospital of the New York State Prison, at

Auburn, a forward dislocation of the second phalanx of the little finger of the left hand, unreduced. The man was at the date of my examination forty-one years old, and the dislocation had existed eighteen years; having been occasioned by a fall. A surgeon in Greene Co., N. Y., had attempted to reduce it soon after the dislocation occurred, but had failed. The joint was nearly ankylosed, yet the finger was quite as useful for all ordinary purposes as before.

Dislocation of the last phalanx is frequently occasioned in the game of base-ball, by the ball being received upon the extremity of the finger.

A young man who was studying medicine, and a private pupil of mine, in attempting to catch a very hard ball, received it upon the extremity of the middle finger of the left hand, dislocating the last phalanx forwards. Twenty minutes after the accident, I found the distal extremity of the second phalanx projecting backwards through the skin, the tendon of the extensor muscle being torn completely off from its point of attachment to the last phalanx. The last phalanx was in a position of slight dorsal flexion, or extreme extension.

Seizing upon the extremity of the finger, I attempted to reduce the dislocation by direct traction, aided by pressure upon the exposed end of the second phalanx, but I was unable to succeed until I brought the last phalanx into a position of palmar flexion.

A slight disposition to redislocation was manifested, and a gutta-percha splint was therefore applied; and, to prevent inflammation, the young man was directed to keep it moistened with cool water lotions. Only a moderate amount of inflammation followed, and in a few weeks the cure was complete.

Such accidents, attended with laceration of the integuments, may occasionally demand amputation, or at least resection of the projecting bone; but I think Mr. Miller is scarcely right when he says that compound dislocations of the fingers almost always are of such severity as to demand amputation. I have myself met with three other cases which were reduced, and did well.

In one case of simple dislocation of the last phalanx of the thumb backwards I have been obliged to resort to section of the lateral ligaments before accomplishing the reduction. This was in the person of a woman admitted to Bellevue Hospital in February, 1864. The accident had happened seven days before, by falling and striking upon the end of the thumb. The position of the last phalanx was extended, that is, in a line with the axis of the first phalanx. She said, however, that it was at first "bent straight back," but that a man took hold of it and pulled it out. Having placed her under the influence of ether, I attempted reduction by forced backward flexion, but failed. I then cut the lateral ligaments by subcutaneous incision, and the reduction was accomplished with great ease.

CHAPTER XVII.

DISLOCATIONS OF THE THIGH (COXO-FEMORAL).

THE femur is especially liable to dislocation in four directions, namely, upwards and backwards upon the dorsum ilii, upwards and backwards into the ischiatic notch, downwards and forwards into the foramen thyroideum, and upwards and forwards upon the pubes.

Dislocations are occasionally met with which cannot be arranged properly under either of these divisions; indeed, it is scarcely necessary to say that the head of the bone may be thrown in almost every direction from its socket, upwards, downwards, inwards, and outwards, or in either of the diagonals between these lines; and that while in a vast majority of cases it will assume one of the positions first named, it may in a few exceptional examples fall short of, or much exceed, the limits assigned in this division. Thus, I shall have occasion hereafter to mention examples of dislocation directly upwards, in which the head of the bone will be found resting upon the fossa between the upper margin of the acetabulum and the anterior inferior spinous process of the ilium; or still higher, between the anterior superior and the anterior inferior spinous processes; or a little to the one side or to the other of these points. Examples will be shown of dislocations directly downwards, in which the head of the femur will rest upon the notch between the lower margin of the acetabulum and the tuber ischii; or still lower, and actually below the tuberosity; or downwards and backwards below the spine of the ischium, into the lower or lesser sacro-sciatic notch. The head may be thrust across the foramen thyroideum, and be only arrested in the perineum upon the ramus, or even beyond the ramus of the ischium and pubes; it may lodge upon the anterior surface of the body of the pubes, as well as upon its superior edge; it may rest against the posterior margin of the acetabulum, instead of rising upon the dorsum; or it may only mount upon its margin, in either of the directions named.

In regard to frequency, the four principal dislocations occur in the order in which I have mentioned them; thus, of 104 dislocations of the hip which I have taken the pains to collate, excluding the anomalous or extraordinary dislocations, and which my intelligent pupil, Mr. Frank Hodge, has carefully analyzed, 55 were upon the dorsum ilii, 28 into the great ischiatic notch, 13 upon the foramen thyroideum, and 8 upon the pubes. Chelius and Samuel Cooper have, however, reversed the order of the last two varieties, arranging dislocations upon the pubes, in the order of frequency, before dislocations into the foramen thyroideum.

Coxo-femoral dislocations may occur at any period of life; a case of thyroid dislocation is reported in the *Lancet* for May 16, 1868, which occurred in a child six months old. One example is mentioned in the *Gazette Médicale*, of a recent dislocation upon the dorsum ilii, in a child

eighteen months old.¹ Dr. N. Fanning, of Catskill, N. Y., informs me in a letter dated June 25, 1867, that he has reduced a dislocation upon the dorsum ilii, on the tenth day, in a little girl eighteen months old. Mr. Kirby has reported, in the *Dublin Medical Press* for October 26, 1842, a case of recent dislocation in the same direction, in a child of three years,² and Dr. Buchanan has seen another, at the same age, in a little girl; the dislocation being into the ischiatic notch.³ Mr. Image communicated to the Suffolk branch of the Provincial Medical and Surgical Association the case of a boy, three and a half years old, with a dislocation upon the dorsum ilii. It had existed twelve days when he was admitted to the Suffolk Hospital in May, 1847. Mr. Image, in reporting this case to the Society, remarked that he had been induced to lay it before them "in consequence of a charge having been urged against a neighboring surgeon, of pretending to reduce a dislocation of the femur in the dorsum ilii, in a child only four years old, that child being a pauper, and chargeable to the parish. It was agreed and proved by authorities that no such case was recorded, and therefore had not occurred, and that seven years old was the earliest period at which this accident had taken place."⁴

J. M. Litten, of Austin, Texas, reports a case of dislocation upon the dorsum ilii in a girl four years old, which he reduced by manipulation.⁵ Dr. V. P. Gibney, of New York, has reported a case in a boy of four years, which he reduced after six weeks.⁶ Dr. Alexander Thompson, of Onondaga, N. Y., has reported another case in an Indian boy four years old. The dislocation was upon the dorsum ilii, and it was reduced promptly, under ether, by Drs. Thompson and Dec.⁷ Dr. Sands C. Mason, of Leonardsville, N. Y., has reduced a dorsal dislocation in a girl of the same age.⁸ In the January number for 1847 of the *American Journal of Medical Sciences* is reported a forward dislocation in a boy aged five years, and a dislocation into the ischiatic notch in a girl of the same age. Dr. A. B. Cook, of Louisville, Ky., has reduced a dorsal dislocation in a boy six years old.⁹

Loewell¹⁰ reduced, in a child four years old, an iliac dislocation without difficulty, which had existed twenty-six days. Laurence¹¹ reduced a dislocation in the foramen ovale easily, which was six weeks old, without an anæsthetic.

Dr. J. C. Warren, of Boston, met with an incomplete dislocation toward the foramen thyroideum in a child six years old, which, having been displaced eight or ten weeks, he was unable to reduce.¹² Sir Astley

¹ *New York Journ. Med.*, Nov. 1850, p. 416.

² *Amer. Journ. Med. Sci.*, vol. xxxi. p. 207, Jan. 1843.

³ *London Med.-Chir. Rev.*, Dec. 1828, p. 251.

⁴ *New York Journ. Med.*, Sept. 1848, p. 281.

⁵ *Ibid.*, March, 1852, p. 259.

⁶ *Amer. Journ. Med. Sci.*, Oct. 1879.

⁷ *Hosp. Gaz.*, Nov. 15, 1879.

⁸ *Mason, Med. Gaz.*, April 21, 1883.

⁹ *Richmond and Louisville Med. Journ.*, May, 1878.

¹⁰ *Loewell, Rec. Mém. de Méd. Mil.*, Janv. Fév. 1876.

¹¹ *Laurence, Cent. für Chir.*, 1878, No. 11, p. 183.

¹² *Boston Med. and Surg. Journ.*, vol. xxiv. p. 220.

Cooper mentions a case in a girl seven years old.¹ I have myself met with two dislocations upon the dorsum ilii, which occurred at ten years, and one into the foramen thyroideum.² Norris reports a case at eleven years,³ and Gibson at twelve.⁴

On the other hand, Dr. P. J. Kline, of Portsmouth, Ohio, has reported to me a case of dislocation of the femur in a woman aged seventy-three, and which thirteen years later he found unreduced; and Gauthier has seen a dislocation of the hip in a woman eighty-six years of age.⁵ The large majority, however, occur between the fifteenth and forty-fifth years of life. From an analysis of eighty-four cases, I have obtained the following results:

Under 15 years	15 cases.
15 to 30 "	82 "
30 to 45 "	29 "
45 to 60 "	7 "
66 to 85 "	1 case.

Dislocations of the hip are much more frequent in men than in women; owing, probably, to the greater exposure of the former to the accidents from which these dislocations usually result, and possibly, also, in some measure, to certain peculiarities in the form and structure of the neck of the femur in the male. Of one hundred and fifteen cases collected by me, one hundred and four were in males and eleven in females. Dr. J. K. Rodgers, of New York, mentioned, however, at a meeting of the New York Kappa Lambda Society, that he had seen and reduced four dislocations of the femur upon the dorsum ilii in females, and that a fifth case had recently come to his knowledge in the New York City Hospital.⁶

Gibson mentions an example of dislocation of both thighs at the same moment,⁷ and Schinzinger has reported a case of double dislocation, in which the right femur was found in the ischiatic notch, and the left above the pubes.⁸

Sigonowitz, Andreini, Crawford, Bigelow, Steiner, and Pollard have each reported examples of double dislocations of the hip.⁹

§ 1. Dislocations Upwards and Backwards on the Dorsum Ilii.

Syn.—"Upwards on the dorsum ilii;" Sir A. Cooper, Miller, Pirrie. "Upwards and outwards;" Boyer, Dupuytren. "Upwards and backwards upon the back of the hip-bone;" Chelius. "Iliac;" Gerdy, Vidal (de Cassis), Malgaigne.

Causes.—Generally they are occasioned by some violence which forces the thigh into a state of extreme adduction, or of adduction united with

¹ A. Cooper, on Disloc., Amer. ed., p. 83, Case 27.

² Buffalo Med. Journ., vol. viii. p. 6. Trans. New York State Med. Soc., 1855. My Report on Disloc.

³ Amer. Journ. Med. Sci., Feb. 1839, p. 296.

⁴ Gibson's Surg., vol. i. p. 389.

⁵ Gauthier, Malgaigne, op. cit., p. 805.

⁶ J. K. Rodgers, New York Journ. Med., July, 1839, vol. i., first ser., p. 220.

