an average angle of about 60° (from 55° to 65°, Naegeli), the second an angle averaging about 12°. (See Fig. 3776).

Meyer proposed to measure the inclination of the pelvis by taking that of a line drawn from the summit of the curve formed by the sacrum (at the body of the third sacral vertebra, see *ante*) to the upper border of the symphysis (normal conjugate). He thought this angle to be more constant than that made by the plane of the inlet, and estimated it as averaging 30°.

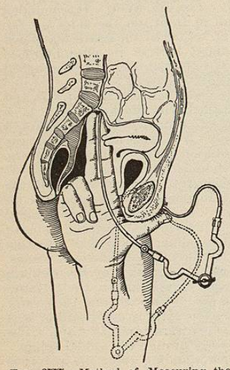

FIG. 3777.—Method of Measuring the Conjugate Diameter of the Superior Strait in the Living.

Measurements.—For obstetrical and surgical purposes it is important that the average dimensions of the pelvis should be accurately known. Of these the diameters of the inlet and the outlet are the most generally useful. The older obstetricians, considering these openings as approximately elliptical, applied to them designations derived from the diameters of an ellipse; so the antero-posterior diameter is often spoken of as the conjugate, the others as the transverse and the oblique diameters.

The conjugate of the inlet might be measured from the middle of the promontory to the top of the symphysis (anatomical conjugate), but for practical purposes the shortest line between the promontory and the symphysis is taken (true conjugate, obstetrical conjugate) which strikes the symphysis below the upper edge, usually about the junction of the upper and middle thirds. The transverse diameter is the longest transverse line that can be drawn between two symmetrical points of the brim. These points are usually situated about the juncture of the posterior and middle thirds of the circumference, immediately behind the acetabula. The oblique diameter is measured from the sacro-iliac articulation to the point on the opposite side where the linea terminalis meets the ilio-pectineal eminence. (See Fig. 3769.)

At the outlet the conjugate is measured from the tip of the coccyx to the angle of the pubis, and is increased by

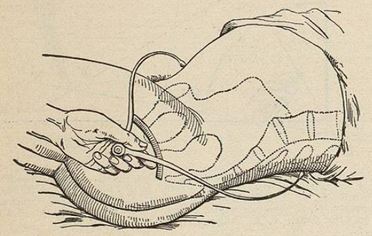

FIG. 3778.—Method of Measuring Baudelocque's Diameter in the Living.

about 2 cm. by moving the coccyx backward. The transverse diameter is measured between the middle points of the posterior borders of the ischial tuberosities. No satisfactory oblique diameter of the outlet can be measured. When stated it is considered to be the shortest distance from either ischiopubic ramus to the great sciatic ligament of the opposite side. (See Fig. 3775.)

The calibre of the cavity of the pelvis varies somewhat from that of the brim. The widest part (amplitudo pelvis) is in a plane passed through the midpoints of the acetabula, the synostosis between the second and third sacral vertebræ and the middle of the symphysis pubis. The narrowest part (angustia pelvis) is between the lower end of the sacrum behind, the summit of the pubic arch in front, and the two ischial spines on either side. The contraction here is caused by a slight elevation (angulus ischiadicus, Waldeyer) that runs on either side from the ischial spine to the lateral tubercle of the obturator foramen, separating a supraspinous from an infraspinous plane.

While these measurements are especially important as relating to normal labor, the following are commonly used for ascertaining pelvic deformities:

The External Conjugate (Baudelocque's diameter). The distance between the upper edge of the symphysis pubis and the tip of the spinous process of the fifth lumbar vertebra. This is readily measured with calipers in the living. (See Fig. 3778.) When less than 19 cm. the pelvis is too narrow for safe delivery.

The Diagonal Conjugate. Distance from the vertex of the pubic angle to the promontory of the sacrum. This may be measured by means of a pelvimeter or closely approximated by measurements made by introducing two fingers into the vagina. (See Fig. 3777.) In a normal pelvis the promontory cannot be reached by introducing a single index finger.

The distance between the anterior superior spines of the ilium.

The greatest distance between the iliac crests.

The greatest distance between the great trochanters.

The external circumference of the pelvis measured from the spine of the fifth lumbar vertebra around to the symphysis pubis on either side, passing between the iliac crest and the great trochanter.

