

despondency, an inclination to melancholia, and aberration of reflexes, an error in diagnosis need not occur.

**PROGNOSIS.**—The prognosis will depend upon the severity of the disease and the extent to which it has advanced. During the first attack the prognosis may be said to be favorable, provided the patient can obtain suitable nourishment, and provided the impairment of the digestive functions be not sufficiently grave to interfere with normal nutrition. On the other hand, after the disease has existed one or more years and general impairment of nutrition becomes more marked, together with involvement of the nerve centres, the prognosis is always extremely grave. When the disease goes unchecked the final fatal termination may be expected in from three to twelve years, the average being about five. In all cases the prognosis will depend upon the ability of the patient to place himself under the most favorable conditions for recovery.

**TREATMENT.**—There are no drug specifics in the treatment of pellagra, and regulation of the diet should be the first consideration. In conjunction with this, proper attention should be paid to the digestive tract, which may require sedatives or soothing medicines, such as olive oil or albolene, together with opium, bismuth, etc. The food selected should be light and easy of digestion, and it should be given in small quantities at frequent intervals according to the strength and general condition of the patient. Milk, eggs, and meat broth are usually indicated in severe cases, and as the strength increases a meat diet with vegetables and bread obtained from well-ripened grain should be given. Next in importance to the diet are the hygienic surroundings of the patient. As has been shown, most cases occur among those who have been subjected to the vilest hygienic conditions; therefore it should be seen that the room occupied by the patient be sufficiently large to insure pure air together with free ventilation; dampness should be avoided by selecting a room to which the sun gains access at least during some portion of the day. Massage and rubbing with salt may be of benefit. By way of further medication, after the more pressing symptoms have been allayed, tonics and vegetable bitters, such as quinine and iron, together with cod-liver oil, should be prescribed. In some cases the administration of arsenic is followed by marked improvement. The cases in which this remedy is most liable to prove beneficial are those which have extended over several years and in which the disease has assumed a chronic stage. To quiet the apprehension of the patient, especially when the nervous manifestations assume a serious aspect, opium may be given.

William Thomas Corlett.

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**PELLITORY.**—*Pyrethrum*, U. S. P.; *Pyrethri radix*, Br. P.; *Spanish Pellitory*; *Spanish Chamomile*. The dried root of *Anacyclus Pyrethrum* (L.) DC. (*Anthemis P.* [L.] fam. *Compositae*.)

The pellitory plant is a pretty little perennial herb, which somewhat resembles the chamomile, whence one of its common names. It is a native of the Mediterranean basin, where it is cultivated not only as a drug, but also as a garden flower.

From 5 to 12 cm. (2 to 5 in.) long and 1 to 2 cm. ( $\frac{3}{8}$ – $\frac{1}{2}$  in.) thick, nearly straight and unbranched, cylindraceous, tapering or slightly fusiform, bearing a few tough, hair-like, yellowish rootlets and in the centre of the crown usually a tuft of cottony or silky, whitish, fibrous tissue; externally deep brown, or slightly grayish-brown, inconspicuously annular near the crown, very roughly wrinkled and pitted, harsh to the touch; fracture short and sharp; bark thick, the inner layer brown, containing about three

circles of dark red resin cells, the outer layer dark brown; wood yellow-brown, finely radiate, containing four or more circles of resin cells; inodorous, pungent, and acrid, producing a prompt and strong sialagogue effect.

The acidity of pellitory is due to a number of constituents, or possibly to some one which is carried in the former. These are a resin and two fixed oils, all present in large amount, as well as the alkaloid *pyrethrine*. The latter is readily decomposed into a derivative alkaloid, believed to be piperidine, and piperic acid. The resin contains a small amount of the alcohol-soluble body, *pellitorin*. The substance which has been sold as "pyrethrin" is merely a fatty and resinous extract. Tannin and volatile oil are present in small, and inulin in large amount.

**ACTION AND USE.**—These have been but little investigated, notwithstanding that the powerfully active properties of the drug warrant a thorough experimental study. It is one of the most powerful of sialagogues, a property which we have not yet learned to utilize, in spite of the important digestive functions of the saliva. It is at least possible that so powerful an action upon the salivary glands is associated with a similar action upon the pancreas, but no observations are recorded upon this point. The most general application of the drug is as a dental anesthetic and counter-irritant, and it enters into numerous "toothache drops" which have themselves largely gone out of use. There is a twenty-per-cent. official tincture, made with alcohol, the dose of which is a fluidrachm.

