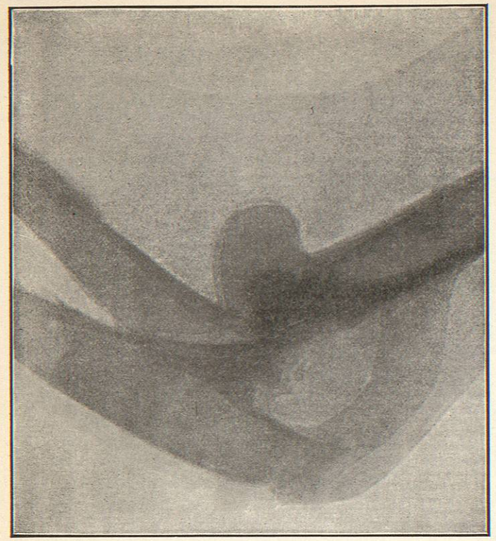

FIG. 1623.—Backward Dislocation of Both Bones of Forearm in a Child. (X-Ray picture, copied from David Walsh's work, Edinburgh, 1899.)

In compound dislocations at the elbow, the propriety of removing—under strict aseptic precautions—the offending fragments is to be considered. In such cases a partial resection offers better chances of success than does reduction with a reunion of the fragments.

In Dislocations at the Wrist we may have the ulna detached from the semilunar surface of the radius and displaced forward or backward. If forward, it is the result of violent supination of the hand, and is accompanied by rupture of the anterior ligaments of the joint. Somewhat to the radial side and on the palmar surface of the wrist a prominence will be apparent, and that of the lower end of the ulna at the back of the wrist will be wanting; the hand will be supinated. With the forearm flexed, counter-extension should be made from the arm, and extension should be applied to the hand. At the same time pressure backward should be made over the head of the ulna, whereupon firm pronation will enable the ulna to slip back into position. Two well-padded splints, such as are used in fracture of both bones of the forearm, should be worn for at least four weeks.

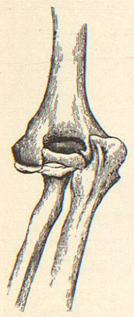

FIG. 1624.—Dislocation of Both the Radius and the Ulna Inward.

Backward displacement of the ulna is the result of extreme pronation of the hand. The ordinary ulnar prominence at the back of the wrist will be found, in this dislocation, to be much more conspicuous, and the styloid process will no longer be in line with the fifth metacarpal bone; the hand will be supinated and the fingers flexed. When the hand is extended, the bone is pushed back until it becomes re-engaged in the semilunar cavity of the radius. The after-dressing consists in applying to the bone a firm compress and a straight posterior splint for a period of three or four weeks; and then, after these have been removed, the wrist should be strapped with rubber plaster, or a bandage and compress should be applied. These dressings should be worn for some time.

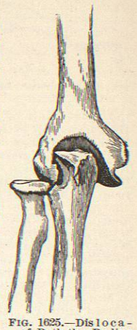

FIG. 1625.—Dislocation of Both the Radius and the Ulna Outward.

Dislocation of Both Bones at the Wrist may take place in either an anterior or a posterior direction. The lesion is quite rare. When the wrist is extended violently and to an extreme degree, the anterior carpal and lateral ligaments are ruptured and the bones of the carpus forced back on the anterior surface of the radius. The hand will be fixed in an extended position, the lower end of the radius and ulna forming a prominence on the posterior surface of the wrist. By making extension from the hand and counter-extension from the arm, and by extending the carpus on the forearm while at the same time pressing the ends of the radius and ulna forward, the luxation may be reduced. The hand and forearm should be placed on a well-padded anterior splint, and secured by a roller bandage. These dressings should be worn for several weeks.