⁷ Gibson's Surg., vol. i. p. 385, sixth ed.

⁸ The International Surgical Record, vol. i. No. 2; from Wiener Med. Presse, 1880, No. 3; Centralb. f. Chir., 1880, No. 11.

⁹ Poincot, op. cit., p. 1007.

rotation inwards; and especially when at the same moment the head of the femur is driven upwards and backwards. Thus, a dislocation upon the dorsum may result from a fall from a height, when the force of the concussion is received upon the outside of the knee: the thigh being thus converted into a lever of the first kind, whose long arm is outside of the margin of the acetabulum; or the dislocation may be occasioned by a fall upon the foot or knee, while the limb is adducted, by which the head of the femur will be at the same moment driven upwards and outwards from the socket. The accident is equally liable to result from the fall of a heavy weight, such as a mass of earth, upon the back of the pelvis when the body is much bent forwards.

The following case presents an extraordinary example of this form of dislocation produced by a force acting upon the thigh as a lever of the first kind:

B., of Rochester, N. Y., æt. 10, fell, in Feb. 1841, from the top of the high bank just below the Genesee Falls, at Rochester, a distance of about one hundred feet. Before he reached the bottom of the precipice, he struck upon an oblique plane of ice, from which he slid gradually down upon the surface of the river, which was then completely frozen over. He did not lose his consciousness in the descent, nor after his arrest upon the river, but began immediately to call for assistance. He remembers very well that when he struck the glacier, the concussion was received upon the right side of the right knee, and a mark of contusion at this point confirmed his statement. Dr. Ellwood, of Rochester, assisted by myself, reduced the dislocation within one hour after its occurrence. We employed pulleys, but the reduction was accomplished easily in about two minutes, and without the application of much force; the bone resuming its place with an audible snap. His recovery was rapid and complete.¹

Pathological Anatomy.—The capsule is lacerated more or less extensively, but especially in its posterior half; the round ligament is ruptured; some of the small external rotator muscles are generally stretched or torn completely asunder, the glutæus maximus, medius, and minimus are pushed upwards and folded upon each other, the head of the femur resting upon or within the fibres of the deep muscles; the triceps adductor is put upon the stretch.

Surgeons have not been agreed as to the cause of the great difficulty which has sometimes been experienced in the reduction of this and of all other forms of coxo-femoral dislocations. While some have ascribed it alone to the resistance of the muscles, others have with equal confidence ascribed the opposition to an entanglement of the head and neck of the bone in the rent capsule, or to the resistance offered by certain untorn ligaments; and still others believe that the impediment ought to be looked for sometimes in the muscles and sometimes in the untorn portion of the capsule.

Sir Astley Cooper thought that the capsular ligament was generally too much torn to offer any impediment to reduction, and he refers to some dissections in confirmation of this opinion. Nathan Smith affirmed that the chief obstacle to reduction by extension was to be found in the

¹ Trans. New York State Med. Soc., 1855, p. 76. My report on Dislocations.

resistance offered by the glutei muscles, which, although at first relaxed, would soon become tense under the stimulus of the extension, and which, in order that the bone might resume its position, must actually be stretched considerably beyond their normal length.¹ W. W. Reid declares that the sole resistance is at first in the abductors and rotators, but that finally the psoas magnus, iliacus internus, and triceps adductor become

FIG. 319.



Dislocation upon the dorsum ilii.

and gemelli, were ruptured and lacerated. The capsule was torn through one-half of its extent.

Dr. Fenner now proceeded to cut away the muscles, and when all the external muscles about the joint had been removed the thigh could not be brought down; the iliacus internus and psoas magnus were then severed, which permitted it to descend a little, but the head could not be replaced; the triceps adductor was then divided without effect. The ilio-femoral ligament was found tensely stretched. All the muscles between the pelvis and the thigh were then severed, and still it was impossible to reduce the dislocation; the head of the femur could not be forced back through the rent in the capsule from which it had escaped; and it was not until the opening was enlarged from one-half to three-quarters of an inch, that the reduction was accomplished.

Dr. Fenner infers that the capsule possesses sufficient elasticity to allow the small head of the femur to pass out through a lacerated open-

¹ Surgical Memoirs, by N. R. Smith, 1831.

² Buffalo Med. Journ., 1851. Trans. N. Y. State Med. Soc., 1852.

³ London Med. Times and Gazette, Dec. 1865, p. 661.

⁴ Parmentier, Bull. Soc. Anat., Paris, 1850, p. 177.

⁵ Servier, Bull. Soc. Chir. Paris, 1893, p. 485.

tense when the pulleys are employed.² Chassaignac recognizes no other impediment to reduction than the contractions of the muscles.³ Parmentier,⁴ in a dissection, found the head imprisoned between the pyramidalis and obturator internus; while Servier⁵ found the head and neck strangled between the pyramidalis and the gluteus medius.

Dr. Fenner, of New Orleans, gives the particulars of a dissection of the hip of a man admitted into the Charity Hospital, who died from injuries received by the bursting of a steamboat boiler. His condition being considered hopeless, no attempt was made to reduce the dislocation. The limb was shortened one inch and a half, and the toes turned inwards. Extensive ecchymosis existed. On raising the gluteus maximus and medius, the naked head of the femur was found lying on the dorsum ilii with the ligamentum teres hanging to it, but partially torn off. Portions of the obturator externus pyriformis,

ing, which might at once contract, so as to offer considerable resistance to its return, and that occasionally this is the true explanation of the difficulty in reduction.¹

Moses Gunn, Professor of Surgery in Rush Medical College, Chicago, who has devoted much time to the study of this subject, and to experiments upon the cadaver, says: "In dislocations of the hip and shoulder, the untorn portion of the capsular ligament, by binding down the head of the dislocated bone, prevents its ready return over the edge of the cavity to its place in the socket; but its return can be easily effected by putting the limb in such a position as will effectually approximate the two points of attachment of that portion of the ligament which remains untorn."²

Dr. Moore, of Rochester, who has often repeated the same experiments upon the cadaver, declares, also, that in attempting to reduce the femur by extension alone he has constantly observed that the untorn portion of the capsule offered the main resistance, and that reduction could not be accomplished until this was more completely broken up.³

Busch, of Bonn, has arrived at similar conclusions;⁴ as also Professors Roser, Weber, and Gellé.

Professor Von Pitha declares that upon a knowledge of the *ilio-femoral ligament* is based the correct understanding of the various forms of hip-joint dislocations.⁵

A very elaborate exposition of the relations of the ilio-femoral ligament to these accidents has been furnished by Dr. Henry J. Bigelow, the Professor of Surgery in Harvard University. The following is a brief summary of his opinions.

¹ New York Journ. Med., Sept. 1848, p. 268, from New Orleans Med. and Surg. Journ., July, 1848.

² Gunn, Paper read before the Detroit Medical Society, by Moses Gunn, M.D., A.M., LL.D., Professor of Surgery, Rush Med. College, Peninsular Journal, Sept. 1858.

³ New York Journ. Med., Jan. 1855.

⁴ Year-Book of Med. and Surg. for 1864. Sydenham Soc. Publications; from Archives of Clinical Surgery, vol. iv., part i., Berlin, 1863. (Poinsot.)

⁵ Von Pitha's and Billroth's Surgery, vol. iv., 1865. (Poinsot.)

FIG. 320.



Ilio-femoral ligament. (Bigelow.)

The ilio-femoral ligament, called by Dr. Bigelow the Y ligament (Bertin's ligament), the internal obturator muscle, and that portion of the capsule of the joint which is immediately subjacent, are alone required to explain, and are chiefly responsible for, the phenomena of the four regular dislocations. The regular dislocations are those in which complete disruption of the ilio-femoral ligament has not taken place.

The irregular dislocations are those in which the ilio-femoral ligament has suffered complete disruption.

In reducing either of the regular dislocations the limb must be flexed, in order to relax the ilio-femoral ligament; but if other portions of the capsule are not sufficiently torn to admit the return of the head within its socket, it must be torn by circumduction of the limb. After flexion, and perhaps circumduction, the reduction may be completed by rotation, or by extension of the thigh at right angles with the anterior surface of the body.

FIG. 321.



Dislocation upon the dorsum ilii. (Bigelow.)

The dorsal dislocation owes its inversion to the external fasciculus of the ilio-femoral ligament.

In the ischiatic dislocation, "dorsal below the tendon" (Bigelow), the head is arrested, in extension, by the tendon of the obturator and the subjacent capsule.

The flexion and eversion of the limb in the thyroid dislocation are due to the ilio-femoral ligament.

In the pubic dislocation the ascent of the limb is finally arrested by the ilio-femoral ligament.

Prof. Gunn, who is not fully in accord with Dr. Bigelow's conclusions, says:

"This portion of the capsule, the Y ligament, is, manifestly, much the strongest, and is probably rarely torn asunder in any of the four classical dislocations, except the thyroid, in which it is, probably always, completely ruptured, as I shall have occasion to demonstrate in the course of the present paper. Its entire want of influence in the dorsal variety of dislocation I shall also be able to show by exhibition of a dissection of the parts. . . .

"I desire to direct attention to another structure which plays an assisting rôle in holding the head of the femur down outside the ridge of the acetabulum in the dorsal dislocation. If, in an intact state of the muscles and the external portion of the fascia lata, the capsular and round ligaments be completely divided, and the head of the femur be dislocated

FIG. 322.



Anterior view, showing tense condition of anterior and inferior portion of capsule, and the loose state of the ilio-femoral portion in the dorsal dislocation. (Gunn.)

FIG. 323.