**ALLIED DRUG.**—*German pellitory* or *pyrethrum* is the root of *A. officinarum* Hayne, the nativity of which is not certainly known, but which is a product of cultivation. The root is very much more slender and elongated than the other, and usually comes to market with long portions of the stem attached. It has a circle of large resin cells in the bark, but there are none in the medullary rays. Its constituents and action are practically identical with those of the official variety.

Henry H. Rusby.

**PELVES, DEFORMED.**—Any marked deviation in size or symmetry from the normal pelvis may be regarded as constituting a deformity of the pelvis, whether the effect on the course of labor be serious or not.

A deformed pelvis may be due to an error in development, to local disease, injury, or new growth, or indirectly to injury, disease, or maldevelopment of the adjoining skeleton. Thus from errors in development there are the abnormally large pelvis, called *justo-major*; the *justo-minor*, or disproportionately small, sometimes of a persisting infantile type; and the pelvis of the masculine type, large and thick-boned, but with a narrowed pubic arch and pelvic outlet.

From local errors in development there are the rare varieties, where one or both of the sacral ala are lacking, giving the *Naegle* (oblique) or *Robert* (transversely contracted) pelvis. The split pelvis is one in which there is failure of meeting of the pubic bones at the symphysis.

From constitutional disease or errors of nutrition causing softening of the bones, there result the pelvis deformed by rachitis and osteomalacia. From local disease there may be caries of some of the pelvic joints, with arrest of development and later ankylosis. The sacro-iliac joints, if diseased in early life, may cause extreme deformity. Following injuries there may be pelvic fracture with formation of callus. New growths may limit or obliterate the pelvic cavity—a primary sarcoma or secondary carcinoma, or some form of enchondroma or exostosis.

Any injury or maldevelopment of parts of the skeleton adjoining the pelvis, especially during early life, may have an important bearing upon the subsequent developments of the pelvis, and leave indirectly its stamp on the general contour of the latter. Thus, for example, poliomyelitis, causing a paralysis and subsequent atrophy of one limb, leaves the pelvis on that side comparatively

undeveloped. As a further result of the shortening of the limb there must be compensatory scoliosis, with its effect upon pelvic growth.

Other forms of paralysis of the lower extremities, or joint diseases of hip, knee, or ankle, may affect the pelvis in the same way. A congenital hip-joint dislocation may

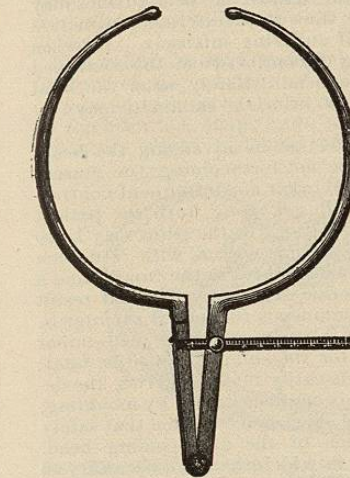


FIG. 3753.—Baudelocque's Pelvimeter.

seriously affect the normal growth of the pelvis. Other results of skeletal deformity upon the pelvis are not infrequently seen from defects in the spinal column, such as simple, compensatory, or rachitic scoliosis, caries of the vertebrae, and, rarely, the anterior dislocation of the bodies of the lumbar vertebrae, known as *spondylolisthesis*. Senile changes in the pelvis before the end of the child-bearing period sometimes cause obstruction by ankylosis of the coccyx with the sacrum.

Habits of living must always be counted upon as etiological factors. The poorly nourished and poorly housed are the ones who present pelvis deformed from rachitis and tuberculous. For this reason the percentage of deformities is small among our native country classes, large among the dwellers in cities, especially of the slums, and greatest among the immigrant population. Abroad, where the sanitary conditions of life are worse, still higher proportions of deformity are found, and osteomalacia is occasionally met with.

There are racial peculiarities in the shapes of the pelvic brim. The Caucasian normal type is one which is wide transversely; the outline of the Australian pelvic brim is almost circular; while the African pelvic brim is one which is relatively constricted transversely, and has a long antero-posterior diameter. This type of pelvis, if affected by the unsanitary conditions in which the negroes commonly live in this country in cities, supplies a large proportion of bad pelvic deformities. Thus one author has reported seven per cent. of deformed pelvis in whites in a city hospital service, as against twenty-one per cent. in blacks.

The recognition of the deformity is important. One "must learn pelvimetry if he is to do intelligent obstetrics." Much can be ascertained by inspection of the patient. The facial appearance, form, carriage, height, gait, or obvious deformities of spine or lower extremities may lead to suspicions and put one on the track of a pelvic defect. A careful questioning may elicit a history of diseases such as rachitis or tuberculous bone disease, or bring out information concerning previous difficult labors.