The following table of measurements is from the determinations of Waldeyer, C. Krause, and Schröder:

	Male.	Female.
Inlet.		
True conjugate diameter	10.5 cm.	11.0 cm.
Transverse diameter	12.5	13.5
Oblique diameter	12	12.75
Outlet.		
Conjugate diameter	7.5 (9.5)	9 (11)
Transverse diameter	8	11
Amplitudo.		
Conjugate diameter	11	12.75
Transverse diameter	11	12.5
Angustia.		
Conjugate diameter	9.5	11.5
Transverse diameter	8	10.5
External conjugate	18	20
Diagonal conjugate	.....	13
Distance between anterior superior spines	26	26
Distance between iliac crests	26	29
Distance between great trochanters	31.5	31.5
External circumference	.....	89
Dorsal length of sacrum	.....	12.5
Ventral length of sacrum	13.5	12
Height of symphysis pubis	5.5	4.5

The *axis* of the superior strait is a line perpendicular to the plane of that strait at its central point. (See Fig. 3776.) It nearly coincides with a line drawn from the tip of the coccyx to the umbilicus. The axis of the inferior strait is similarly obtained, and when produced reaches the promontory of the sacrum. The axis or traction line of the pelvis is one that bisects all possible conjugate diameters. It is practically parallel with the curve of the sacrum and coccyx, and therefore, in the female pelvis, nearly straight above and sharply curved below. It is important to bear in mind its direction when attempting

traction upon the fœtus and when introducing instruments.

Indices.—The method of proportional measurements or indices, first devised for the cranium, has also been applied to the pelvis. Two of these are used, first that which Topinard calls the general index of the pelvis, found by comparing the greatest width between the iliac crests with the height taken from the punctum ischiadicum or lowest point of the ischial tuberosity to the punctum coxale or highest point of the crest; second, the index of

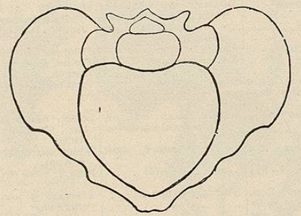

FIG. 3779.—Pelvis of an Andaman Islander. (Garson.)

the superior strait, found by comparing the anatomical conjugate diameter with the transverse diameter of the inlet.

By the first method the height is taken as 100, and the index expresses the proportionate breadth. Topinard obtained the following averages:

46 European males	126.6
17 African negroes, males	121.3
11 Natives of Oceanica, males	122.7
24 European females	136.9
10 African negresses	134.2
10 Natives of Oceanica, females	129.0
20 Anthropoids	105.6
16 Ruminants	77.2
12 Carnivores	68.1
4 Rodents	66.8
4 Kangaroos	63.0
2 Edentates	61.4

These figures appear to show that as we rise in the scale of races the pelvis broadens. It should be remembered, however, that exceedingly heavy animals, like the

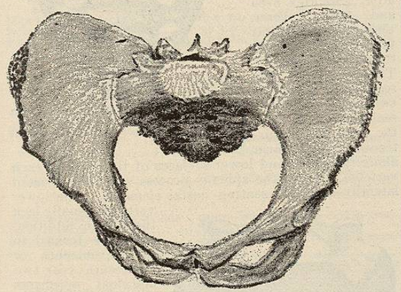

FIG. 3780.—Pelvis of an Aino. (Hennig.)

elephant and rhinoceros, have a proportionately wide pelvis to permit of the insertion of the muscles necessary for sustaining their enormous weights. Some authors use the breadth of the pelvis as the basis of comparison, which changes the figures without altering their serial relation. It will be noted that in all human races the female pelvis is broader in proportion to its height than that of the male.

By the second method the breadth of the superior strait is taken as 100, and the index expresses the proportionate value of the conjugate diameter. Sir William Turner

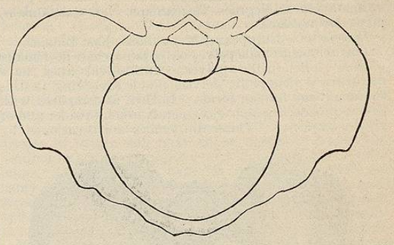

FIG. 3781.—Diagram of European Pelvis, seen from Above. (Garson.)

used this index in his investigation of the bones brought back by the *Challenger*. He devised the terms *dolichopellic* for pelves having an index above 95, *mesatipellic*