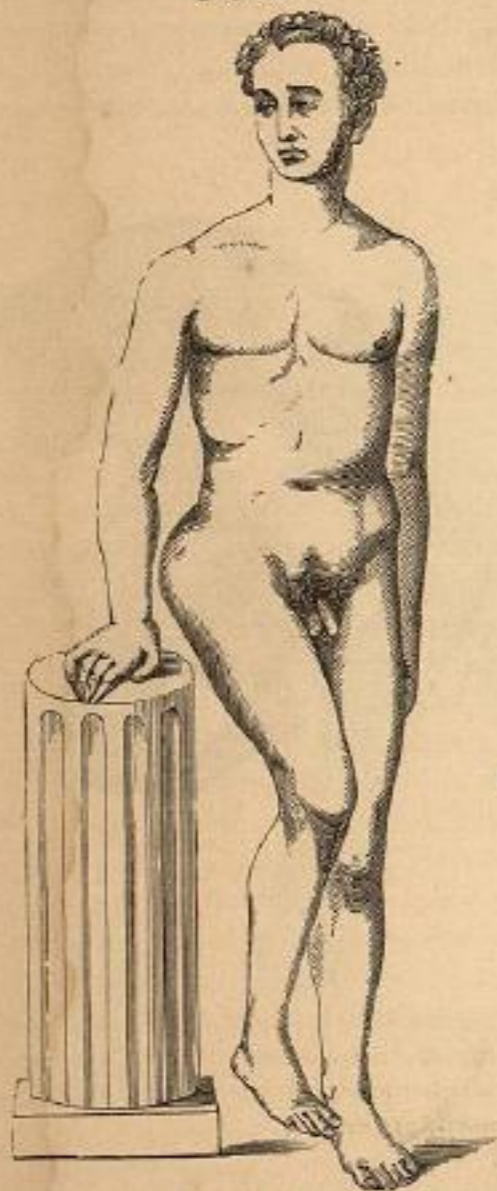
Posterior view of same specimen, showing the tense state of the anterior and inferior untorn portion of capsular ligament. (Gunn.)

upon the dorsum of the ilium, it will be found that the characteristic deformity of direction in the limb will be wanting, *i. e.*, the limb will be parallel with its fellow, on a line with the trunk lacking the inversion and adduction, but will be shortened the usual extent. If now the limb be placed in the position characteristic of dorsal dislocation in the living subject, and the reduction be attempted by the old method of extension and counter-extension, it will be found that the head is still held down firmly in its hooked position outside of the ridge of the acetabulum. It is thus held by the *fascia lata*, which in this position of the limb describes

the outermost curve, and consequently is put upon the stretch and holds the whole trochanteric end of the bone pressed firmly inwards.

"These figures," continues Prof. Gunn, "as is the case in all my illustrations, are made from a dissection of the parts, which dissection I also herewith exhibit. It is seen that the anterior and inferior portion of the ligamentous capsule is untear, tense, and holds the dislocated head firmly hooked outside the dorsal portion of the rim of the acetabulum, while that portion of the capsule between the anterior inferior spinous process of the ilium and the anterior intertrochanteric line of

FIG 324.



Dislocation upon the dorsum ilii.

the femur, which is reinforced and strengthened by the ilio-femoral fibres, is quite loose, owing to the approximation of these two points, in the shortened, adducted, and internally rotated state of the limb which characterizes this form of dislocation. Thus, this ilio-femoral portion of the capsule, in the dorsal dislocation, is entirely without influence, either in determining the deformity or in opposing our efforts at reduction. It is entirely to the anterior and inferior portion of the capsule that these influences are due."

Symptoms.—Sir Astley Cooper affirmed that the limb was sometimes found shortened in this dislocation to the extent of three inches. Liston, B. Cooper, Gibson, and others, repeat the affirmation. Che- lius places the extreme of shortening at two and a half inches; Miller, at two inches; while Malgaigne declares that he has never seen the limb shortened more than half an inch, and that in some cases it is not shortened at all, and the very opposite opinions entertained by other surgeons he attributes to errors in the measurement. I am certain, however, that Malgaigne has fallen into some error, and that,

while the average shortening is about one inch or one inch and a half, it does occasionally reach three inches. The thigh is rotated inwards, adducted, and slightly flexed upon the pelvis. The great toe of the dislocated limb, when the patient stands erect (and in this position the examination ought, if possible, to be made), rests upon the instep of the foot of the sound limb, and the knee touches the opposite thigh near the upper margin of the patella. It must not

be supposed, however, that the position of the limb is in all cases precisely such as I have described. Indeed the degree of rotation, adduction, flexion, etc., will vary according as the head of the femur is more or less displaced, the capsule, including the ligaments, more or less torn; or as it may be torn in its upper or lower margins, as the muscles may be actually rent asunder or only put upon the stretch, and perhaps also according to the amount of injury and consequent relaxation which they may have sustained from the shock. The thigh can be easily flexed; adduction is more difficult, and abduction is almost impossible, except to a very limited extent; the body of the patient is a little bent forwards, the roundness of the hip is lost in consequence of the relaxation of the glutei muscles; the trochanter major is depressed, and approaches the anterior superior spinous process of the ilium; and if the patient is not fat, and swelling has not already taken place, the head of the femur may be felt in its new position rotating under the hand when the limb is turned inwards or outwards, but especially may it be felt when, by flexing or extending the limb, the head is made to move downwards and upwards, upon the dorsum ilii.

As I have already said, this examination ought to be made, if possible, in the erect posture; after which, it will be well to place the patient alternately upon his back, upon his sound side, and upon his belly, until the diagnosis is rendered complete.

The *differential* diagnosis between dislocation upon the dorsum ilii and a fracture of the neck of the femur may be briefly stated as follows.

In fracture, we may expect to find crepitus; the limb is in most cases mobile; the toes are generally turned out; the limb is shortened moderately or not at all; the patient is sometimes able to walk for a short distance; fractures of the neck of the femur generally occur in advanced life.

In dislocation, crepitus is not often present, and only when a fracture coexists; the limb is immobile, or nearly so; the toes are turned in; the limb is shortened more; the patient is unable to bear the weight of his body upon his foot for one moment. Skey, however, says he has seen a patient with a recent dislocation, who walked one-quarter of a mile, to the hospital. I do not think that any other similar case is upon record. Dislocations of the femur generally occur in middle life.

I have been frequently told by persons who have called upon me with children suffering from hip-disease, that they had been informed the hip was out, and they expected me to reduce it. In two or three instances they have blamed their surgeons very much, because they had not detected the accident at the time of its occurrence. Norris, of Philadelphia, mentions an extraordinary example of this kind, as having been presented at the Pennsylvania Hospital, and which ought to serve as a sufficient warning to prevent similar mistakes in future. A lad twelve years old, was brought to the hospital from a neighboring State, who a short time previous had been suddenly attacked with lameness in his right limb, and which, by his friends, was attributed to some injury received in play. Two physicians, who had been called to see the boy, pronounced him to be laboring under dislocation of the hip, and had made two strong efforts with the pulleys, to reduce it; but after causing great suffering,

they gave up all hopes of ever replacing the bone, and sent him to Philadelphia. The symptoms were plainly those of hip-joint disease in its early stage. The attitude was that assumed by those laboring under this affection; the leg seemed lengthened, but a careful measurement showed that it was of the same length with the other; the buttock was flattened, and the motions of the joint were tolerably free but painful.¹

If the supposed dislocation occurs in a child, or in a person under ten years of age, we ought to take especial pains to ascertain that it is not a separation of the epiphysis, of which accident I have mentioned some examples when speaking of fractures of the neck of the femur.

FIG. 325.



Everted dorsal dislocation.
(Bigelow.)

Examples have occasionally been reported of "everted dorsal dislocations," in which most of the usual signs of a dorsal dislocation are present, except that the limb is everted, and sometimes slightly abducted. Bigelow attributes this condition to a rupture of the outer fibres of the ilio-femoral ligament, and he affirms that under these circumstances the limb may be found inverted, but it is also easily everted; the foot may be slightly everted, it may lie flat upon the bed, or it may even point backwards.

The treatment of the everted dorsal dislocation consists in reducing it first to an ordinary dorsal dislocation by flexion and rotation inwards, aided by adduction, if necessary.

Prognosis.—Boyer says the limb remains always weaker than the other, the round ligament never uniting completely; and that inflammation of the cartilages and synovial glands may ensue, ending in caries of the joint. Such results have, indeed, been occasionally met with, nor are examples wanting in which more rapid inflammation, resulting in the formation of acute abscesses, has followed, but these are only rare accidents. In

the large majority of cases the patients recover speedily, and in course of a few weeks, or months at most, the limb seems to be as sound and as useful as before.

In one case reported from my clinic at Bellevue, the patient, aged 33, after I had reduced a recent dorsal dislocation by manipulation, walked on the fourth day; and on the seventh day he ascended five flights of stairs to the amphitheatre, walking without any halt. He declared, also, that he felt no soreness or lameness about the hip.²

Examples of non-reduction, however, from an error of diagnosis, or, what is more pertinent to our present purpose, from a failure to accom-

¹ Norris, Amer. Journ. Med. Sci., vol. xxv. p. 280.

² Reduction of a Dorsal Dislocation of the Femur. The Med. Record, Dec. 3, 1876, p. 780.

plish the reduction where the attempt has been made, are numerous. Fortunately, Mr. Chelius, the author of a most excellent *System of Surgery*, to which I have already had frequent occasion to refer, has sufficient reputation, the world over, to enable him to bear a portion of these failures, without injury to himself or to the profession which he so eminently adorns. I shall therefore make no apology for reporting the following unsuccessful attempt to reduce a dislocation of the hip in which Mr. Chelius himself was the operator:

On the 11th of June, 1851, John Mauren, a German, æt. 19, called at my office and related as follows: "When ten years old, I fell from a tree, a height of six feet, and dislocated my left hip. I was then living twelve miles from Heidelberg, and I was immediately taken there, but I did not see Mr. Chelius until the next morning. He took me to the University, and, before the medical class, attempted to reduce it, but he could not. During several weeks following, he tried six times, using pulleys, etc., but he could never succeed."

On examination, I found the limb shortened two inches, the head of the femur lying upon the dorsum ilii; the knee was turned in, but the toes were inclined a little outwards. He was able to walk rapidly, of course with a manifest halt, yet without pain or discomfort.

Treatment.—Regarding dislocations of the femur upon the dorsum ilii as the type of all the coxo-femoral dislocations, the remarks which I shall make under this section may be considered applicable, with only certain qualifications, to all the others.

I shall arrange the various methods of reduction which have been employed by surgeons under two principal heads, namely, manipulation and extension. It is not possible, however, to classify rigidly the different procedures, so as to bring them under these two simple divisions, without some violence; since neither manipulation nor extension has usually been employed alone, but almost always some degree of extension has been recommended in connection with the manipulation; if not in the first instance, at least in the event of the failure of manipulation alone; while, on the other hand, extension is seldom if ever practised without manipulation. I intend, then, to imply by these designations respectively, that either manipulation or extension has constituted the prevailing feature in the treatment.