But the history may be lacking, and all external appearance of deformity absent. Moreover, in all cases, no matter how obvious the deformity, its true extent and its obstetric significance can be ascertained only by careful pelvimetry, through palpation, vaginal examination, and instrumental pelvic measurements. External measurements, except in some cases of great obesity, are of a certain value in determining the types of deviation from the normal. Of greater importance is the exploration by vaginal examination of the pelvic cavity.

For external measurements there have been chosen certain easily recognized bony landmarks. The distance between these points is taken by a form of caliper called the pelvimeter. Of the commoner types perhaps those of

Baudelocque and Breisky are best known. The essentials of a good pelvimeter are compact size and an accurate and legible scale, preferably in centimetres.

The first measurement usually taken is the distance between the anterior superior spines. For this measurement the patient should be flat on the back, with all but the thinnest clothing removed from about the hips and lower abdomen. The thumb and forefinger should steady each tip of the pelvimeter. The thumb should now be allowed to rest in the notch below the spines and the tips of the pelvimeter be lightly pressed against their outer side and the reading made. Taken in this way the measurements will be fairly constant when made by different individuals. The average interspinal diameter is 24 cm.

The next measurement should be the distance between the crests of the ilia, this measurement being made between the points which are most widely separated. The patient lying in the same position, the tips of the pelvimeter are slipped back along the outside edge of the crests, and the widest points of divergence noted and measured. This is called the *intercrystal* measurement. It should average about 28 cm. These two distances furnish an indication of the transverse diameter of the pelvic brim, especially if taken in consideration with the so-called external oblique measurements.

The ratio of the interspinal measurements to the intercrystal has a distinct value in the study of certain types of deformity, especially the rachitic.

The external oblique measurements are those taken from one posterior superior spine to the opposite anterior superior spine. To take the left oblique measurement the doctor stands on the right of the patient, who lies on her left side. The distance from the left posterior superior spine to the tip of the right anterior superior spine is measured. The posterior spines are not very prominent, but are usually indicated by the presence of a dimple on either side of the sacrum from one and one-half to two inches from the median line. The patient now lies on the right side, and the right oblique measurement is taken. The average length of these measurements is 22 cm. The right oblique is commonly 0.5 cm. larger than the left. The obliques furnish a fair idea of the oblique diameters of the pelvic brim. Any marked deviation of their normal relation to each other is a good index to oblique pelvic contraction.

For estimation of the antero-posterior diameter, or so-called conjugate of the pelvic brim, a measurement is taken which is called the external conjugate. This is the distance from the tip of the last lumbar spine to a point about one-quarter of an inch below the upper edge of the pubic symphysis in the median line. Some authorities give the depression just below the last lumbar spine as the posterior landmark, but this gives less constant and exact measurements. The last lumbar spine is usually the most prominent spine in that region. It is found about 2 cm. above the level of a line drawn through the two posterior superior spines. This measurement calls attention to contractions in the antero-posterior diameter of the pelvis. In the normal pelvis it measures from 20 to 21 cm. Any pelvis measuring less than 18 cm., even if *justo-minor*, should be regarded as flat. There are, however, possibilities of error in this measurement. Occasionally a

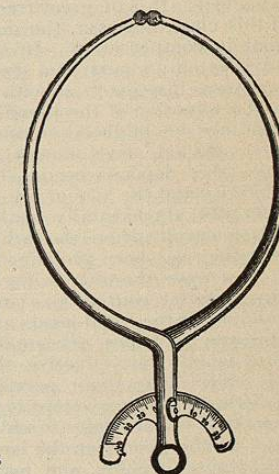


FIG. 3754.—Breisky's Pelvimeter.

pelvis which has an external conjugate of large size will show flattening upon internal pelvimetry.

One other external measurement is sometimes of importance; that is, in the type of pelvis where there is obstruction at the pelvic outlet due to a narrowing of the pubic arch and an approximation of the tuberosities of the ischia. This is called the bi-ischiatic diameter. It is easily taken, while the patient is in the lithotomy position. The tuberosities may be readily felt, and the distance between them taken by tape measure or pelvimeter. If the distance be below 9 cm. the narrowing is dangerous.

The most valuable information is furnished the physician by vaginal examination. After he has acquired some experience he will be able to make out variations in the size of the cavity of the pelvis. If he can readily with the finger touch the sacral promontory, flattening is certain. Fairly accurately to estimate the internal conjugate, the first and second fingers of the right hand are introduced until the middle finger rests against the promontory. At the point where the index finger intersects the symphysis a mark is made by the finger nail of the left forefinger. The internal oblique conjugate is the distance between this mark and the tip of the middle finger. Subject to slight variations the true internal conjugate may be estimated by the subtraction of 1.5 cm. from these figures. The normal internal conjugate is 11 cm. Any conjugate below 10 cm. indicates a dangerously flattened pelvis.