The application of force to the back of the hand in such a manner as to produce extreme flexion may cause

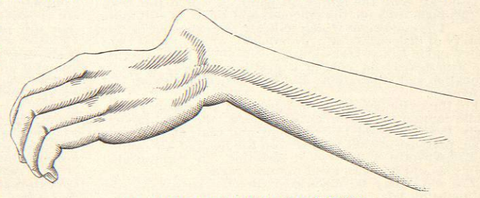

FIG. 1626.—Forward Dislocation of Carpus.

rupture of the posterior radio-carpal and lateral ligaments, and force the carpus back on the posterior surface of the radius and ulna. The deformity consists in marked increase in the antero-posterior diameter of the wrist, the hand being slightly extended, the fingers flexed, and the

joint immobile. With the forearm fixed, extension from the hand combined with slight flexion, abduction, and adduction, will effect a reduction of the dislocation. A straight splint, applied to the anterior surface of the forearm and hand, should be worn for several weeks.

In discriminating between a fracture of the wrist and a dislocation at this point we are aided by the following

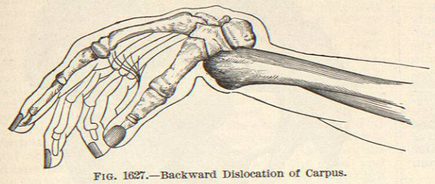

FIG. 1627.—Backward Dislocation of Carpus.

facts: in a fracture there is increased mobility with crepitus, and the deformity reappears after it has been reduced, provided no dressings are applied to keep the parts in place.

In compound dislocation at the wrist, the fragments of bone should be removed under rigid asepsis, all torn nerves, tendons, etc., should be sutured, bleeding vessels should be ligated, and a well-padded palmar splint should be applied.

Dislocations of the Carpal and Metacarpal Bones are rare, and no specific instructions are likely to meet the indications in any particular case. A knowledge of the anatomical relations, comparison with the uninjured hand, and general attention to practical surgical measures are the only things that are necessary. The displaced bones should be moulded into position with the fingers of the operator and properly secured in this position by a splint and bandage.

The metacarpal bone of the thumb may be dislocated backward or forward by extreme extension or flexion;

FIG. 1628.—Dislocation of Phalanx of the Thumb Backward.

the reduction is to be effected by making extension from the proximal phalanx and by pressing the displaced bone back into position. As a dressing a moulded binder's board or a leather or gutta-percha splint, should be fitted to the thumb; it should extend well back over the wrist, and should be secured by a narrow roller.

The Thumb is dislocated most commonly by a backward or forward displacement of the proximal phalanx, the proximal end passing in front or back of the head of the metacarpus. As a rule, the backward dislocation is rendered more difficult of replacement by reason of the head of the bone being grasped between the two heads of the flexor pollicis brevis. In effecting a reduction

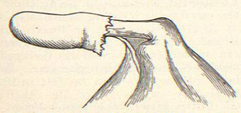

FIG. 1629.—Dislocation of Phalanx, without Rupture of the Flexor Brevis.

the metacarpal bone should first be fixed, and then the thumb is to be extended, drawn downward, and suddenly flexed. If this fails, one of the heads of the short flexor may be divided subcutaneously. A dressing similar to the one just cited will be appropriate. Noty* suggests the following plan as having succeeded in backward dislocation of the thumb after other efforts have failed: "The hand flexed and forcibly pronated; the surgeon's two fore-fingers placed beneath the head of the metacarpus, and the thumbs applied to the dorsum of the phalanx at its base, pressure is made in opposite directions as the thumb is raised to a right angle."

FIG. 1630.—Dislocation of Phalanx, with Rupture of Muscle: Head of Metacarpal Bone Covered Only by Skin.

Reduction of Dislocation of the Phalanges is not difficult, and is usually accomplished by firm extension and manipulation. In compound dislocations of the phalanges efforts to secure perfect asepsis are essential. If the bones are extensively comminuted, the removal of fragments, excision, etc., may be needed, and as in simple

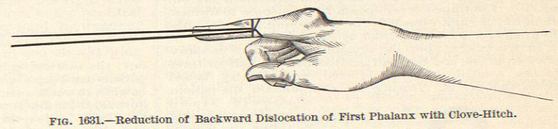

FIG. 1631.—Reduction of Backward Dislocation of First Phalanx with Clove-Hitch.

dislocations, a moulded binder's board, or a leather or gutta-percha splint, should be applied.

