

convergence, which may develop into convergent strabismus. (See *Asthenopia*, *Strabismus*.)

The effect of the disturbed correlation between accommodation and convergence in ametropia has been concisely formulated by Donders, as follows:

Hypermetropia causes accommodative asthenopia, to be actively overcome by strabismus convergens.

Myopia leads to muscular asthenopia, passively yielding to strabismus divergens.

Astigmatism is a refractive anomaly in which the refractive power of the eye is unequal in different meridians. (See *Astigmatism*.) This inequality is greatest in two meridians which lie at right angles to each other, and which are called the principal meridians. The astigmatic eye may be emmetropic in one of its principal meridians, in which case it is either myopic or hypermetropic in the other; or it may be either myopic or hypermetropic in both meridians; or, lastly, it may be myopic in one of its principal meridians and hypermetropic in the other. If the astigmatic eye is hypermetropic in its horizontal meridian, the accommodative disturbances generally simulate those which belong to hypermetropia, namely, accommodative asthenopia, or a tendency to convergent strabismus; if, on the other hand, the eye is myopic in its horizontal meridian, the complications are more commonly those which belong to myopia, namely, muscular asthenopia or insufficiency. Moreover, as in astigmatism the acuteness of vision is more or less impaired, the inclination is always to hold the book too near to the eyes, and thus the tendency to accommodative tension or to muscular insufficiency, on the one hand, or to muscular tension, or to accommodative insufficiency, on the other hand, is materially increased.

Irregular astigmatism (see *Astigmatism*) necessarily impairs the acuteness of vision at all distances, and may prove a source of disability or of danger through the forcing of both accommodation and convergence in the effort to read continuously at a very short distance.

The correction of regular astigmatism, together with any accompanying ametropia, by means of appropriate cylindrical, spherico-cylindrical, or toric, lenses, both improves the acuteness of vision and removes the disabilities incident to the displacement of the region of accommodation. Even in irregular astigmatism a part of the refractive defect may often be corrected by means of some form of cylindrical lens, with corresponding improvement in the acuteness of vision.

Unequal refraction in the two eyes—*anisometropia* (from *ἀνισος*, unequal, *μέτρον*, measure, and *ὄψ*, eye)—may give rise to certain complications growing out of the close connection between accommodation and convergence. Moreover, as the accommodation is sensibly equal in the two eyes, the same degree of inequality exists in accommodation as in a state of rest, so that the two eyes are never accurately accommodated for the same distance at the same time. In order to see any object clearly, one of the eyes must therefore accommodate accurately for its distance, while the other eye is accommodated for some other distance. Hence one of the retinal images is distinct, while the other is imperfectly defined. This difference in definition is, however, not of very great importance, for, practically, the attention is concentrated upon the clearer image, and the confused details of the other image are disregarded. Both images are, however, utilized in binocular vision, as is shown by the persistence of the binocular faculty of estimating differences of distance and of appreciating the form of solid objects (stereoscopic vision). On theoretical grounds a certain improvement in the acuteness of vision should result from the accurate correction of both eyes by means of glasses of different foci, and this is actually the fact in the case of lesser differences in refraction, but in cases of great difference, equalizing glasses are not always readily accepted. A person with one emmetropic eye of normal visual acuteness will not ordinarily accept glasses for the sole purpose of remedying a defect of which he is perhaps unconscious and which causes him no inconvenience; and, similarly, many persons with ametropia of a differ-

ent grade in the two eyes will rest satisfied with glasses of equal foci, which leave the existing refractive difference unchanged. Hence it is, as a general rule, unnecessary to give glasses for an uncomplicated refractive error of one eye, and, in cases of unequal defect in the two eyes, it is often sufficient to prescribe glasses of equal foci, selected with reference to the condition of the eye which is habitually in use.