Of the various types of deformities which are perhaps most commonly seen are the pelves of normal symmetry but of extremes of size. The justo-major pelves are those of exaggerated size. They occur usually in women of robust type, who have an otherwise large frame. These women are often tall, but they may be of normal stature. The effect of such a pelvis upon labor is slight. Certain authors suggest that from the lack of bony resistance there is a tendency to precipitate labors and resulting lacerations. There may be an increased proportion of uterine displacements from lack of bony support. The practical obstetrician may disregard this deformity. The diagnosis of this condition may be made in those cases in which the oblique diameters measure 24 cm. or more.

The justo-minor or equally contracted pelvis is of more serious moment. It is usually found in smaller women, but may occur in women of otherwise normal development. It may be classified as one of symmetrical shape, but with external obliques measuring 20 cm. or less. The etiology of this condition cannot always be explained. It is of great frequency in the African race. In this class, however, the deeper conjugate acts somewhat in compensation. In some cases the justo-minor pelvis is only a part of a dwarfed general system. In some cases it seems to go with under-developed pelvic organs, a retention of the juvenile type. Unfavorable surroundings in childhood or during intra-uterine life may have affected development unfavorably. The effect upon labor depends necessarily upon the degree of the deformity and the size of the child's head. In those patients who are naturally small the child will be in proportion, except where the father is of large size or where pregnancy has been prolonged beyond the normal time. In these cases the only safety for the child depends on strong uterine contractions and a capacity for extreme moulding of the foetal head. In the African race, as the foetal cranial bones are notably soft, and the uterine pains usually very effective, the head moulds extremely well. The justo-minor pelvis, therefore, in the negro has little significance except in those cases in which some other kind of deformity is added to the general contraction. In the Caucasian the larger and firmer head of the foetus causes trouble, and may necessitate very active interference.

The mechanism of the labor in the justo-minor pelves is as follows: The head, unable to engage by moderate flexion, becomes more and more flexed until the occipital bone presents. The external occipital protuberance may be felt. Engaging in one oblique the head gradually de-

scends, under the influence of strong pains. The overlapping of bone at the lambdoidal sutures is an index of the amount of moulding accomplished. If the obstruction is so moderate that the pains can accomplish the delivery, after a rather protracted second stage the head reaches the pelvic outlet. Obstruction occurs until the head is well past the mid-pelvis. During this time the suffering from the pressure against the pelvic bones may be very severe. At the time of the uterine contraction the patient cries out as if suffering intensely. Between the pains there is aching discomfort from the continued pressure of the impacted head. Rarely, after the head has safely passed the pelvic brim, the shoulders may furnish some obstruction.

If the pains are not effectual in advancing the head, and artificial assistance be not forthcoming, the muscular force may diminish. Weaker and infrequent contractions may cause labor to linger along until the patient suffers from extreme prostration; or the pains may be so severe as soon to develop a tonic uterus, with retraction and migration of the muscular fibres to the fundus and a thinning of the lower uterine segment. The end result of such a case may be spontaneous rupture of the uterus. Should the breech present in a patient with a justo-minor pelvis, the complication for the child is apt to be fatal; for while the body moulds easily into the pelvis, the descent of the head can be accomplished only by moulding, which is impossible in the short space of time that safety permits for the extraction of the after-coming head. There are cases on record in which the force necessary to deliver the head through a justo-minor pelvis has caused a diastasis of one or more of the pelvic joints.

The masculine type of pelvis is most often found in women with large muscular frames. The external measurements may be even justo-major. The bones are unusually thick. The peculiar deformity in this type of case is in the narrowing of the pubic arch. The pelvis may be shallow or deep. In the latter case it is best described as funnel-shaped. The true funnel pelves, however, are more extreme cases than those of the masculine type, and usually occur in connection with some spinal deformity, especially kyphosis.

The diagnosis is an easy one to be overlooked, because of the otherwise large development of the patient. Indeed, in many instances the case is allowed to go on until the obstruction during the second stage of labor calls attention to the deformity. It is upon the vaginal examination that the diagnosis must be based. The pelvic walls are felt to be drawing nearer together as the outlet is approached. At the outlet the approximation of the ischial spines and tuberosities to each other should be recognized, and also the sharper angle of the pubic arch.