Reduction by manipulation dates from the earliest records of our science. Says Hippocrates: "In some the thigh is reduced with no preparation, with slight extension directed by the hands, and with slight movement; and in some the reduction is effected by bending the limb at the joint and making rotation."¹

Richard Wiseman, who wrote in 1676, speaks as follows: "If the thigh-bone be luxated inwards, and the patient young and of a tender constitution, it may be reduced by the hand of the surgeon, viz., he must lay one hand on the thigh, and the other on the patient's leg, and having somewhat extended it toward the sound leg, he must suddenly force the knee up toward the belly, and press back the head of the femur into its acetabulum, and it will snap in. For there is no need

¹ Works of Hippocrates, Syd. ed., vol. ii. p. 643.

of so great extension in this kind of luxation; for the most considerable muscles being upon the stretch, the bowing of the knee as aforesaid reduceth it; yet in rough bodies it may require stronger extension."¹

Richard Boulton repeated, in 1713, almost the same instructions, affirming that this plan was applicable especially to dislocations inwards, in the case of "young and tender children."²

In 1742, Daniel Turner declared that he had reduced three dislocations of the hip, one of which was a backward dislocation, by a method combining extension with manipulation, but alone "by the strength of the arm or without any other instrument." Extension and counter-extension being made by assistants, and "as soon as the surgeon perceives the bone moving out," says Turner, "let him take his opportunity, giving orders to the extenders below suddenly to lift up the patient's thigh toward his belly, pressing with his hands either to the right or left, as the situation of the same requires, and therewith force back its head toward the acetabulum, whereunto it will, flipping over the tip of the cartilage, snap sometimes with a loud noise."³

Thomas Anderson, surgeon, of Leith, in Scotland, was called, in Sept. 1772, to see a man who had dislocated his left femur into the foramen thyroideum. When he arrived four other surgeons were present, and prepared to use the pulleys, which they did in his presence several times, but to no purpose. After examining the limb carefully, "I was convinced," says Mr. Anderson, "that attempting the reduction in the common method, with the thigh extended, was improper, as the muscles were all put on the stretch, the action of which is, perhaps, sufficient to overbalance any extension we can apply. But by bringing the thigh to near a right angle with the trunk, by which the muscles would be greatly relaxed, I imagined that the reduction might more readily take place, and with much less extension.

"When I made this examination, he was lying on a table on his back. I raised the thigh to about a right angle with the trunk, and, with my right hand at the ham, laid hold of the thigh, and made what extension I could. From this trial I found I could dislodge the head of the bone. At the same time that I did this, with my left hand at the head and inside of the thigh, I pressed it toward the acetabulum, while my right gave the femur a little circular turn, so as to bring the rotula inwards to its natural situation; and on the second attempt it went in with a snap observable to the gentlemen standing around, but more so to the poor man, who instantly cried out he was well and free from pain. His knees could then be brought together; the legs were of the same length, and the foot in its natural situation. The knees were kept together for some time, with a roller, to confine the motion of the thigh; and in three weeks he was at his work, without the least stiffness in the joint."

Subsequently Mr. Anderson reduced, by a similar method, a disloca-

¹ Eight Chirurgical Treatises. By Richard Wiseman, Serjeant-Chirurgion to King Charles II. London, 1676. Book vii. chap. viii.

² A System of Rational and Practical Surgery. By Richard Boulton. London, 1713. p. 346.

³ The Art of Surgery. By Daniel Turner. London, 1742, vol. ii. p. 339.

tion upon the dorsum ilii in a child eight years old, and which had been out nineteen days.¹

Says Pouteau, in a memoir on dislocations of the thigh upwards and outwards: "We observe, then, first, that the thigh ought to be flexed to a right angle with the body during the extension and counter-extension; second, that we ought to rotate the thigh from within outwards, when the extension appears to be sufficient; third, that this position puts into relaxation, as much as possible, the triceps and gluteal muscles, which oppose the chief resistance to the extension, thus saving the patient from excessive pain; fourth, that the flexion of the thigh places the head of the bone in the best position for a return to the cotyloid cavity during extension; fifth, that feeble extension suffices for reduction, because all the muscles of the thigh are relaxed."²

On the 7th of January, 1811, Dr. Philip Syng Physick, of Philadelphia, reduced an outward dislocation of the hip, after extension had failed, by flexing the thigh to a right angle with the body, and then giving to the limb an "outward circular sweep."³

So early as 1815, and perhaps much earlier, Nathan Smith, Professor of Surgery in the New Haven Medical College, taught that the only correct mode of reducing a dislocation upon the ilium was to flex the leg upon the thigh, the thigh upon the pelvis, and then to carry the limb diagonally to the opposite side, whence it was to be brought outwards and downwards; and in 1824, Dr. Smith, being under oath, affirmed as follows: "I do not think that the mechanical powers, such as the wheel and axle, or the pulleys, are necessary to reduce a dislocated hip, or any other dislocation." He further adds that he once reduced a dislocation upon the dorsum ilii after he had pulled in every direction but the right, "by carrying the knee toward the patient's face."⁴ Subsequently the son of Dr. Smith, Nathan R. Smith, the present distinguished teacher of surgery in the Medical College at Baltimore, gave a more full account of his father's method, illustrating his views of the pathology of these dislocations, and the mechanism of their reduction, by several drawings. It must be noticed, however, that Dr. Nathan Smith left no written explanation of his views and practice, except that which is to be found in the affidavit already quoted, and that the account published by his son is from memory, and it is given as follows: "The patient, being prepared for the operation by whatever means may be deemed necessary, may be placed in an attitude convenient for the operation, with the body securely fixed, by placing him in the horizontal posture, on a narrow table covered with blankets, and on the sound side. To the table his body should be firmly fixed, and this can be conveniently done by folding a sheet several times, lengthways—then applying the middle of the broad band thus made to the inner and upper part of the

¹ Anderson, Medical Commentaries, Edinburgh, 1776, vol. ii. pp. 261-4.

² Vidal (de Cassis); from Œuvres posthumes de Pouteau, Paris, 1783.

³ Physick, Dorsey's Surg., 1813, vol. i. p. 242. Mem. of Nathan Smith, 1831, p. 172. Phelps's paper in Trans. New York State Med. Soc., 1856, p. 169.

⁴ Trans. N. H. State Med. Soc., 1854, p. 55.

⁵ Report of the Trial of an Action for Malpractice. Lowel v. Faxon and Hawks, Machias, Maine, 1824; also Buffalo Med. Journ., vol. xiii. p. 515.

sound thigh—carrying its extremities under the table, crossing them beneath it, and then carrying them obliquely up and crossing them firmly over the trunk, above the injured hip. The ends may then be secured beneath the table. To support the trunk the more firmly, a pillow may be placed on each side of it upon the table, and be included in the bandage. Should the operator design to employ any degree of extension, a counter-extending band may be placed in the perineum, and carried up to the extremity of the table, be fixed to some more firm body, or held by the hands of assistants.

“The operator, now standing on the side to which the patient’s back presents, grasps the knee of the dislocated member with his right hand (if the left femur be dislocated—*vice versa*, if the right), and the ankle with the left. The first effort which he makes is to flex the leg upon the thigh, in order to make the leg a lever with which he may operate on the thigh-bone. The next movement is a gentle rotation of the thigh outwards, by inclining the foot toward the ground, and rotating the knee outwards. Next the thigh is to be *slightly* abducted by pressing the knee directly outwards. Lastly, the surgeon freely flexes the thigh upon the pelvis by thrusting the knee upwards toward the face of the patient, and at the same moment the abduction is to be increased.

“Professor N. Smith regarded the free flexion of the thigh upon the pelvis as a very important part of the compound movement. He believed that it threw the head of the bone downwards, behind the acetabulum, where the margin of the cup is less prominent, and over which, therefore, the abductor muscles would drag it with less difficulty into its place.

“The operator may slightly vary these movements, as he increases them, so as to give some degree of rocking motion to the head of the os femoris, which will thereby be disengaged with the more facility from its confined situation among the muscles.”¹

Dr. Luke Howe, of Boston, who was a pupil of Nathan Smith’s, gives the following account of the method practised by him successfully, about the year 1820, and which method, he says, was recommended by his preceptor: “The patient was permitted to lie on his back on the bed where I found him, the knee of the luxated limb turned in and over the other. I raised the knee in the direction it inclined to take, which was toward the breast of the opposite side, till the descent of the head of the bone gave an inclination of the knee outwards, when I made use of the leg, being at a right angle with the thigh, as a lever to rotate the latter and turn the head of it inwards. It then readily returned to its socket, with an audible snap. During this operation, the two assistants who had been placed to make the lateral extension and counter-extension, if ultimately required, were directed to draw moderately at their towels. How much of the success of the operation is to be imputed to their extension, and the rotation of the thigh by the leg, I am unable to determine; but as Dr. Smith succeeded without the aid of either, and as the head of the femur seemed to descend by an easy and natural process, I am inclined to believe that all that is necessary, in such cases, is to ele-

¹ Medical and Surgical Memoirs, by Nathan Smith, late Prof. of Surgery, etc., in Yale College. Edited by Nathan R. Smith, Professor of Surgery in Univ. of Maryland. Baltimore, 1831, pp. 163-183.

vate the knee, when the ilium, the muscles attached to it, and perhaps the ligament, become the natural fulcrum, over which the thigh, as a lever, acts to bring the head down and inwards into the socket.”¹

Kluge, in 1825, combined moderate extension with manipulation, by flexing both the leg and thigh, while at the same moment the thigh was abducted and the knee rotated inwards.² Wathman, in 1826, directed that in this dislocation the limb should be seized by the knee and ankle

FIG. 326.



Nathan Smith's method of reduction by manipulation. (From Smith's "Memoirs.")

and slowly lifted forwards until it came to a right angle with the long axis of the body; when, if the outward “self-twisting of the thigh” occurs, “which cannot be prevented by fast holding,” the movement of the head of the bone is declared, and it will only remain for the surgeon to let down the thigh gradually upon the bed so that the two limbs will come side by side, and the reduction will be accomplished.”³

Rust recommended also, in 1826, a similar plan, combining moderate extension by the hands, with flexion and abduction of the thigh.⁴

Colombot, whose opinions date from 1830, suggested that the patient should lay himself forwards upon a bed or table, no higher than his hips, with the sound leg and foot resting upon the floor, and that then the surgeons seizing the foot with one hand, so as to flex the leg, should, with the other hand, exercise a moderate degree of extension, and at the same time move the limb to the right or to the left, backwards and for-

¹ Howe, Boston Med. and Surg. Journ., vol. xxii, p. 249, May, 1840.

² Chelius's Surg., by South, Amer. ed., vol. ii, p. 241.

³ Ibid., p. 239.