The complications which may make it necessary to prescribe glasses of different foci in anisometropia occur chiefly in cases of myopia of one eye, or of myopia of a different grade in the two eyes. In myopia of one eye, with emmetropia or moderate hypermetropia of the other,* the myopic eye is ordinarily used in reading, and the emmetropic or hypermetropic eye in distant vision. Such a person may suffer from muscular asthenopia or insufficiency of the recti interni, as a consequence of the habitual relaxation of the accommodation in reading, or from injurious tension of the accommodation, with a tendency to progressive increase of the grade of myopia, incident to the habit of converging accurately for the reading distance. In such cases it is generally best to correct the myopic eye by means of a suitable concave glass, and to prescribe for the other eye either a plane glass or a convex glass suited to the grade of its hypermetropia. In myopia of a different grade in the two eyes it is the rule to correct the less myopic eye for distance, and to give either the same glass, or one of shorter focus, to the more myopic eye, as may be found most satisfactory upon trial. If the difference in the refraction of the two eyes is large (two dioptres or more), a partial correction of the more myopic eye may be preferred in the beginning, and the full correction may be accepted after the lapse of a few weeks or months.

Aphakia (from *α*, privative, and *φακός* = *lens*, a lentil) is the condition in which the crystalline lens is either wholly wanting or is so displaced that it no longer lies in the axis of the eyeball. The focal length of the crystalline lens, within the eye, is estimated at 43.7 mm., representing a refractive power of about 23 D. The aphakial eye has therefore sustained a loss of refractive power equal to about 23 dioptres, besides the loss of its entire accommodation. In correcting aphakia by means of a convex glass, the position of the glass (about half an inch in front of the cornea) is much more advantageous than that of the crystalline lens which it replaces, so that a glass of ten or eleven dioptres is sufficient, in most cases, to make good the refractive deficiency. The retinal image is also enlarged by about one-third, in consequence of the change in the position of the nodal point. A certain degree of accommodative adjustment, with additional enlargement of the retinal image, may be obtained by holding the glass farther from the eye, but as the distance at which the glass can be easily held is limited to the length of the nose, it is too small to admit of the necessary adjustment for reading. Hence two glasses are generally required, a weaker glass, of ten or eleven dioptres, for distant vision, and a stronger glass, of say thirteen to fifteen dioptres, for reading. If the aphakial eye is of hypermetropic construction, proportionally stronger glasses, and if of myopic construction, proportionally weaker glasses, are required. In aphakia of one eye, with normal visual acuteness of the other eye, it is impossible, by any glass, to make the retinal images equal in size in the two eyes, yet even with this drawback the correction of the aphakial eye is generally accepted by young persons, with the very great advantage of helping to keep the eye in use, and so opposing the not infrequent tendency to drift into a position of divergent (or more rarely of convergent) strabismus. An aphakial eye, even when uncorrected, generally takes some part in binocular vision, and is of use by enlarging the general field of vision, and also by assisting in the estimation of distances. A considerable grade of astigmatism is frequently present in aphakia, which may be due either to original asym-

* The name *antimetropia* has been proposed for the particular form of anisometropia in which one eye is hypermetropic and the other myopic.

metry of the cornea or to an acquired asymmetry incident to the healing of a corneal wound or of the incision in the operation for the extraction of cataract. Low grades of astigmatism are often overcome by looking obliquely through the strong convex glasses worn to correct the aphakial condition; higher grades may require correction by a spherico-cylindrical or toric lens. (See *Astigmatism*.)

DISORDERS OF ACCOMMODATION may occur as a result either of an abnormal condition of the special organ of accommodation, the crystalline lens, or of disordered innervation.