In the masculine pelvis labor progresses normally, even to the time of the appearance of the caput in some cases. And then as the head encounters the bony obstruction all progress ceases, or very slowly and by increased expulsive effort the head is moulded past the outlet. The narrowed arch forces the head posteriorly, and, thus increasing the tension upon the perineum, causes a liability to extensive lacerations. These lacerations may involve not only the perineum, but sometimes run up on either side of the vulva, along the line of the pubic rami. Where they extend into the venous plexuses of the vestibule, hemorrhage may be very persistent. From the prolonged pressure various necroses of the vagina or the cervix, or a trauma to the bladder, may be caused.

The pelvic narrowing sometimes causes faulty flexion of the head. The occiput may be forced to rotate posteriorly. Sometimes rotation is so interfered with that the head is born obliquely or even transversely.

The treatment is usually by assistance with low forceps. If this is not sufficient, symphyseotomy may be of especial value in this deformity. But the fact that the prolonged pressure in the second stage may have injured the child beyond hope of recovery must be taken into consideration before any major surgical operation on the mother is undertaken.

The simple flat pelvis is a fairly common type of de-

formity, and one which may have a serious effect on labor. It occurs usually in pelves with measurements otherwise normal. If this deformity be engrafted on a justo-minor pelvis, the consequences are most serious. The cause of this condition is not always plain. A slight degree of rachitis, the carrying of heavy burdens, excessive standing on the feet, prolonged illness in bed in early life may all have some effect. This flattening is most often met with in the lower classes and the foreign born.

The deformity may be anything from a simple jutting forward of the promontory to a marked approximation of sacrum to symphysis, changing the cordiform outline of the brim to a shape more reniform. There is a compensatory slight widening of the pelvic brim trans-

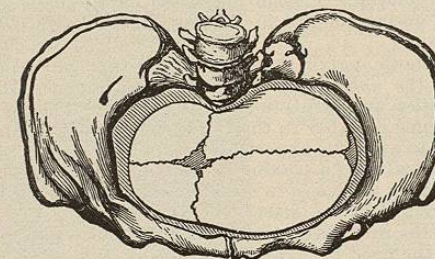


FIG. 3755.—Position Assumed by the Head in a Flat Pelvis. (After Simpson.)

versely. Nothing about the general appearance of the individual in most cases would lead one to suspect the difficulty. The external conjugate in some cases shows no shortening. The internal measurement is therefore of greatest importance. The flattening, if of much significance, will allow the promontory to be easily reached by the examining finger. The extent of the deformity may be readily ascertained by the method suggested above.

If the narrowing be of slight extent, normal spontaneous delivery is possible, but there is a tendency to dry labors and a slight modification of the mechanism. The head engages transversely, poorly flexed, but slightly inclined laterally, so that the anterior parietal bone presents. Occupying the direction of least resistance the occiput slips to one side, thereby causing the bitemporal diameter to engage the conjugate rather than the biparietal. During the time of moulding the woman suffers severely from the pressure of the head against the sacrum.

As soon as the widest part of the head has passed the constriction advance may be rapid. Because of the poor flexion of the head rotation of the occiput to the front occurs late if at all. The head is often born obliquely, sometimes even transversely, or with the occiput still posterior. The shoulders and hips are apt to be born transversely. If much moulding has been necessary, the posterior parietal bone may show a grooving parallel with the coronal suture, caused by the pressure of the head against the promontory. The posterior parietal bone is overlapped by the anterior.

The effects of the flat pelvis upon labor may be only those mentioned above. If the child be small, attention may not be drawn to the deformity. The well-known tendency of women to have larger children in succeeding pregnancies, however, often brings the first manifestation of a flat pelvis in a later pregnancy in a woman who has already had several normal deliveries.

If the deformity be more serious the head engages, but cannot mould sufficiently to pass the brim. After a reasonable length of time artificial assistance must be employed. In the cases of greater flattening no engagement occurs and exhaustion soon supervenes from the futile efforts of the uterus at expulsion. The head rides high above the pelvic brim. The uterus tends to fall forward, causing a pendulous abdomen, which makes the efforts at engagement of the head still more ineffectual.

The flattening, preventing the fitting of the head in the pelvic basin, may cause malpresentations. The lack of adjustment between head and pelvic brim may cause a prolapse of the cord. In the earlier months of pregnancy the projecting promontory may force the uterus into retroflexion and ultimate incarceration in the hollow of the sacrum. Where the head cannot engage or descend into the pelvis the dilatation of the cervix is incomplete because the presenting part does not reach it to cause pressure against it. Instead of the usual meniscus-shaped bag of membranes a cylindrical-shaped bag forms which is ineffectual as a dilator and very prone to early rupture.