Dislocations of the Pelvic Bones partake more of the nature of a fracture, and for their diagnosis a careful study of the relations of the various prominences and of the degree of mobility at the point of separation, usually suffices. In order to secure a satisfactory examination the patient should be placed on a firm, well-padded table or mattress. The treatment consists in manipulating the bones into position and in applying broad strips of adhesive plaster and a well-adjusted muslin roller; or a plaster-of-Paris dressing may be applied, and this should be worn for a month or six weeks.

The displacements of the coccyx, whether from fracture or from dislocation, present similar indications; and if, after they have been reduced, a redisplacement occurs, giving rise to discomfort or inconvenience, removal of the bone is the proper recourse. Replacement is accomplished by means of the fingers of one hand placed in the rectum, while the other hand makes pressure from without.

Dislocations of the Hip, or Coxo-Femoral Dislocations,

FIG. 1632.—Forward Dislocation of Second Phalanx of Finger.

are liable to occur most frequently in four directions: (1) upward and backward on the dorsum ilii, (2) upward

* British Medical Journal, October 15th, 1898.

and farther backward into the ischiatic notch, (3) downward and forward into the thyroid foramen, and (4) downward and forward upon the pubes. In addition, what are known as irregular dislocations are occasionally met with, as diagonally between any of the above, and in some rare instances going beyond the thyroid foramen and lodging upon the tuberosity of the ischium. Slight manipulation, however, readily brings the head of the bone into one or the other of the four positions known as regular dislocations. Irregular dislocations are found only in cases in which the ilio-femoral or "Y" ligament is completely ruptured. If this ligament remains intact the head of the bone should be forced to take its position in one of the regular forms.

"In regard to frequency," says Hamilton,* "of 104 dislocations (regular), 55 were upon the dorsum ilii, 28 into the great ischiatic notch, 13 upon the foramen thyroideum, and 8 upon the pubes." They may occur at any period of life, but are found most frequently in the most active period, viz., from 15 to 45; and in regard to this matter I will quote the following tabular arrangement from Hamilton. On page 810 I find:

Under 15 years	15	cases.
15 to 30 years	32	"
30 " 45 "	29	"
45 " 60 "	7	"
66 " 85 "	1	"

The above is his analysis of 84 cases.

The injury is more common in males than in females, Agnew giving 78 out of 89 cases, and Hamilton 104 out of 115. Continued fevers possibly predispose to dislocations of the hip, especially in the young. Double dislocations have been reported by numerous observers.

In dislocation upon the dorsum ilii, the limb is shortened from one and one-half to two and one-half or three inches, rotated inward, adducted, and slightly flexed upon the pelvis. During the examination the patient should stand erect, and should throw the weight of his body upon the sound foot, the knee touching the opposite thigh above or near the upper margin of the patella. The thigh can be flexed, but adduction is difficult, and abduction is impossible except to a very limited extent; the body is bent slightly forward; the roundness of the hip is diminished by relaxation of the gluteal muscles; the trochanter major is brought down so as to approach the level of the anterior superior spinous process; and the head of the bone may be felt on the dorsum ilii.

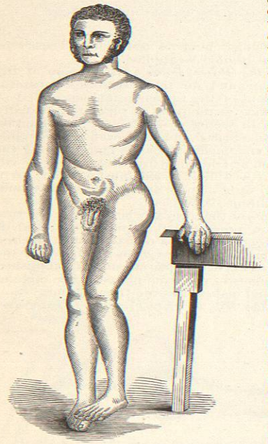

FIG. 1633.—Dorsal Dislocation of the Hip.