The progressive hardening of the crystalline lens, which has already begun in youth, and which goes on probably throughout the entire duration of life, becomes, after middle life, an insurmountable obstacle to such change in the form of the lens as is essential to perfect accommodation for the usual reading distance. (See *Presbyopia*.) Only in myopia is there an apparent exception to this statement, owing to the fact that the far point (*r*) often lies so near to the eye as to bring it within the ordinary reading distance of 30 cm. (12 inches). In such cases the myope never becomes presbyopic in the sense of being unable to read without the aid of convex glasses; but whereas in youth he reads easily with the concave glasses which accurately correct his myopia, he is compelled, with advancing age, either to lay aside his glasses in reading or to exchange them for weaker concave glasses than those through which he sees well at a distance. In hypermetropia, on the other hand, the loss of accommodation shows itself by an early recession of the near point (*p*), so that help is sought from convex glasses, perhaps long before the usual age of from forty to forty-five years. The young hypermetrope, wearing convex glasses which correct his hypermetropia, is able both to see at a distance and to read, and it is only at the age of about forty-five years that he finds himself compelled to exchange these glasses for stronger reading glasses. Under no circumstances can a presbyope see clearly at a distance and read easily with the same glasses. Either he is an emmetrope, in which case he requires convex glasses for reading, but none for distant vision; or he is a myope, and so requires concave glasses for distance, and weaker concave glasses, or no glasses at all, or possibly even weak convex glasses, for reading; or he is a hypermetrope, and so sees distinctly at a distance with neutralizing convex glasses, but requires stronger convex glasses for reading.

Paralysis or paresis of accommodation from defective innervation may be the result of an affection implicating the terminal branches of the ciliary nerves, or any part of the nervous tract between these and the central origins of the oculomotor nerve in the ganglia and cortex of the brain. It is accompanied by dilatation and loss of mobility of the pupil, and in many cases also by paralysis or paresis of one or more of the muscles supplied by the oculomotor nerve, namely, the levator palpebrae superioris, the rectus superior, the rectus inferior, the rectus internus, and the obliquus inferior.

A typical example of paralysis of accommodation dependent on impairment of the function of the terminal branches of the ciliary nerves is that which follows the instillation of a mydriatic solution into the conjunctival sac. Within fifteen minutes after the instillation of a drop of a solution of atropia sulphate of a strength of one per cent. (1:100), the pupil begins to dilate, and within half an hour the dilatation reaches its maximum, and the pupil no longer contracts under the stimulus of strong light. Closely following the dilatation of the pupil, the near point (*p*) begins to recede rapidly from the eye, and the paralysis of accommodation is complete at the end of about an hour and a half. The dilatation of the pupil and the paralysis of accommodation continue without sensible change for about two days, after which both begin to pass away, the former very gradually, the latter more rapidly for two or three days and afterward more slowly, until at the end of ten or twelve days the effect of the drug disappears altogether. The effect of very

weak solutions of atropia, say of a strength of one one-hundredth of one per cent. (1:10,000), is to dilate the pupil in the course of an hour and a half or two hours, but without rendering it immovable under the influence of strong light, and without greatly affecting the accommodation. Under the action of atropia the near point (*p*) recedes from the eye until it comes to coincide with the far point (*r*). Hence the visual disturbance varies very conspicuously according to the refractive condition of the eye. In emmetropia distant vision remains clear, but accommodation for the near is rendered impossible; in hypermetropia vision becomes indistinct for the distance, and still more so for the near; while in myopia of a rather high grade there may be no trouble in reading, and the loss of accommodation, within the narrow limit of distance between the far point and the near point, may give rise to little inconvenience or may even pass unnoticed. To the hypermetrope or myope wearing glasses which correct his refractive defect the visual disturbance is the same as in emmetropia. Several other plants, belonging mostly to the natural family *Solanaceae*, yield alkaloids whose action is nearly identical with that of atropia; cocaine also, the active principle of *erythroxylon coca*, has the property of dilating the pupil, with a minimum effect on the accommodation. Euphthalmine hydrochlorate, a synthetic product lately introduced in ophthalmic practice, has mydriatic properties similar to those of cocaine.

Concussion of the eyeball is sometimes followed by weakening or loss of the accommodation, conjoined with dilatation of the pupil. This condition may soon pass away, or it may be permanent.