The flat pelvis may be the cause of a breech presentation, and when this condition occurs in a pelvis which by measurements other than the conjugate is shown to be ample, the breech labor seems to be the safest. The reason for this is that the after-coming head enters the pelvic canal, with the smallest part of the wedge first. The larger part adjusts itself to the most roomy part of the pelvis. The occiput slips toward one side of the pelvis, and in so doing causes the bitemporal diameter to engage the conjugate, instead of the biparietal, as is usual in vertex cases. The bitemporal diameter has the advantage of being at least 1 cm. smaller than the biparietal. The force which must now be applied from below, by traction on the child, will complete the necessary moulding in the safest possible way.

It is for this reason that the method of delivery by version and breech extraction is often considered and safely employed in a labor case with a flat pelvis.

A kind of pelvis which always shows flattening and yet is quite distinctive in type occurs in those women who have suffered from rachitis in infancy or childhood. The rachitic pelvis shows the effect of various pulling and pressure forces upon the different bones.

The extent of the deformity varies with the severity of the disease and depends somewhat upon the position occupied by the patient during the course of the disease, *i.e.*, whether lying in bed, sitting up, or walking about. One other factor is the arrested general development which occurs at that time.

The weight of the pelvic viscera combined with muscular traction tends to flatten the ilia and to prevent the inward curvature of the crests to the anterior superior spines. In this way the spines are thrown outward. In severe cases the ilia flare to the spines. The intercrural diameter is thus smaller than, or of the same width as, the interspinal. About two-thirds of the way to the posterior spines on the crests there is frequently a sharp angle where the crests turn in toward the spines.

The brim of the pelvis is diminished in the conjugate by the pressure of the weight of the trunk transmitted along the spine to the sacrum, and forcing it down and forward on its transverse diameter. The lower half of the sacrum tends to be thrown backward, but the tip is pulled forward in compensation, in sharp flexion, by the sacro-sciatic ligaments. The sacrum is further changed, so that its anterior surface instead of presenting a concavity from side to side is convex or flat. Sometimes there is a sharp bending backward of the lower part of the sacrum at the juncture of the first and second sacral vertebra, causing the second vertebra to form a false promontory, which in estimating the internal conjugate must be accepted as the working promontory.

There is a widening of the pubic arch from muscular traction on the ischial tuberosities. If the patient be allowed to walk during the disease, there may be some constriction of the pelvis transversely by pressure over the acetabula. In general the size of the pelvis is restricted. The flattening is the worst feature. The pelvic brim presents a reniform outline, with a slightly increased transverse diameter. The pelvic cavity is usually ample and the outlet wide. The symphysis forms a wider angle with the plane of the sacrum. All degrees of deformity are met with.

The diagnosis of the extreme cases is easy. In slighter deformities the history of the patient is of some help—

late walking, late dentition, unhygienic surroundings. There may be evident the square forehead, rickety chest, bowlegs, or any of the rachitic skeletal changes apart from the pelvis. Locally, there is found the



Fig. 3756.—Rachitic Negress Delivered by Caesarean Section at the Sloane Maternity Hospital, New York City. (Service of Dr. Edwin B. Cragin.)

changed ratio of the interspinal to the intercrystal measurements; the easily felt promontory, with perhaps a false promontory at the junction of the first and second lumbar vertebrae; the sacrum convex from side to side; and the wide pubic arch.

The effect of rachitis on labor depends on the extent of the deformity. Even in cases of slight deformity the effective working space of the bony passages is circumscribed. In lesser cases the mechanism may resemble that of a simple flat pelvis. In worse cases a spontaneous delivery or even engagement of the head is impossible.

*Osteomalacia*, or *malacosteon*, is a disease which causes a softening of the pelvic bones by the absorption of the lime salts. It develops during pregnancy or lactation; more usually the latter. The condition is rarely met with in this country. Nothing is known of its etiology other than that it is a disease of nutrition. The softening of the bones, however, is the occasion for an extreme collapse of the pelvic basin. The sacrum and the regions of the acetabula are crowded in so that the pelvic brim is triradiate in shape. This collapse leaves the symphysis projecting like a beak, giving the pelvis the name of the "rostrate pelvis." The pubic arch is much narrowed. Severe cases of rachitis show a similar deformity. For differentiation, in the cases of osteomalacia the ilia are curved like scoops and the crests are more sharply curved, while in rachitis the ilia flare and the spines are widely separated.

The history of cases of osteomalacia is characteristic. There are dull aching pains in the extremities and lumbar region, with difficulty in walking and rotation of the body as one foot is advanced in front of the other. The stature is appreciably diminished during the course of the disease. There may be tenderness over the anterior pelvic wall. Examination reveals the beaked pelvis, the narrow pubic arch, and, if the finger can reach so high, the triradiate pelvic brim. Such a pelvis, unless in the earlier stages and quite soft, will not allow any form of conservative operative delivery *per vias naturales*. The Caesarean operation with extirpation of the uterus furnishes the best solution of the difficulty.