In differentiating this dislocation from fracture of the neck of the femur, we shall find absence of crepitus (unless fracture coexists), immobility, the toes turned in, a greater degree of shortening, and inability to stand upon the limb. In fracture, on the other hand, there is mobility —possibly preternatural; the toes are generally turned

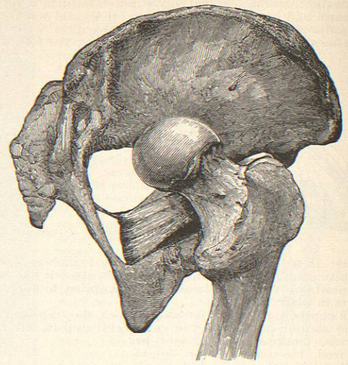

FIG. 1634.—Dislocation on Dorsum Ilii Below Tendon of Obturator Internus. (Bigelow.)

out; the shortening is limited if at all apparent; and the patient can bear some weight on the limb, and may even be able to walk a short distance. It must also be borne in mind that a fracture is more liable to occur in advanced life; indeed it is quite rare in early life or prior to middle age. Separation of the epiphysis must be looked out for in early life, and the possibility of hip-joint disease must not be forgotten.

If the outer fibres of the ilio-femoral ligament are ruptured, the rare form of everted dorsal dislocation may occur, in which we have the principal signs of a dorsal dislocation with the limb everted; the limb may be found inverted, but it is easily everted; and the foot may be slightly everted, lying flat upon the bed, or it may point backward. By flexion, rotation inward, and adduction this dislocation is readily converted into the regular form on the dorsum ilii.

In this dislocation, as with the others, the ligamentum teres is ruptured or torn from its attachment; the capsular ligament is torn at its lower posterior portion, and generally also on its under part; the quadratus femoris, the gemelli, the obturator internus, the pyriformis and obturator externus muscles, all or at least some of them are torn or partially lacerated. The glutæi, on the other hand, either escape altogether or are only slightly injured.

The head of the bone may lie close to the acetabulum, even overlapping its cavity, or it may be lodged far backward, or backward and upward; it may be so low as to overlap both sciatic notches, its centre resting on the base of the ischiatic spine or opposite the apex of the great sciatic notch.

When the head of the bone leaves the acetabulum at its lower part it usually passes below the obturator internus and then rises behind it, this muscle being interposed between it and the cavity; or lodging beneath this muscle it may press it forcibly upward; or finally, it may slip above the obturator internus, passing between it and the pyriformis, in which case it will be covered only by the glutæus maximus and the integument. In the latter event, the head of the bone can be felt in its new position, moving with the movements of the thigh; the normal outline of the buttock, which becomes broadened and prominent, is lost, and the great trochanter is approximated to the anterior superior spine, lying above

* *Op. cit.*, p. 808.

a line drawn from that point to the tuber ischii (Nélaton's line). If the head of the bone is below the tendon the symptoms will be practically the same, yet there is less shortening, and the flexion, adduction, and inversion are more marked.

Reduction is accomplished, in all recent cases, by manipulation. The studies of Dr. Bigelow have thrown great light upon dislocations at the hip, and he very correctly gives priority of invention of the method now so commonly in use to the late Prof. Nathan Smith, of New Haven, who formulated it in 1831. Desprès,* in 1835, independently formulated the method of flexion and outward rotation, and Reid,† in 1851, did the same. In his method, however, marked adduction preceded the flexion, and the obstacles encountered were incorrectly attributed by him to the resistance of the muscles.

In reducing this dislocation by the classical method of Professor Smith, the patient is placed on a firm mattress and anæsthetized (if deemed necessary); the surgeon grasps the ankle of the injured limb with one hand and the knee with the other; the leg is flexed on the thigh and the thigh on the abdomen; it is then adducted and carried to the sound side, and rotated slightly outward; and finally, by circumducting externally, it is swept across the abdomen and brought down in a straight position beside the other limb.

Allis‡ recommends the following steps: The surgeon, kneeling beside the recumbent patient, in the case of the right hip, should grasp the ankle with the right hand and place the bent elbow of the left arm in the popliteal space; then he should turn the leg outward, by means of the ankle, and should lift it upward with the left arm; finally, he should turn the leg inward and should bring the femur down into the position of extension.

Hamilton§ gives the following: "The patient being laid upon 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 lifted carefully toward the face of the patient until it meets with some resistance; it must then be moved outward and slightly rotated in the same direction until resistance again is encountered, when it must be gradually brought downward again to the bed."