Diphtheria is often followed by paresis of accommodation, with enlargement of the pupils. It occurs, as a rule, after recovery from the throat affection, and has ordinarily a duration of several weeks. It is generally associated with paresis of the palatine muscles, giving rise to characteristic alteration of the speech, and difficulty of swallowing liquids. The external muscles of the eye may also be affected, and cases of true convergent strabismus have been observed as a result of excessive efforts to accommodate in the weakened condition of the accommodation. The symptoms of paresis of accommodation following diphtheria are essentially the same as in asthenopia resulting from the overloading of the accommodation in hypermetropia, and the use of convex glasses is often indicated as an aid in reading during the continuance of the disability; the instillation of a drop of a weak solution of pilocarpine, two or three times a day, is also of utility in many cases.

Pressure upon the ciliary nerves, from intra-orbital hemorrhage, inflammatory exudation, tumor, etc., may give rise to loss of accommodation and dilatation of the pupil, without affecting the function of any of the external muscles of the eyeball.

In lesions affecting the conductivity of the oculomotor nerve, the accommodative disturbance and dilatation of the pupil are accompanied by paralysis of the levator muscle of the upper lid (ptosis), of the recti muscles (excepting the abducens), and of the inferior oblique muscle.

Mydriasis, with loss of accommodation, may occur as a symptom of intracranial disturbance, affecting the central origins of the oculomotor nerve. Such disturbance may be the result of a pathological process (syphilis, embolism, etc.), in which case it is apt to be associated with paralysis of one or more of the external muscles of the eyeball.

Exposure to sudden changes of temperature is sometimes followed by paralysis of one or more of the motor nerves of the eye or of the eyelid. These cases, which are often designated as rheumatic, end frequently in perfect recovery after some days or weeks; in other instances they prove rebellious to all treatment.

The constitutional effect of an overdose of any one of the common mydriatic drugs (belladonna, datura, hyoscyamus, duboisia), administered by the stomach or hypodermically, is marked by conspicuous dilatation of the

pupils, with loss of accommodation. If the patient survives the toxic influence, these symptoms disappear after a short time.

True spasm of accommodation, as distinguished from the condition of accommodative tension already noticed in connection with ametropia, is of comparatively rare occurrence, and is a result of irritation of the ciliary nerves or the oculomotor nerve centres. It is associated with contraction of the pupil, and is the exact opposite of accommodative paralysis with mydriasis. Certain drugs (*myotics*), instilled into the conjunctival sac, have the property of evoking accommodative spasm with contraction of the pupil. A single drop of a solution of eserine sulphate (the active alkaloid of Calabar bean), of the strength of one-half of one per cent. (1:200), brings on contraction of the pupil and spasm of accommodation, which begin nearly simultaneously within about ten minutes, and reach a maximum in from thirty to forty minutes. After about two hours, the far point (*r*), which at the height of the action of the drug is not over 20 cm. (eight inches) from the eye, is found to have receded to its normal position (infinity in the emmetrope eye); but the near point, in voluntary accommodation, is considerably nearer than normal after the lapse of six hours, showing a temporary increase in the range of accommodation. The contraction of the pupil begins to diminish after about two hours, at first slowly, then more rapidly for about four hours more, and afterward slowly until, at the end of two days, the pupil has nearly or quite regained its normal diameter. With a weaker solution of eserine the spasm of accommodation is much less than with the half-per-cent. solution, and is painless; with the stronger solution the action is accompanied by a sensation of spasmodic jerking, with some pain. Pilocarpine, the active alkaloid of jaborandi, is much milder in its action than eserine, but is nevertheless an efficient myotic, and exerts also a very positive effect in stimulating the accommodation.

Contraction of the pupil is frequently observed in central nervous affections, and notably in tabes dorsalis. Myosis, with spasm of the accommodation, follows also the administration of large doses of eserine, opium, and some other drugs, internally. The internal or hypodermic use of pilocarpine does not produce contraction of the pupil or spasm of accommodation.