⁴ Ibid., p. 241, note by South.

wards, in order to disengage the head of the femur; and, finally, that he should communicate to the thigh a sudden movement of circular rotation, either from within outwards, or from without inwards, as the surgeon may choose.¹

Collin states that, in 1833, he had reduced four dislocations of the hip by a method very similar to this recommended by Colombot.²

Dr. William Ingalls, of Chelsea, Mass., reduced a compound dislocation of the femur, in which the head of the bone rested upon the pubes, after an unsuccessful attempt had been made to reduce it by extension. "An assistant, taking the ankle of the dislocated limb in his right hand, and placing his left in the ham, bent the leg at right angles upon the thigh, and the thigh upon the pelvis, then lifting with a power little more than sufficient to elevate the whole limb, he carried it to its greatest state of abduction, at the same time rotating the femur inwards, while Dr. Ingalls passed his thumb through the wound, and, pressing upon the head of the femur, directed it toward the acetabulum. At this moment he directed the limb to be forced toward its fellow, by which the reduction was effected with the greatest possible ease and elegance."³

Similar methods of reduction, with only such slight variations as scarcely deserve a special notice, have been suggested and practised from time to time by Palletta, in 1818;⁴ Desprès, in 1835;⁵ Vial, in 1841;⁶ Fischer, Mahr, and Clark, in 1849.⁷

In 1851 Dr. W. W. Reid, of Rochester, N. Y., published an account of the method practised by himself successfully in three cases of dislocation upon the dorsum ilii, the first of which dated from the year 1844. His method, as applied to a dislocation upon the dorsum ilii, consists in "flexing the leg upon the thigh, carrying the thigh over the sound one, upwards over the pelvis as high as the umbilicus, and then abducting and rotating it."⁸

Dr. Markoe, of New York, adopts the same procedure, except that when the limb has been sufficiently flexed and abducted, he directs that the limb shall be gradually brought down, and he affirms that it is during this last manœuvre that he has usually found the bone resume its place in the socket.⁹

Bigelow, of Boston, declares, as has already been stated, that in all the regular dislocations, that is to say, in all those dislocations in which the ilio-femoral ligament is not torn, the thigh must be first flexed, in order to relax this ligament, and then reduction may be effected by extension directly forwards, the thigh being at a right angle with the body, or by rotation. In some cases, where there is probably only a button-hole slit in the capsule, free circumduction may be required in order that the capsule may be torn more freely.

His method of reducing the dislocation upon the dorsum ilii, is to flex the thigh upon the abdomen, abduct and then rotate outwards; or, to

¹ Malgaigne, op. cit., vol. ii. p. 825.

² Ibid., p. 823.

³ Ingalls, Bransby Cooper's ed. of Sir Astley's English ed., 1842, and Amer. ed., 1852.

⁴ Chellius's Surg.; note by South.

⁵ Malgaigne.

⁶ Ibid.

⁷ Dublin Med. Press, Dec. 3, 1851. New York Journ. Med., March, 1852.

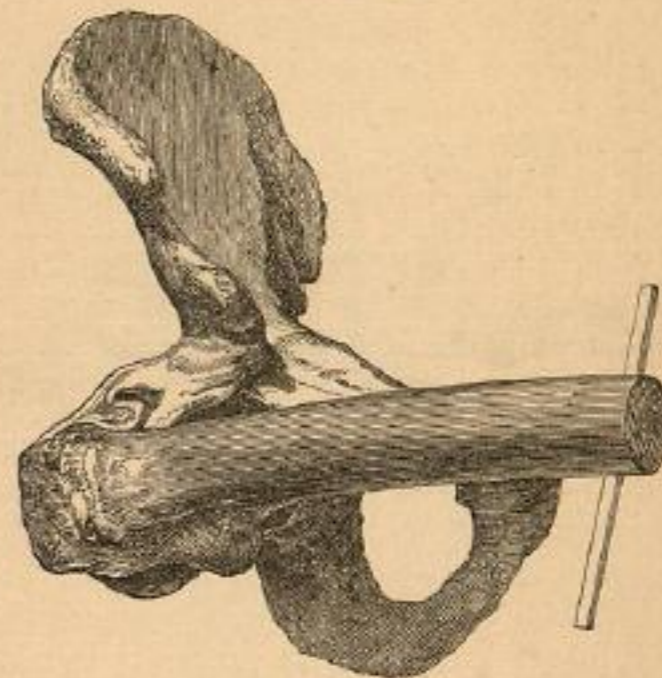
⁸ Reid, Buffalo Med. Journ., vol. vii. pp. 139-143, Aug. 1851.

⁹ Markoe, New York Journ. Med., January, 1855.

flex, then adduct and rotate a little inwards, to disengage the head of the bone from behind the socket, then abduct and pull directly upwards. When necessary, circumduction is practised to lacerate the capsule more completely.

Says Prof. Gunn, of Chicago: "I think, therefore, that in reference to position, I may offer the general rule: That for the easy reduction of a dislocated hip or shoulder, the limb should be placed in, as nearly as possible, the same position as that which most frequently characterizes it at the instant of escape." And speaking especially of dislocations of the femur upon the dorsum ilii, he adds: "If we now flex, adduct, and inwardly rotate to a still greater degree, we shall loosen the anterior and inferior tense untorn portion which is holding the head hooked outside the acetabular ridge, and then by a moderate amount of force we may

FIG. 327.



Relaxation of the ilio-femoral ligament by flexion. (Bigelow.)

draw the head into the socket. This is most conveniently accomplished by putting the patient on the floor on his back; an assistant fixes the pelvis; the surgeon grasps the limb, flexes and adducts it till it crosses the limb of the opposite side at a point as high as the union of the upper with the lower two-thirds of the femur; now rotating the limb inwardly, he will be able to lift the head into place by a moderate effort."

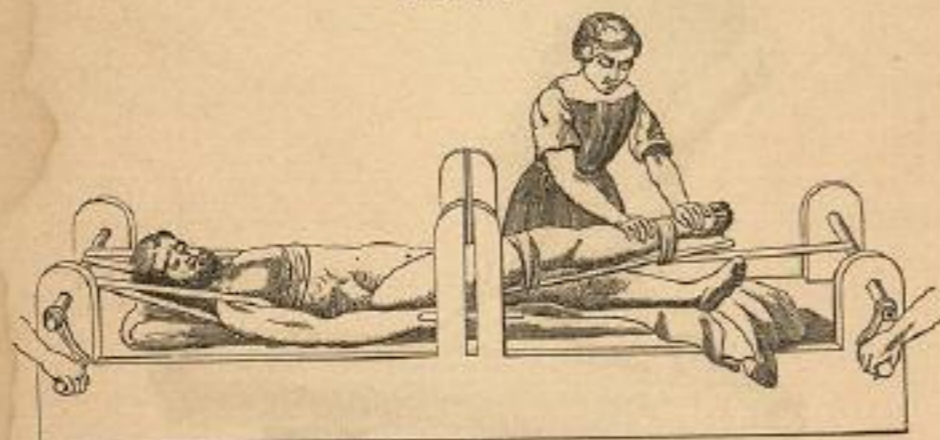
Reduction by extension dates from a period equally early with reduction by manipulation. Hippocrates recommended, when other and gentler means had failed, to make extension and counter-extension; the extending bands being made fast above the knee and above the ankle, so as to distribute the points of pressure; and the counter-extending bands being secured around the chest under the armpits, and also, if thought necessary, in the perineum of the sound side.

Among the methods recommended and practised by Hippocrates, was sitting across the upper round of a ladder with a weight attached to the thigh of the dislocated limb; or suspending the patient from a sort of gallows with the head downwards, and if the weight of the patient's own body proved insufficient, the surgeon might add his also; a method which Hippocrates characterizes as "a good, proper, and natural mode of reduction, and one which has something of display in it, if any one takes delight in such ostentatious modes of procedure."¹

With various modifications as to the position of the limb, and as to the points upon which the extending and counter-extending forces are to be applied, and with differently constructed appliances, surgeons have continued to employ extension down to this day.

The great majority have regarded flexion of the thigh as essential to success; some holding the limb only slightly flexed, and others insisting that flexion should be increased to a right angle with the body.

FIG. 328.



Hippocrates's mode of reducing dislocations of the hip by extension.

The French surgeons, including Boyer and Vidal (de Cassis), prefer generally to apply the extending bands to the feet, in order that the muscles of the thigh may not be stimulated to contraction by the pressure of the bandages. Mr. Skey adopts the same method.

Sir Astley Cooper, Samuel Cooper, B. Cooper, Fergusson, Miller, Pirrie, Erichsen, and the English surgeons generally, make fast the lacq above the knee. J. L. Petit and Duverney, among the French, and Dorsey, Gibson, with most of the American surgeons, recommend the same; but Gerdy seeks to multiply the points of application, and for this purpose secures the extending band to the whole length of the leg, and to a small portion of the thigh above the knee.

The counter-extending bands are now almost universally made to operate against the perineum of the dislocated limb, but Roux, following the practice of Hippocrates, places it in the perineum of the sound limb. Gibson recommends the same practice.

Lizars recommends that sometimes the reduction should be attempted by simply placing the heel in the perineum and making the extension with the hands, very much as Sir Astley Cooper advises us to proceed

¹ Works of Hippocrates, Syd. ed., London, vol. ii. p. 641.

in dislocations of the humerus. Morgan and Cock, of Guy's Hospital, have reduced six cases of dislocation of the hip-joint by placing the foot between the thighs, so that it pressed against the upper part of the dislocated bone, and thrust it away from the pelvis; extension and rotation of the limb being made at the same time by assistants.¹ Three of these were examples of dislocation upon the dorsum ilii, two upon the pubes, and one into the foramen thyroideum; and most of them had occurred in weak or elderly persons.

Ambrose Paré was among the first to recommend the use of pulleys for the reduction of dislocations. Most surgeons since his day have employed them for the purpose of making extension more energetic and steady, and that it might be longer continued. Sir Astley Cooper's plan of procedure is as follows:

FIG. 329.



Reduction of a dislocation on the dorsum ilii, by pulleys. (Sir Astley Cooper's method.)

The patient having been bled freely, and the muscles still farther relaxed by nauseating doses of antimony and by the hot bath, he is to be placed on his back upon a table of convenient height between two staples; a strong padded leathern girth or perineal band, constructed so as to receive the thigh, and to press at the same moment against the perineum and the outer surface of the pelvis, is then applied and made fast to one of the staples situated behind the patient in the direction of the axis of the limb. A wetted linen roller is next to be tightly applied just above the knee, and upon this a leathern strap is to be buckled, having two short straps with wings at right angles with the circular part; or, instead of this, a round towel made in the knot called the clove-hitch. The knee is to be slightly bent, but not quite to a right angle, and brought across the opposite thigh a little above the knee. The pulleys being now attached, the extension is to be commenced.

A very simple and efficient mode of making the extension, if one has not the pulleys, is to employ for this purpose a small rope, the ends being tied together, and the rope being then doubled upon itself once or twice, so as to make four or eight parallel cords. The opposite ends of this bundle of ropes being made fast to the limb and the staple, the extension is made by thrusting a stick through its centre and twisting it. (Fig. 330.)

¹ Cock and Morgan, Chelius, op. cit., vol. ii. p. 242, note by South.