I also quote the following from Stonham‖: "In all forms of dislocations the patient is most conveniently placed

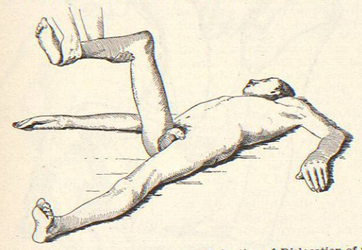

FIG. 1635.—Manipulation Method for Reduction of Dislocation of the Thigh, First Stage, Showing Flexion of Knee and Hip to a Right Angle. (Heiferich.)

upon a hard mattress on the floor, the surgeon thus having full command of the limb. He must be fully anæsthetized. In the dorsal dislocations the surgeon, flexing the knee to a right angle, grasps the leg above the ankle, and just below the knee. The thigh is now flexed upon the abdomen to a right angle, and the patient is slightly raised from the mattress so that his body becomes a counter-extending force; if this be insufficient his pelvis may be fixed by an assistant, or the surgeon may exert pressure on the anterior superior iliac spine with his unbooted foot. The femur is now abducted and rotated out, and thus the head is brought nearer the acetabulum; finally the limb is extended and the head slips into the socket. The formula for reduction is 'lift up, bend up, roll out, and extend.' If any difficulty is experienced it will most likely be due, not only in the dorsal, but in all regular dislocations, to the smallness of the aperture in the capsule; this is to be made larger, without fear of inflicting much additional damage, by circumduction in the direction opposite to that which the head of the bone must subsequently travel. In the other cases adduction and inversion may be slightly increased in order to disengage the head of the bone."

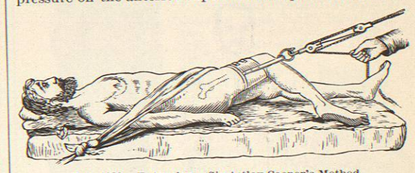

FIG. 1636.—Extension. Sir Astley Cooper's Method.

"In the everted dorsal dislocation it may be converted into the ordinary dorsal by flexion, adduction, and inward rotation of the limb," says Mr. Stonham; and according to him "Bigelow recommends that the head should be disengaged by circumduction of the extended limb inward, coupled with eversion to free it from the edge of the pelvis in the supraspinous form." "The anterior oblique may be converted into the ordinary dorsal form by inward circumduction and internal rotation."

Charles A. Sturrock* has advised the following method of reducing dislocations of the hip: "The patient is laid upon the back and anæsthetized. The surgeon kneels upon the left knee and at the left side of the patient in a dislocation of the left hip. The patient's thigh is then carefully flexed to a right angle, and while this is being done the leg is also flexed to a right angle and laid with the most prominent part of the calf on the right knee of the surgeon. The ankle is then firmly grasped with the left hand, and the condyles of the femur with the right. The thigh is abducted for thyroid dislocations, adducted for dorsal and pubic, and rotated inward for all, by drawing the foot away from the middle line and keeping the knee steady. Traction is now made by steadily depressing the ankle, the surgeon using his knee for a fulcrum; the patient's leg makes a most powerful lever, and the pelvis can be easily raised from the ground if necessary, the body acting as a counteraction; finally the thigh is rotated out, and while this is being done the head of the femur slips into place."

These methods all act in the manner suggested by Prof. Nathan Smith, and the points brought out in regard to the ilio-femoral or "Y" ligament, so philosophically considered by Dr. Bigelow, are the important factors in the pathology and reduction of this dislocation,—the "Y" ligament being a re-inforcement of the capsular ligament. The method of Allis and that of Sturrock give the surgeon greater power in making extension and counter-extension during the manipulation. Sir Astley Cooper's method of employing the compound pulleys, and other devices, mechanical in their character, for extension and

* Bull. de la Soc. Anatomique, September, 1835, p. 4.
† Buffalo Med. Journal, 1851.
‡ Wharton and Curtis: "Practice of Surgery," *op. cit.*, p. 585.
§ *Op. cit.*, p. 835.
‖ "Manual of Surgery," by Charles Stonham, vol. ii., p. 195, The Macmillan Co., 1900.