Irritation of the fifth cranial nerve (ophthalmic division) is followed by contraction of the pupil, and the same phenomenon may attend irritation of the terminal branches of this nerve in the cornea. Myosis from this cause may also be attended with spasm of accommodation.

John Green.

ACEPHALUS. See *Teratology.*

ACETABULUM, FRACTURES OF, may be divided into compound and subcutaneous, or, as regards their causation, into direct and indirect. The hip joint is so deeply situated and so efficiently protected by the surrounding bony projections and soft tissues against direct violence that fractures produced in this manner almost invariably belong to the compound variety, and in the great majority of cases they are the result of gunshot injuries. Gunshot wounds of the hip joint, with or without fracture of the acetabulum, have always been considered by surgeons as formidable and dangerous lesions. Pirogoff made the statement that during the Crimean War all injuries of this kind proved fatal. During the War of the Rebellion nearly all cases of gunshot injuries of the hip-joint treated on the conservative plan resulted in death. Of 63 cases of similar injury in which resection was performed, only 5 recovered. In his classical treatise on this subject, B. von Langenbeck collected 119 cases which occurred during the Franco-Prussian War, with 29 recoveries; 88 were treated on the expectant plan, with 25 recoveries; 31 were submitted to excision, with 4 recoveries.

The acetabulum may be fractured without injury of the head or neck of the femur, as the bullet may impinge

upon the floor of the acetabulum, from within the pelvis, with sufficient force to break the bone, producing a fissure or stellate fracture of its base, or it may, in its course, carry away the rim of the cotyloid cavity. An exceedingly interesting case, illustrating the latter assertion, is reported by Dr. J. F. Miner, of Buffalo (*Buffalo Med. and Surg. Journal*, vol. v., p. 383). Lieut.-Col. James Strong, of the Thirty-eighth New York Volunteers, was wounded, May 5, 1862, at the battle of Williamsburg, Va. The ball entered a little below the anterior superior spinous process of the ilium, and made its exit near the outer margin of the sacrum. The ball passed deeply, and fractured, in its course, the rim of the acetabulum, which was removed, an inch and a half in length, and of a diameter sufficient to show that the whole upper rim had been carried away. This fragment of bone was removed from the wound at the dressing made in the hospital to which he was carried, after having lain on the field for some hours. The wound was very large, and a thorough examination could be made by the easy passage of the finger. The patient passed through a serious and prolonged illness from the suppuration and hectic fever which followed, but finally recovered, with five inches shortening of the limb, inward rotation of the foot, and bony ankylosis between the dislocated thigh bone and the ilium. The points of entrance and exit of the projectile furnish valuable information in regard to the probable injury of the acetabulum in gunshot fractures of the hip joint. In the case here reported, the ball entered just below the anterior superior spinous process of the ilium, and passed out near the margin of the sacrum, leaving intact the head of the femur, but opening the hip joint by carrying away the superior and posterior margin of the rim, thus permitting the subsequent dorsal dislocation of the head of the femur by muscular force. B. von Langenbeck states that, in case the ball enters directly below and toward the outer side of the spine of the pubes, and takes its exit in the region behind the greater trochanter of the same side, as a rule it penetrates the hip joint; and, at the same time, it fractures in its course the upper rim of the acetabulum. Escape of synovial fluid, swelling in the region of the hip joint from extravasation of blood or the products of inflammation, preternatural motion in the joint, crepitation, and dislocation of the head of the femur spontaneously or on manipulation, are other important diagnostic symptoms. The most important information regarding the exact nature of the injury is, however, obtained by enlarging the track of the bullet and rendering the hip-joint accessible to touch and sight. This procedure, done under antiseptic precautions, not only affords an opportunity to ascertain the true nature and gravity of the injury, but it is imperatively called for as the first and most important step in the treatment. All foreign bodies and detached pieces of bone should be removed, all hemorrhage carefully arrested, and the whole injured surface and surrounding parts thoroughly disinfected; effective drainage should be established, and every possible source of infection guarded against by dressing the wound antiseptically. All these measures are essential, as the success of the operation and the life of the patient depend on procuring and maintaining an aseptic condition of the wound. The leading principle in the treatment should be, from the very beginning, to convert the compound into a simple fracture, and thus protect the patient against the disastrous consequences of traumatic infection, exhausting suppuration, pyemia, and septicæmia.