I have several times had occasion to resort to this plan; and indeed it has been for some time known and practised among surgeons in this

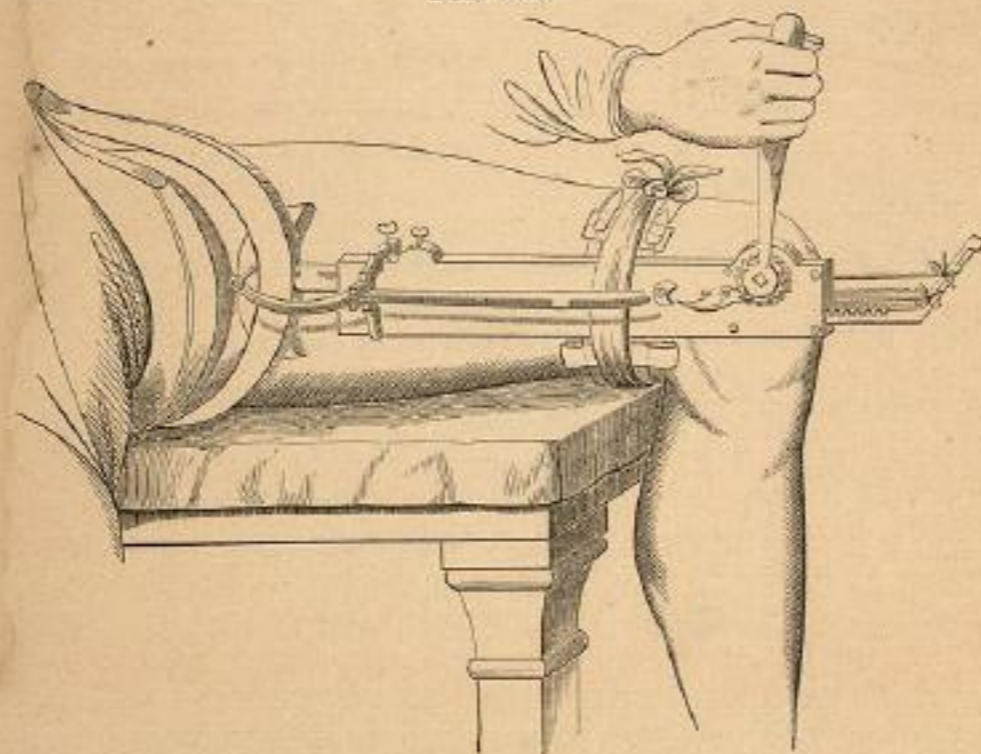
FIG. 330.



Reduction of a dislocation on the dorsum ilii, by the Spanish windlass. (Gilbert.)

country,¹ having been first, according to Professor Gilbert, introduced by Fahnestock, of Pittsburg, Pa. It is usually known as the "Spanish windlass."

FIG. 331.



Jarvis's adjuster applied for reduction of a dislocation of the hip.

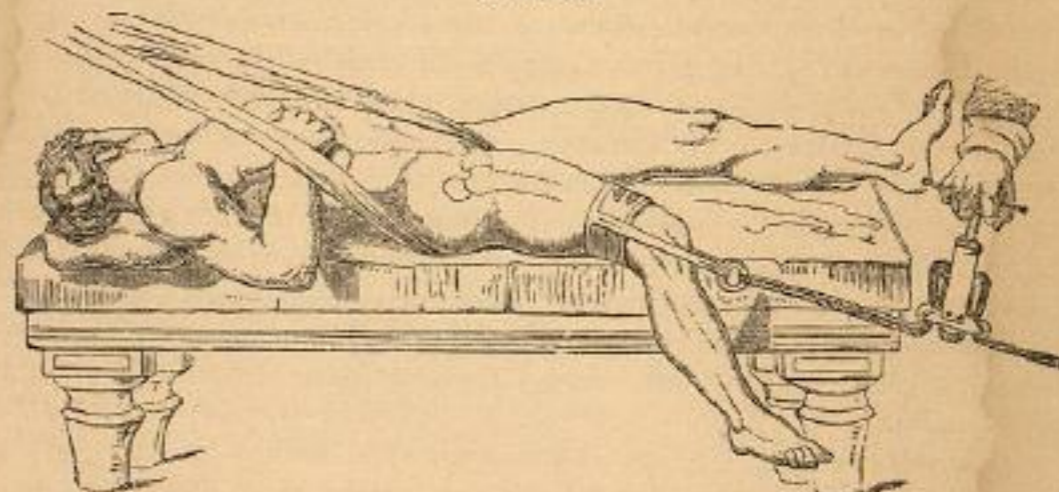
Jarvis's adjuster, to which I have already made allusion when speaking of dislocations of the humerus, has been often used with success in

¹ Gilbert, of Philadelphia, note to Pirrie's Surg.; also Amer. Journ. Med. Sci., vol. xxxv., April, 1845.

dislocation of the hip as well as in dislocations of the shoulder.¹ Its power is equal to that of the pulleys, while the direction of the force can be varied with much greater ease.

Mr. Fergusson says that the *Lancet* for July 26, 1845, contains a description of a similar apparatus constructed by Coxeter at the suggestion of G. N. Epps;² and L'Estrange, of Dublin, has invented a "windlass" for making extension, with a "forceps," by which the extending power can be instantly disengaged.³ Mr. Bloxham's "dislocation tourniquet" is also very simple, and Mr. Erichsen affirms that by it "any amount of extending force that may be required can be readily set up and maintained."⁴ Sédillot, a French surgeon, has suggested that when pulleys are used, we should measure the exact power employed in the reduction, by an ingeniously contrived apparatus called the dynamometer,⁵ and which has been variously modified by Charrière, Mathieu, Robert, and Collin.⁶ Such an instrument might occasionally be useful in preventing the application of excessive force, especially when the patient is under the influence of an anæsthetic.

FIG. 332.



Bloxham's "dislocation tourniquet" applied for reduction of a dislocation on the pubes.

Appreciation.—Finally, without attempting to determine the precise relative value of these different procedures, all of which claim for themselves the testimony of experience, I am prepared to admit that no one of them is without merit, and that each may in certain cases possess advantages over the others. Precisely what the cases are to which each individual method may be especially applicable, I believe it would be impossible to declare unless the cases were actually before me; and even then it would probably be found difficult often to say which was the best until a fair trial of one or more, and a final success, had determined the question. The time has not yet arrived in which we may institute a rigid comparison between the relative merits of the two leading plans of

¹ Crandall, Boston Med. and Surg. Journ., vol. xxxix. p. 77; Atlee, Trans. Amer. Med. Assoc., viii. p. 357, 1850.

² Fergusson, 4th Amer. ed., p. 200.

³ Erichsen, Amer. ed., 1858, p. 242.

⁴ Amer. Journ. Med. Sci., vol. xv. p. 520.

⁵ Poincot, op. cit., p. 1038.

⁶ Ibid., p. 198.

reduction, manipulation, and extension, for while it is true that reduction by manipulation has been practised from the earliest day, it is equally true that extension has been generally preferred and practised by surgeons in all ages. Indeed, it was not until Dr. Reid, of Rochester, again called the attention of the profession to this subject, illustrating his views by the results of several successful experiments and by ingenious arguments, that reduction by manipulation could be said to have been fairly introduced as an established method of practice; a large majority of all the cases upon record of reduction by manipulation having been reported since the year 1851, the period of Dr. Reid's first communication to the *Buffalo Medical Journal*.

The following summary of a paper prepared by myself, with the view of determining, if possible, the relative value of the two methods, and exhibiting an analysis of sixty-four cases in which manipulation was employed, will enable the reader to form some estimate of the difficulty in which this subject is involved; and if it does not actually decide a moot-point, it will at least demonstrate that the method by manipulation is not without its hazards.¹

"Of forty-one cases in which the fact is stated, twenty-eight were reduced on the first attempt, seven on the second, four on the third, and two on the seventh. In seven examples the head of the femur has been thrown from one position to another upon the pelvis, travelling from the dorsum of the ilium to the ischiatic notch, and from thence to the foramen ovale; or directly from the dorsum to the foramen, and back again; or in other directions, according to the character of the original dislocation; in some instances these changes being made as often as seven times in succession. In the majority of cases no evil consequences seem to have followed upon these changes of position. One of my own cases will especially serve to show with what impunity sometimes these changes may be made.

"John Caswell, æt. 28, was admitted to the Buffalo Hospital of the Sisters of Charity on the 13th of January, 1858, with a dislocation of the left femur upon the dorsum ilii, which had occurred six days before. His own account of the accident was that he was standing at the bottom of a well, bent forwards until his body was at a right angle with his thighs, when a bucket holding five hundred pounds of earth fell upon his back and hips. No attempt had been made to reduce the dislocation. Five times in succession manipulation made by myself failed, leaving the head of the bone each time upon the dorsum ilii; the sixth attempt, made with the addition of moderate extension by the hands, threw the head into the foramen thyroideum. By reversing the movements, it was easily replaced upon the dorsum ilii. The seventh trial was made in the same manner, except that when I supposed the head of the bone to be opposite the lower margin of the socket I did not permit the limb to turn either outwards or inwards, but while lifting at the knee with my hands, with sufficient power to raise his hips from the table, I brought

¹ Reduction of Dislocation of the Femur by Manipulation. By the Author. *Buffalo Medical Journal*, Nov. 1857; Feb., March, June, 1859. With tables constructed by my very intelligent pupil, Lucien Damainville.

the limb down gradually to a line parallel with the opposite, and thus finally the reduction was accomplished. No pain or inflammation followed, and in two weeks he left the hospital; but whether he was able to walk or not at that time, I am unable to say."¹

Since this paper was written, the following cases have come to my knowledge. December 9, 1865, Dr. James R. Wood attempted, at the Bellevue Hospital, the reduction of a dislocation of the femur upon the dorsum ilii, of five months' standing, in a man sixty years of age, in the presence of Dr. Sayre, myself, and the class of medical students. The patient was under the influence of ether. Manipulation alone was employed. Probably half an hour had been consumed in the various efforts, when, at a moment when the thigh was being forcibly abducted, the neck was broken within the capsule, and very close to the head. I was able to feel the head of the bone distinctly, after the fracture, and to move it freely separated from the neck.

Dr. David Prince, of Illinois, who was present at the time, informed me that he had himself fractured the neck of the femur in attempting the reduction of an ancient dislocation of the hip by manipulation.

In Markoe's paper, published in the *New York Journal* for January, 1855, several cases similar to that of Caswell are reported, in which the results have been equally fortunate; but the case mentioned as having been under the care of Dr. Post, had a more serious termination. This patient, John Kelly, æt. 21, had a dislocation into the ischiatic notch, and on the same day the reduction was attempted by manipulation. On the first trial the head of the bone was thrown into the foramen ovale; and, after having been moved backwards and forwards between these two points several times, it was finally carried directly from the foramen ovale into the socket by manual extension applied in the ordinary way, but without pulleys. "In this case," says Markoe, "the cure was very slow, and he left the hospital with some degree of pain and swelling about the joint. I learned that an abscess formed in or about the joint, which was opened, and when I saw him, a year after, there was every appearance of seated morbus coxarius."

In Case 14, of Markoe's paper, the thigh was broken at the neck after manipulation had been employed, but while extension was being made by the hands, united with "a lifting outwards." Whether the fracture was due to the extension, or to the manipulation, seems not to be clearly determined. The dislocation had existed seven weeks when this attempt at reduction was made.