Kyphosis developing in early life from caries of the vertebrae, possibly from rachitis, leaves its stamp upon the pelvis, producing the type known as the *kyphotic pelvis*. This was first described by Breisky in 1865.

The difference in the direction of the pressure, transmitted through the spinal column on the sacrum, is dependent upon the location of the kyphos. The deformity is most marked when the kyphos is low down. In the upper dorsal region spinal deformity will affect but slightly pelvic development.

The characteristic kyphotic pelvis has a displacement of the upper end of the sacrum backward. This gives an unusually deep conjugate. The lower end of the sacrum is thrown forward. There is an approximation of the posterior superior spines and of the ischial tuberosities. There is a narrow pubic arch. The sacrum is long, narrow, and straight. This pelvis presents therefore the funnel type. The pelvic brim is deep and ample, but the outlet is much narrowed. Combined with kyphosis there is usually some scoliosis, causing some pelvic obliquity. Some of these individuals have smaller measurements in general, due to arrested development.

A kyphotic pelvis does not affect the course of the labor to the extent that would be anticipated from the examination and inspection of the patient. The successful outcome of labor in these dwarfed women is often a surprise to even the experienced.

There is always a pendulous abdomen with anteflexed uterus and a tendency to malpresentation, which is usually corrected by the onset of pains. Engagement of the head in the first stage may be delayed. As soon, however, as the head is engaged progress is normal until the outlet is reached. Here the bony obstruction may be such that prolonged moulding or assistance by forceps becomes necessary for the extraction of the head. The narrowing may prevent the forward rotation of an occiput posterior, or even cause an anterior position of the occiput to turn into a posterior. Four per cent. of cases are reported to present by the face. In this deformity the bi-ischial measurement is of importance in prognosis. If it is below 8.5 cm. there is probability of serious difficulty.

*Oblique deformities of the pelvis* of the extreme type are due to failure of growth of one of the sacral ala. To this deformity the name of Naegele, who first described it, has been given. The oblique measurements vary widely. The short oblique is that of the normal side. The sacrum, which is narrowed, faces from the small side. The pubic arch is asymmetrical. The sacrum is narrowed. Vaginal examination shows the front of the sacrum and promontory facing toward the diseased side. The ischial tuberosity is higher on that side and the corresponding posterior superior spine is higher, lying closer to the sacrum. The subpubic angle is asymmetrical and looks toward the diseased side.

The failure in growth may be due to a congenital developmental defect or to disease. If it is due to a con-

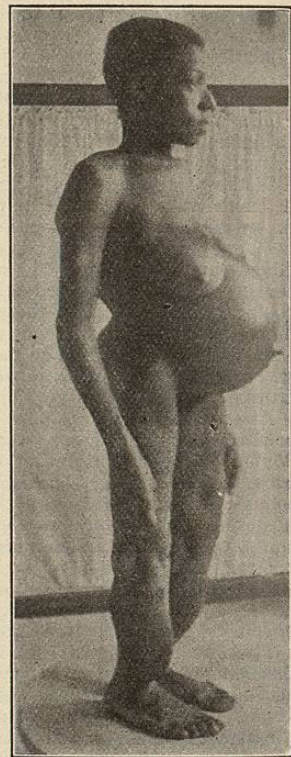


Fig. 3757.—Side View of Same Showing Pendulous Abdomen.

The failure in growth may be due to a congenital developmental defect or to disease. If it is due to a con-

genital defect, the deformity is not evident until after walking has occurred. Pressure then causes the crowding up, in, and back of the innominate bone on the diseased side, and the rest of the asymmetry noted above. If it is due to disease of the sacro-iliac joint, tuberculosis, or some acute arthritis secondary to the general disease, must in early life have been sufficiently extensive to destroy the bony nuclei of the ala of the sacrum on that side. Ankylosis of that joint is the usual accompaniment of the deformity, but is not the absolute rule.

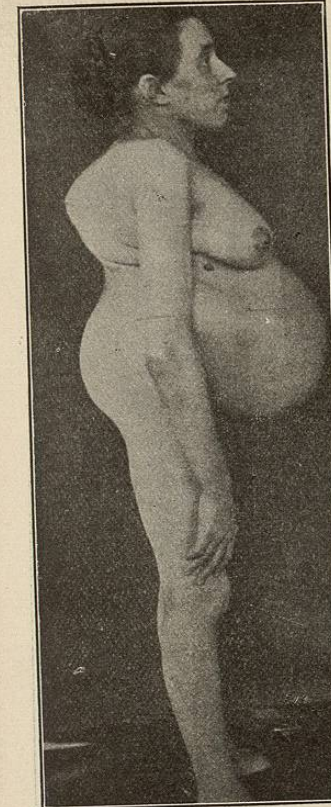


Fig. 3758.—High Dorsal Kyphosis. (Service of Dr. Edwin B. Cragin, Sloane Maternity Hospital.)