Subcutaneous or simple fractures are again divided into those which involve the floor and those which involve the rim of the acetabulum. This division rests on clinical experience as well as on the results of experimental research. Fractures of the base or floor of the acetabulum, notwithstanding their rare occurrence, yet present a great diversity in the direction and extent of the line of fracture. Courant observed a fracture which traversed the ilio-pectineal tubercle, the entire acetabulum, and the ischium. Earle and Travers describe two cases in which two lines of fracture passed through the

acetabulum; Neill and Sansom saw cases with three lines of fracture which extended beyond the rim. In Dr. Neill's specimen the lines of fracture followed those of the embryonal division of the bone; the union which followed was complete, and there was very little callus on the articular surface, a circumstance undoubtedly due to the slight displacement of the fragments. More serious to the life of the patient and the future utility of the limb are those cases in which a multiple fracture at the base exists with such wide separation between the fragments as to allow the head of the femur to be driven into the pelvis by the fracturing force, thereby producing an intrapelvic dislocation of the thigh. A number of such cases have been reported. Astley Cooper alludes to three cases. In two of these the thigh was rotated inward, in the third case the leg and thigh were supinated. Mr. Moore's case demonstrates the possibility and manner of repair in these cases (*Medico-Chir. Transactions*, vol. xxxiv., p. 107). A man suffered a severe injury of the hip, which was diagnosed and treated for fracture of the femoral neck. The thigh was not inverted or everted, only slightly flexed and adducted. The man recovered, and several years afterward died from other causes, when an autopsy revealed that the injury had been a fracture of the os pubis, ilium, and acetabulum, which allowed the head of the femur to pass through into the pelvis, the trochanter resting against the acetabulum. Similar cases have been reported by Kendrick and Morel-Lavellée. In all cases of fracture at the base of the acetabulum, without displacement of the head of the femur, the diagnosis usually remains doubtful. Main reliance must be placed on the manner in which the injury was inflicted, the intensity of the force applied, and the location of the pain. Accurate measurement will always furnish important negative evidence. In case of intrapelvic dislocation of the head of the femur through the fractured base of the acetabulum, the shortening of the limb and the approximation of the trochanter major toward the pelvis will be proportionate to the degree of penetration of the head and neck into the pelvis; rotation of the limb will not be practicable; flexion and extension will be found to be either impaired or rendered impossible; and at the same time the head of the femur may be felt within the pelvis on making a digital examination through the rectum. In the adoption of therapeutic measures it is necessary to ascertain the degree of impairment of the functional capacity of the acetabulum. If the head of the femur is retained firmly in its normal position the fracture will unite promptly and firmly without any special retentive measures. Rest in bed with the thigh slightly flexed and resting upon pillows will be sufficient to fulfil the local indications. If the pelvic ring is more extensively fractured, a plaster-of-Paris splint including the pelvis, both thighs, and the entire leg on the affected side, or Verity's suspension splint, will prove most efficient in securing immobility of the fragments, and will afford the greatest amount of comfort to the patient. When the base of the acetabulum has been perforated by the head of the femur it is of paramount importance to replace the dislocated bone and retain it *in situ* by a plaster-of-Paris dressing, or by applying extension by weight and pulley, as advised by Hueter, until the opening is closed by callus or connective tissue which will definitely prevent redislocation.