* British Medical Journal, April 8th, 1899.

counter-extension, are now abandoned as being very liable to produce injury (through the employment of excessive force) in all recent dislocations; and, with the means suggested above, they are needed only as adjuvants to manipulation, if at all. Manipulation is to some extent impeded by mechanical devices, for they interfere with the

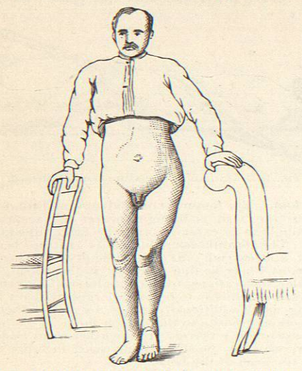

FIG. 1637.—Luxation in Ischiatic Notch. (From a Photograph.)

freedom of movement; I never resort to them unless I am absolutely forced to do so, through the failure of other means, and then I rely upon them only as aids to the proper movements of the limb. I am convinced that I can accomplish more—while at the same time incurring a smaller risk—by a careful study of the mechanism of the dislocation and by employing dexterity, than by resorting to violent force.

When reduction has been accomplished the limb may be kept in position by sand bags, or by the use of a long fixed splint, the patient being kept in bed for about two

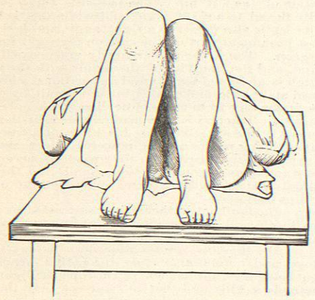

FIG. 1638.—Drawn from a Photograph. The same case as that shown in Fig. 1637.

weeks; at the end of which time passive motion may be gradually essayed, and the patient allowed to get about on crutches, but he should not actually use the limb until after the expiration of a month. At the end of five or six weeks all support may be dispensed with.

As before stated, in connection with other dislocations, it is not time alone that determines when a dislocation at the hip-joint becomes ancient. However, if two months have elapsed, forcible attempts are likely to be dangerous and failure to effect a reduction is common, the danger becoming greater and the failure more certain with the advance of time. Nevertheless, attempts are justifiable and may prove successful and safe in one individual at the end of a certain period, while the obverse is the case in another individual, after the lapse of the same or even a shorter period of time.

Dislocation backward into the great sciatic notch is usually produced by a force acting on the knee, foot, or pelvis when the thigh is flexed on the pelvis. The limb is slightly flexed, inverted and adducted, with the knee turned toward and touching the inner margin of the patella of the other leg. The shortening is

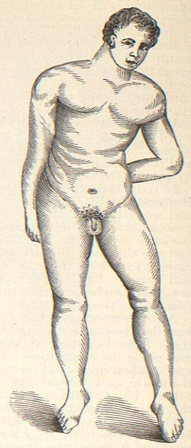

FIG. 1639.—Thyroid Dislocations.

rarely more than half an inch, the hip is less prominent, the trochanter is farther from the anterior superior spi-

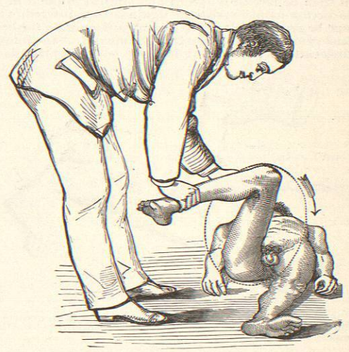

FIG. 1640.—Reduction of Thyroid Dislocation by Manipulation. (Bigelow.)

nous process of the ilium, and the head of the femur is lower and less movable than when it rests on the dorsum ilii.

Flexing the thigh, in iliac dislocations, relaxes the "Y" ligament, and in ischiatic dislocations it releases the head of the femur from the obturator internus muscle. The

surgeon, grasping the ankle in one hand and the front of the knee in the other, should flex the leg on the thigh, and the thigh on the abdomen; he should then adduct the limb and carry it over to the sound side, rotating it slightly outward; and finally, by a sweep of extreme circumduction, he should carry it across the abdomen and bring it down parallel with the other limb. Reduction by extension and counter-extension is now rarely resorted to, and only in old dislocations, and as an adjuvant to manipulation.