The diagnosis is easily made by means of the pelvimeter and the vaginal examination. If disease be an etiological factor the presence of a scar or sinus over the affected iliac joint aids in the diagnosis. The effect produced by this deformity upon labor in the less extreme cases may not be serious. But usually the distortion is so extreme that the natural delivery is impossible. The delivery, if possible, is accomplished by extreme flexion and moulding of the head, as in the generally contracted pelvis. Abnormalities of rotation and flexion are apt to occur in the lower pelvis.

The forceps may be tried, and if these fail craniotomy or the Caesarean section may be performed. Symphysectomy is contraindicated on account of the probable ankylosis of the sacro-iliac synchondrosis on the affected side.

Where both sacral ala have failed of development that rare deformity, the *double obliquely contracted pelvis*, is found. In 1842 this type of pelvis was described by Robert, and has since been known as the Robert type. From the same causes as in the Naegele pelvis, the sacral ala are both absent or only partly developed. There results the extreme type of transversely contracted pelvis. The pelvic brim presents the outline of a long narrow ellipse. The conjugate is of normal or only slightly lessened size, the obliques are much shortened, and the transverse diameter excessively narrow. The sacrum is long, narrow, and oblong rather than triangular. Both sacro-iliac joints are usually ankylosed. The posterior superior spines are very close to each other. The pubic arch is narrowed. Unequal development, due to partial growth of one ala, may cause a slight degree of obliquity.

The effect of such extreme contraction must be complete obstruction to the passage of a viable child. Another rare type of developmental deformity is that in which the pubic rami have not developed sufficiently to meet at the symphysis. This is called the *split pelvis*. It furnishes no obstruction to delivery. The lesser degrees of obliquity, which rarely have much

effect on the mechanism of labor, are due to scoliosis; to injuries or disease of hip, knee, or ankle-joint; to failure in development of one limb from some kind of paralysis, usually poliomyelitis; or to club-foot.

In cases of *scoliosis* extra pressure is transmitted through the lower acetabulum and there is consequent shortening of that oblique. Simple scoliosis is common, but it often accompanies rachitis or vertebral caries. If there is rachitis, there are the other rachitic effects on the pelvis and a greater obliquity. If scoliosis is combined with Pott's disease, there is merely slight obliquity added to the typical kyphotic pelvis. This is the so-called *kypho-scoliotic pelvis*. The slight obliquity caused by such simple scoliosis is of no significance, but the shortening of the spinal column may cause a pendulous abdomen, which will give trouble in the engagement of the head at term.

Any cause which acts so as to limit or do away with the use, in early life, of one of the lower extremities, reacts upon the pelvis by throwing greater pressure upon the well side. Tuberculous disease of the hip, knee, or ankle-joint is the most common disease affecting the lower extremities. Local deformity of the pelvis has been encountered from erosion of the acetabulum and displacement of the head of the femur through into the pelvic cavity. Ankylosis of one or both femora in adduction may cause an obstruction to delivery.

A congenital hip dislocation causes the pelvis to develop with one short oblique from pressure on the healthy side. An anterior displacement of the femur may drive in the anterior wall of the pelvis. The head of the femur may project over the ramus into the pelvic outlet. If both femora are dorsally displaced there is a shallow pelvis with wide outlet.

A rare deformity, but a most serious one from an obstetrical standpoint, is that known as *spondylolisthesis* of the lumbar vertebrae. It was described by Rokitansky in 1859, and later by Neugebauer. The bodies of the vertebrae are dislocated forward. There is some lumbosacral dislocation permitting a slipping of the body of the last lumbar vertebra in front of the sacrum. Here it becomes ankylosed. Then exaggerated lordosis occurs, and possibly there is a descent of the fourth and third lumbar vertebrae, so that they project over the pelvic brim. The sacrum is pushed down and back. In compensation the symphysis rises, lessening the inclination of the brim. There is narrowing of the brim, with antero-posterior limitation, which will prevent the passage of the head.

This deformity may be started by disease, especially lumbar caries, or by injuries, or perhaps it may date from intra-uterine life. For diagnosis we must depend upon the history of the case—



Fig. 3759.—Low Dorsal Kyphosis. (Service of Dr. Edwin B. Cragin, Sloane Maternity Hospital.)