Dr. Bigelow has reported a case of dislocation upon the dorsum, of six months' standing, in a man 23 years of age, which he attempted to reduce, and caused a fracture of the neck of the femur. His account of the manner in which the accident occurred is as follows: "I flexed the limb once slowly upward upon the abdomen—a movement which was attended with a continued fine crepitation about the hip." Upon examination, the head of the bone was found to be separated from the neck.

Dr. Dawson has reported to the Cincinnati Academy of Medicine a case in which this accident occurred in his hands. Captain Williamson,

¹ *Buffalo Medical Journal*, vol. xiii. p. 682.

a gentleman in middle life and fair health, was received at Dr. Dawson's clinic with a dislocation into the ischiatic notch of nine weeks' standing. He was placed under the influence of ether, and various methods of manipulation employed. At last "more force was used, the thigh was pressed forcibly across the abdomen," and this was followed by rapid circumduction. At the sixth repetition of this manœuvre, the neck of the bone suddenly gave way.¹

Dr. J. S. Wight, of Brooklyn, broke the femur in an attempt to reduce a dislocation of four months' standing. The patient was fifty-three years old, and the head of the femur was thought to be in the ischiatic notch. Under ether the thigh was flexed upon the body, and then adducted with moderate force, when it broke with a loud snap just below the trochanter. The fragments subsequently united.²

A lad, æt. 15, fell through a hatchway, dislocating the left femur upon the dorsum ilii. The surgeon first called did not recognize the accident. April 29, 1873, eight weeks and one day after, this patient was received into St. Francis's Hospital, and reduction attempted by Drs. Rose and Lellman, both gentlemen of experience. It was reduced (apparently) with ease, the patient being under the influence of ether. Extension, with a six-pound weight, was applied to the limb, in order to secure quiet, and three days later they found the bone out of place, and they repeated the attempt at reduction by manipulation. It was now ascertained that the neck of the femur was broken, but whether this accident happened in the first or second attempt is not quite certain. Two days later I saw the patient, and found the limb shortened one inch and a half, and rotated outwards when unsupported. The head of the bone could be felt on the dorsum.

Dr. Rose informs me that Dr. Krackowizer told him that he had just met with the same accident.

Assisted by my pupil, Mr. Hodge, I have also succeeded in collecting sixty-two cases of attempts at reduction by extension; a great majority of which, we find, were reduced in the first trials; but five cases of recent dislocation were not reduced until after several attempts had been made.

In five cases the femur was broken. The first occurred in St. Thomas's Hospital, London. Ben. Whittenburg, æt. 40, was admitted Nov. 4, 1827, with a dislocation into the ischiatic notch, of twenty-two weeks' duration. After bleeding, etc., had been practised, an attempt was made to reduce the bone by pulleys, in which the reporter professes to believe they were successful, but on the following day it was plainly enough not in place. Mr. Travers again resorted to extension, and while extension was kept up and the assistants were rotating the limb outwards, the neck of the femur gave way.³ Malgaigne mentions a case in which, while he was himself directing the operation, the thigh was broken through its lower third. He was attempting to reduce the bone by extension, but it was not until he gave the signal for rotation out-

¹ Dawson, *The Clinic*, Oct. 17, 1874.

² Wight, *Hosp. Gazette*, Sept. 13, 1879.

³ *London Med.-Chir. Rev.*, Nov. 1828, p. 239.

wards that the bone gave way.¹ Gibson says that Dr. Physick, at the Pennsylvania Hospital, while engaged in reducing a dislocated thigh by the pulleys, broke the femur in consequence of exerting too much force upon it in a lateral direction by an additional pulley; and that a similar accident is supposed to have happened to Drs. Harris and Randolph in the same hospital, in the year 1838, while using the pulleys upon a boy twelve years of age; for during extension and counter-extension, at the moment of rotating the limb, and of drawing it forcibly outwards by a towel, a sudden crack was heard.²

The fifth case is related by Sir Astley Cooper as having occurred at the Brighton Hospital, under the care of Mr. Gwynne; the dislocation was upon the dorsum ilii, and was supposed to have existed about one month. The neck of the femur was broken in the first attempt at reduction, and while the surgeon was making extension, with gentle rotation.³

Sir Astley says: "There are plenty of cases upon record, of fatal abscesses from violent attempts at the reduction of dislocated hips." I presume that this remark has reference to attempts at reduction by extension, since, in his day, this was almost the only mode in use among surgeons. He adds, moreover, that Mr. Skey has mentioned, in the *Lancet*,⁴ a fatal case of phlebitis following protracted extension of the thigh. Malgaigne has collected no less than eight similar examples, with several more in which serious consequences and even death followed promptly upon violent attempts at reduction by mechanical means.⁵

Marchand⁶ has reported three cases of paralysis ensuing upon attempts at reduction by extension; in one of which, however, some doubt remains as to whether it was due to the extension.

The head of the bone has been repeatedly thrown from the dorsum ilii into the ischiatic notch; and B. Cooper mentions a case in which the bone was carried from the foramen ovale into the ischiatic notch, from which latter position it could not afterwards be changed.⁷

As to the relative chances of failure by the two methods, the testimony of the recorded cases is equally unsatisfactory. Of the failures by extension, the experience of almost every surgeon, the journals, and the treatises furnish a sufficient number of examples; while among the sixty-four cases of attempts at reduction by manipulation collected by me, and, excepting the cases in which the bone was broken, only two were positive failures. It is somewhat remarkable, however, that these two cases occurred in the experience of the New York City Hospital; and that they are taken from a total of fifteen, this being the whole number which had been treated by this method at the date of these observations, in the New York Hospital. One had existed one month, and, after repeated trials by manipulation and frequent changes of position,

¹ Malgaigne, *op. cit.*, vol. ii. pp. 146 and 830.

² Gibson's *Surgery*, sixth ed., vol. i. p. 389.

³ Sir Astley Cooper on *Disloc.*, Amer. ed., p. 88.

⁴ *Op. cit.*, vol. i. p. 767, 1840-41. Cooper on *Disloc.*, p. 69.

⁵ Malgaigne, *op. cit.*, vol. ii. p. 164 et seq.

⁶ Marchand, *Thèse d'agrégation*, Paris, 1875, p. 76.

⁷ Sir Astley Cooper on *Disloc.* By Bransby Cooper, Amer. ed., p. 96.

it was finally reduced by pulleys. The other, a dislocation into the ischiatic notch, had existed only a few hours. At least seven or eight trials were made to accomplish the reduction by manipulation, but without success. The first attempt by extension failed also, but in the second attempt the femur was kept at a right angle with the body, and the bone was soon brought into its socket.¹

We have in these two examples not only a record of failure by manipulation, but an equal record of success by extension; while, on the other hand, we find, in an analysis of the sixty-four cases, sixteen triumphs of manipulation over extension.

I must not omit to mention, in order that the reader may form a just estimate of the value of these statistics, that the great majority, especially of the cases treated by manipulation, have occurred in private practice, and it is unnecessary to say that such statistics do not furnish the most reliable basis for conclusions. As a general rule, unsuccessful cases are not published by private practitioners, but successful cases are pretty certain to be made known; while, on the other hand, a series of cases furnished by any single hospital will generally be found to have given both unsuccessful and successful cases. The writer has heard lately of a complete failure to reduce by manipulation in a recent dislocation of the hip, after repeated efforts on several successive days, and where skilful surgeons were in attendance; but it is believed that no account of the result has been published.

I have already called attention to the fact that, in the New York City Hospital, two of the fifteen cases reported were failures; a circumstance of remarkable significance, especially when we consider the skill of the several gentlemen who were the operators in these cases; and it plainly renders a new series of statistics necessary, drawn solely from the experience of one or more similar large establishments, before we shall be prepared to decide positively upon the relative value of the two procedures.

Nevertheless, I shall not hesitate to express my present convictions upon this subject, reserving to myself the right of a change of opinion whenever the proofs shall warrant it.

Manipulation, owing to the greater power which may be brought to bear upon the neck and head of the bone through the action of the shaft of the femur as a lever, is most liable to throw the head of the bone into new positions, and consequently most liable to rupture the various soft tissues about the joint; to produce inflammation, suppuration, and caries. For the same reason it is most liable, also, to fracture the neck of the femur. It is not certain in my mind but that, when the principles which control the reduction are more completely understood, these evils may be lessened; yet I can scarcely persuade myself that by any future observations the state of the question will ever be greatly changed. I cannot but think, also, that some conclusions ought to be drawn from the circumstance that, since the time of Hippocrates to the present day, manipulation has been occasionally recommended and successful examples reported; the reduction being accomplished in most in-

¹ Van Buren, New York Med. Times, Jan. 1856, p. 126.

stances by processes identical, or nearly so, with those now adopted; yet generally the writers appear to have been ignorant of what had been done before, and, indeed, they have generally avowed their belief that the method suggested by themselves was altogether new and original. Possibly this slowness to establish, and total inability to sustain and perpetuate a reputation, was not the fault of the method, and had no relation to its failures. Until within a few years the number of surgical books, and especially of medical journals, was comparatively very small, so that valuable truths often died with their discoverers, or were known and remembered only by a few; but it is possible, also, that it has a deeper significance, and that it implies some defect in the procedure, or serious danger, in consequence of which it has from time to time lapsed into desuetude and finally into complete oblivion.

The Author's Method of Manipulation.—The rules which the author would give for the employment of manipulation are very simple.

FIG. 333.



The Author's method. First position.

The patient being laid on his back upon a mattress, the surgeon, assuming that it is a dislocation upon the dorsum ilii, should seize the foot with one hand and the other he should place under the knee; then, flexing the leg upon the thigh, the knee is to be carefully lifted toward the face of the patient until it meets with some resistance; it must then be moved outwards and slightly rotated in the same direction until resistance is again encountered, when it must be gradually brought downwards

again to the bed. I do not know that the whole process could be expressed in simpler or more intelligent terms than to say, that the limb should follow constantly its own inclination.

FIG. 334.



Second position. Not often required. Liable to cause secondary dislocation into ischiatic notch or foramen ovale.

All writers have united in the necessity of flexion; and, indeed, with very few exceptions, the advocates of extension have insisted upon carrying the dislocated limb more or less across the sound one; or of making the extension at right angles with the body. They have also been nearly unanimous in their statements that the thigh should then be abducted and finally brought down. Nathan Smith has added the injunction to rotate the shaft of the femur outwards, and to press gently upon the inside of the knee while the thigh is being flexed upon the body, so as to compel the head of the bone to hug the outer margin of the acetabulum and to prevent its falling into the ischiatic notch; a suggestion which has been erroneously interpreted by some writers to mean that he would carry up the limb abducted, a thing which is simply impossible until the reduction is accomplished. In adopting this practice, however, we must not forget the danger which we incur, when the limb is completely flexed, and the head of the femur is below the edge of the acetabulum, of throwing it over into the foramen ovale. Dr. Nathan Smith has also noticed the advantage which sometimes may be gained by giving to the limb at this moment a slight rocking motion.