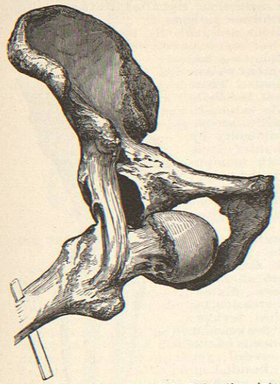

FIG. 1641. — Mechanism of Dislocation into Thyroid Foramen, Showing the Y-ligament Suspending the Trochanter. (Bigelow.)

A force acting upon the limb while in a state of abduction will throw the head of the bone downward, lodging it on the thyroid foramen and upon the obturator externus muscle. The limb will be lengthened about an inch and a half, the heel raised, the hip flattened, the body inclined forward on the pelvis and toward the injured side, and the foot may be everted. The head of the bone may be felt below the horizontal ramus of the pubis.

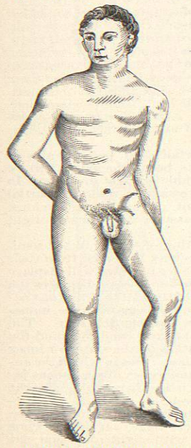

FIG. 1642.—Pubic Dislocation.

With the leg flexed on the thigh, the limb is to be carried up to a right angle with the pelvis; then, being held as before directed, it is first to be abducted and rotated inward, next carried across the abdomen toward the opposite side, and then finally brought down into a position of adduction, alongside the other leg. The head of the bone, during these manipulations, may pass below the acetabulum and slip by it, thus establishing the conditions of an ischiatic or iliac luxation. This may be guarded against by the aid of an assistant, who, with his fingers, shall press the head of the bone upward as the limb is being carried across the abdomen, or the same result may be accomplished by placing a folded towel beneath the upper end of the femur and exerting upward traction upon it while the manipulations just described are in progress. If the accident in question should occur, then the proper procedure will be to resort to the manipulations recommended for either of the cases previously described.

FIG. 1643.

Falling upon the foot or knee, when the thigh is drawn backward from a perpendicular, or violent twists of the limb, may dislocate the head of the femur forward and upward on the pubes, causing it to lodge internally to the pubic eminence. The limb will be shortened and abducted, the thigh flexed, the foot everted, and the trochanter less prominent, and the head of the bone will be apparent in front of the pubis. This dislocation is liable to be confounded with fracture of the neck of the femur. In pubic dislocation there will be absence of crepitus, immobility, abduction and flexion of the thigh; whereas in fracture there will be crepitus, increased mobility, and the thigh neither flexed nor abducted.

FIG. 1644.

For the reduction of this dislocation the leg must be flexed upon the thigh, and the thigh carried forcibly up to the abdomen until it rests in contact with it, thus relaxing the "Y" ligament and lifting the head of the bone off the pubis. As the next step the thigh must be rotated inwardly, and then, during adduction, the limb must be brought down toward and parallel with its fellow. If the luxation is suprapubic, in carrying the limb from its abnormal position of abduction to that of adduction it is not necessary to carry it so far across the body as in thyroid dislocation.

The suggestions as to after-treatment and in regard to ancient luxations, which were made in connection with the subject of dorsal dislocations, are equally appropriate for this as well as the other forms of dislocation of the thigh.

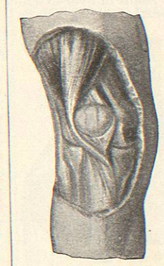

FIG. 1645.

Dislocations of the Patella are somewhat rare, and are due to sudden muscular contraction, to forcible torsion of the joint, or to the action of a force operating against one or the other side, the dislocations then being lateral. Separation of the tubercle of the tibia, or of the apex of the patella, may permit the bone to be displaced upward—a variety of displacement which partakes more of the nature of a fracture and requires the same treatment.

FIG. 1646.