FRACTURE OF THE RIM OF THE ACETABULUM.—A number of well-authenticated cases of this accident have been reported, so that no further doubt can exist that some portions of the rim can be fractured without further injury to the acetabulum. Some years ago the writer collected from various sources twenty-seven cases of this kind of fracture, all of them supported by an accurate clinical history, some having been cases verified by a post-mortem examination. Dr. H. O. Walker, of Detroit, has in his possession a typical specimen of this kind, an illustration of which is here inserted (*Detroit Lancet*, July, 1879). In the text-books on surgery this subject is usually referred to under the head of complicated dislocations of the head of the femur. As this fracture usually in-

volves the upper and posterior portion of the rim, the resistance to the head of the femur in that direction is lost, and as a result—either with the concurrent aid of some extraneous force, or even without such aid, simply by the force of muscular contraction—a dorsal dislocation of the thigh takes place, with adduction, flexion, and rotation of the thigh inward. The difficulty experienced in retaining the head of the femur in the acetabulum under these circumstances, as well as the obscurity of the diagnosis, imparts to this subject an unusual amount of interest. The older works on surgery mention direct and great violence as the only cause of fracture of the acetabulum; indeed, until more recently, it had been considered impossible for a fracture of the rim to take place without more extensive injury to the ilium. When the fracturing force is applied over the centre of the trochanter major, in the direction of the neck of the femur, the head of the bone is driven directly against the socket, and a stellate or perforating fracture of the base of the acetabulum is the result, according to the amount of violence applied; but if the force is applied in such a manner that it first rotates the femur outward or inward, then one margin of the acetabulum acts as a fulcrum to the neck, and the head is forced against the opposite side, and a linear fracture through the acetabulum, or a fracture of the rim, takes place. In such cases, the traction of the capsular ligament assists the head of the femur in producing the fracture of the rim, but independently of other causes such traction is insufficient to produce the injury. When the force is applied to the posterior part of the pelvis, the pelvis becomes the movable point, and the foot, if the leg is extended, or more frequently the knee, becomes the fixed point, and furnishes the necessary amount of resistance. These assertions have been verified by the writer by numerous experiments on the cadaver. At the moment the injury is received, it is essential for the thigh to be *abducted*, as adduction would favor a dislocation by the head of the femur gliding over the inclined plane of the internal surface of the acetabulum. The pelvis may be the fixed point, and the force may be transmitted through the femur by a blow or fall upon the knee. In most instances in which this accident occurred, the thigh was more or less flexed at the time of injury; hence, in the majority of cases, the upper and posterior segment of the rim was fractured, and the head of the femur dislocated into the upper sciatic notch or upon the dorsum ilii. Of the twenty-seven cases of fracture of the rim of the acetabulum, the extremes of the ages were eighteen and seventy-eight years, so that most of these cases occurred during the time of life when the individual is most exposed to grave injuries. It is also well to remember that, in young persons, dislocation and diastasis occur in preference to fracture, while in the aged, the altered position of the neck of the femur, as well as the increased fragility of its tissue, is a potent predisposing cause of fracture of the femoral neck.

The symptoms presented by a case of fracture of the rim of the acetabulum are those of dislocation and fracture combined; the symptoms of the former resemble ordinary dislocation, while those of the latter are directly referable to the broken bone itself. A certain degree of displacement of the head of the femur was present in all cases in which a diagnosis was made during life. Benjamin Travers believed that in some cases of fracture of the rim of the acetabulum the displacement takes place gradually some time after the injury has been received, but it is more probable that these were cases such as have been described by Hueter as inflammatory dilatation of the

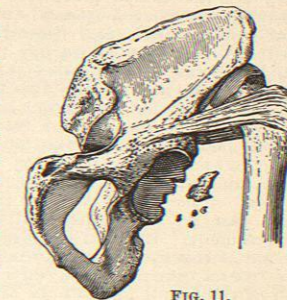


FIG. 11.