These movements of the limb, with perhaps other slight modifications, such as lifting the knee moderately or forcibly when the bone refuses to mount over the margin of the acetabulum, pressing with the hand or foot upon the pelvic bones, and violent circumduction, are all which have been usually practised in successful manipulation.

FIG. 335.



Third position.

I repeat, however, that as a general rule, in the first trial, the knee must be carried only in those directions which offer no resistance, and these will be found almost always to be the same; the knee of the dislocated femur hanging over the sound one will be made easily to ascend to about a right angle with the body; we can then carry it outwards a short distance, probably not more than four or five degrees; at this moment, frequently, the thigh will begin to rotate outwards of itself, and with considerable force, or, as Wathman says, "a self-twisting of the thigh occurs, which cannot be prevented by fast holding." When this action takes place, the reduction is immediately accomplished; and it is in fact at this moment, before the limb begins to descend, that the bone most frequently resumes its socket. If it does not, then as soon as the limb begins to fall the reduction occurs, generally with a loud snap. It is pretty certain that this manipulation is to fail if the knee has descended more than a few inches without the reduction having taken place; and it will be better to repeat the manœuvre at once, rather than to bring the limb completely down.

Generally anæsthetics ought not to be employed, since the operation, if successful, is not usually painful, and we need that the patient should preserve his consciousness, in order to admonish us when we are using improper violence. It is probable, also, that the action of certain muscles sometimes affords material assistance in the reduction. If, however, the patient is very sensitive, or the parts about the joint are very tender, or manipulation without anæsthetics has failed, then certainly these agents may be properly and advantageously employed.

If we propose to attempt reduction by extension, it is no longer necessary to resort to the lancet, antimony, and the hot bath, as preliminary measures, since the muscles can be at once overcome by the much more certain and more powerful agents, chloroform, ether, etc.

Sir Astley Cooper's Method of Extension.—The method recommended by Sir Astley Cooper, and most often practised by surgeons of the present day, is essentially as follows:

The patient is placed upon a bed of suitable height, reclining on his back, but partly over upon the sound side. Observing now the line of the axis of the dislocated thigh, one strong staple is to be secured into the wall upon one side of the room, and another upon the opposite side, both of which shall correspond as nearly as possible with the line of the shaft of the femur. The staple in front of the body will be higher than the bed, and the staple behind will be, in the same proportion, lower than the bed. The limb being stripped, two pieces of strong factory cloth, each about four inches wide and two feet long, should be laid parallel with and on each side of the limb; the centre of each strip being about opposite that portion of the thigh which is just above the two condyles. Over the centre of these strips, above the condyles and patella, a strong roller, three inches wide and at least three yards long, previously wetted in water, is to be turned as tightly as it can be drawn until the whole roller is exhausted; the extremity of the roller being made fast with a needle and thread rather than with pins. The upper ends of the side strips are then to be brought down, and tied to the lower ends, forming thus two lateral loops, upon which one of the hooks of the compound pulleys is to be made fast, while the other hook is secured to the front staple in the wall. Instead of these rollers we may employ, if we choose, a leathern thigh-belt. For the purpose of counter-extension a sheet is folded diagonally, and its centre being applied to the perineum of the dislocated limb, the ends are tied firmly into the back staple. To prevent the body from moving laterally, under the action of the pulleys, one assistant should be seated upon the bed, with his back against the side and back of the patient, and his right arm thrown over the body; it is well also to station another beside the sound limb, so as to retain it also in its place upon the bed. Underneath the upper part of the dislocated limb a strong and broad bandage should be placed, of sufficient length to tie over the neck of the surgeon when he is standing about half-bent over the body of the patient.

Everything being arranged, and all portions of the apparatus having been sufficiently tested to make sure that nothing will give way during the operation, the anæsthetic is to be administered, and as the patient falls gradually under its influence, the action of the pulleys should com-

mence, and be slowly but steadily increased; a third assistant managing the rope, so as to leave the surgeon unembarrassed, and able to direct his whole attention to the position of the trochanter major and of the head of the femur. In order to this, he should place one hand upon each of these prominences, and watch carefully their descent.

The length of time which will be required to bring down the limb must differ greatly in different persons, according to the peculiar circumstances of the case, and the condition, age, etc., of the patient; but it must never be forgotten that a slow and steady action is much more effective than rapid and irregular tractions, and it is in this especially, rather than in the relative amount of power, that the pulleys possess always so great an advantage over the hands.

When the surgeon finds that the head of the bone has nearly or quite reached the socket, if it does not take its place spontaneously, he may place his neck in the noose which passes underneath the thigh, and lift upwards and outwards, in order to raise the trochanter major, and thus enable the head to rotate toward the acetabulum. It is in this part of the manœuvre, and especially when at the same moment one of the assistants, after bending the leg upon the thigh so as to make of it a lever, has rotated the thigh outwards, that the fracture of the neck has generally taken place; and we cannot be too cautious, therefore, particularly in old persons, not to bear very strongly upon the noose, nor to permit the assistant to rotate outwards with great force.

If the bone does not enter the socket, we may increase the flexion, or suddenly release the tension, or, in fine, again resort to manipulation alone.

When the reduction is accomplished, the patient should be laid upon his back, with the knees resting over a pillow, and tied together lightly with a towel or a strip of cotton cloth. In order also the more certainly to prevent a redislocation, the thigh of the dislocated limb should be gently rotated outwards, by which the head will be pressed forwards against the anterior portion of the capsule.

Such an accident, however, as a recurrence of the dislocation, in the case of the femur, is exceedingly rare; and I should have deemed it altogether impossible, except as the result of considerable violence again applied, had not at least two examples been reported to me upon very excellent authority. Malgaigne says he has himself seen an example of redislocation upon the dorsum ilii, occasioned by an untimely movement;¹ and Verneuil has seen, ten days after the reduction of a dislocation upon the ischiatic notch, the dislocation reproduced by a sudden effort of the patient to sit up;² indeed, it is when the limb is in a flexed position that the accident seems most likely to occur.

Of course, in these remarks I mean to except those cases in which the upper margin of the acetabulum is broken off, and the head of the femur has consequently lost its natural support in this direction.

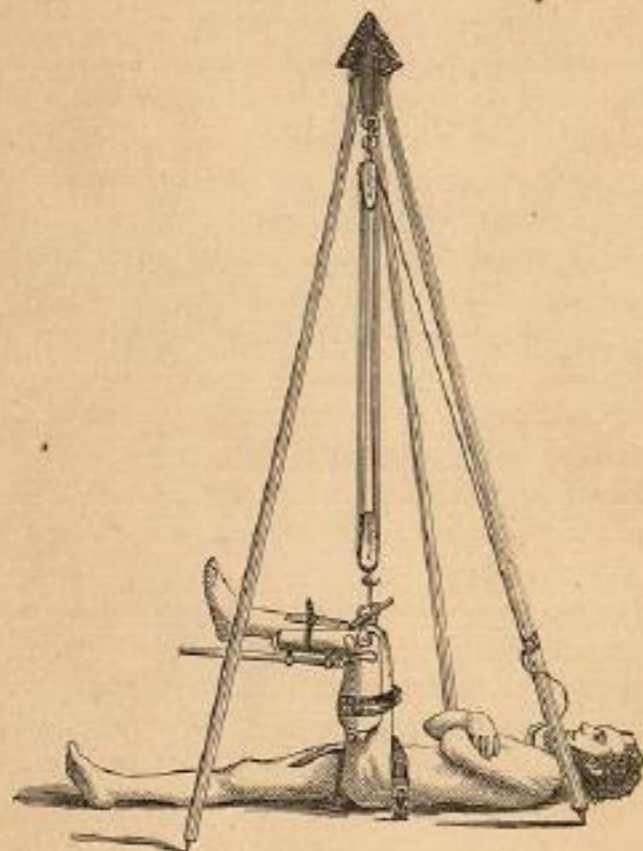
The possibility of this accident is also confirmed by the examples of "voluntary" dislocations, which I shall relate in the last section of this chapter.

¹ Malgaigne, op. cit., tom. ii. p. 830.

² Ibid., p. 840.

Bigelow's Method of Extension.—The method of extension recommended by Dr. Bigelow, namely, with the thigh at a right angle with the body, has already been referred to; and there is much reason to believe that, as a rule, it is preferable to extension as practised by Sir Astley Cooper. Nearly all surgeons, however, have recognized the necessity of flexing the thigh in certain cases. Dr. Bigelow suggests that where greater force is required than can be obtained by the usual methods, a tripod should be employed, as shown in the accompanying woodcut.

FIG. 336.



Tripod for vertical extension. (Bigelow.)

The following case, reported to me by Dr. N. Fanning, of Catskill, N. Y., illustrates the occasional necessity of resorting to extension, and is of special interest on account of the extreme youth of the patient. I have referred to the same case once before.

A little girl, two and a half years old, was caught under a falling door on the 24th of May, 1867, but her parents suspected no injury beyond a severe bruise until ten days later, when they consulted Dr. Fanning. The left femur was then found to be dislocated upon the dorsum ilii. Dr. Fanning attempted first to reduce the dislocation by manipulation, but he failed. He then directed the father to make extension by the legs, while the mother made counter-extension by seizing the child under the arms, and thus he soon succeeded in effecting the reduction.

§ 2. Dislocations Upwards and Backwards into the Great Ischiatic Notch.

Syn.—"Upwards and backwards into the ischiatic notch;" Sir A. Cooper. "Upwards and backwards into the great sacro-sciatic notch;" Lizars. "Backwards into the sacro-sciatic foramen;" S. Cooper. "Backwards into the ischiatic notch;" Liston, B. Cooper, Miller, Pirrie, Eriksen, Skey, Gibson. "Downwards and outwards on the os ischium;" Boyer, Dorsey. "Backwards and downwards into the ischiatic notch;" Chelius, Petit, Duverney. "Upon the ischium;" Brandi. "Sacro-sciatic;" Gerdy. "Ischiatic;" Malgaigne. "Dorsal below the tendon;" Bigelow.

Boyer considers this dislocation as only secondary upon a dislocation upon the dorsum ilii; but it is very certain that it often occurs as a

FIG. 337.



Dislocation upwards and backwards into the great ischiatic notch. (A. Cooper.)

primary accident. Not unfrequently, also, what was primarily a dislocation into the ischiatic notch, becomes subsequently a dislocation upon the dorsum ilii.

Causes.—A fall upon the foot or knee when the limb is very much in advance of the body; or the fall of a heavy weight upon the back and pelvis when the thigh is nearly or quite at a right angle with the body. Indeed, the causes are very similar to those which produce dislocations upon the dorsum ilii, except

FIG. 338.



Dislocation upwards and backwards, into the great ischiatic notch.