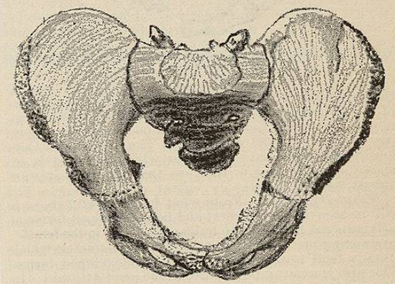

FIG. 3782.—Pelvis of a Young Maori. (Hennig.)

for those from 90 to 96, and *platypellic* for those below 90. The Andaman Islanders appear to have the inlet most nearly circular of any yet examined, Garson finding

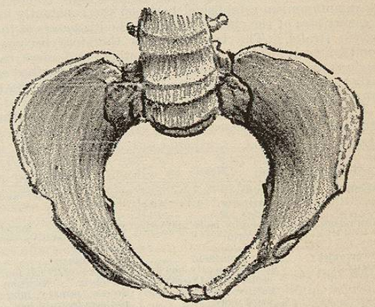

FIG. 3783.—Pelvis of a Negress. (Hennig.)

the index 99 in an average of 13 cases. Figs. 3779 and 3781 show a comparison between this pelvis and that of a

European. Other peoples hitherto investigated may be classified as follows:

Dolichopellic.—Australians, Bushmen, Hottentots, Kaffirs, many Polynesians, Malays.

Mesatipellic.—Negroes, Tasmanians, New Caledonians, many Melanesians.

Platypellic.—Europeans, Mongolians, East Indians.

This relates to male pelves only, as nowhere do females possess dolichopellic pelves. Anthropoid apes have markedly dolichopellic pelves, much exceeding in this character any human forms. Indeed, as compared with lower animals, the pelvis of man is much broader and of greater capacity. These differences are occasioned by

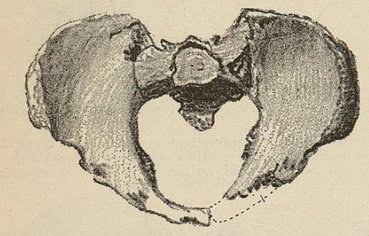

FIG. 3784.—Pelvis of an Individual Belonging to the Stone Age. (Hennig.)

the erect attitude, which necessitates an effective support of the viscera. In some races of men slight peculiarities appear which may be considered to be transitional forms. (See Figs. 3780, 3782, and 3783.) The Veddahs of Ceylon, for example, have pelves in which the inlet is remarkably contracted in front, so that the inlet appears almost wedge-shaped.

Sexual Differences.—From what has been said above it will be seen that the highest and best developed forms of pelvis are not found in the human male but in the female, contrasting markedly with other sexual characters which usually tend toward embryonic or undeveloped forms. This also is a natural result from the erect attitude. In the quadrupedal position comparatively little weight is hung from the pelvic arch, and a marked separation of the bones during parturition does not necessarily impair to any considerable degree the stability of the support of the body. In the erect position, however, so great a weight is thrown upon the arch that no considerable amount of separation is practicable, and there comes to be an antagonism established between the constantly increasing size of the child's head and the diameters of the pelvic straits. The female pelvis therefore becomes comparatively wider, shorter, smoother, and more capacious than that of the male. It has been described as a short segment of a long cone, that of the male being a long segment of a short cone.

The following table, mainly from Waldeyer, gives the principal sexual differences in the articulated pelvis:

Portion.	Male.	Female.
Sacrum	Relatively longer and narrower. Average index 103.5.	Relatively shorter and wider.
Curvature	Generally more marked, uniform.	Usually less; flatter above, more curved below.
Promontory	More prominent	Less prominent.
Coccyx	More frequently has five vertebræ. Co-ossifica earlier, projects forward more.	More frequently has four vertebræ. Synchondroses remain later; projects forward less.
Ilium	Higher, narrower; placed more obliquely, inclination of borders to each other = 53°.	Lower, broader, less obliquely placed; inclination averages 50°.
Crests	Thicker, rougher, more sinuous.	Narrower, less rough, less sinuous.
Portion.	Male.	Female.
Posterior superior spines	Average distance apart 50 mm.	Average distance apart 40 mm.
Fossæ	Deeper	Shallower.
Ischium	Stronger, thicker	Less massive.
Tuberosities	Nearer together, inflexed	Wide apart, everted.
Ischio-pubic rami.	Margins more everted.	Margins less everted.
Pubis	Arch pointed, more angular (70°-70.95°). *Angulus* pubis.	Arch rounded, arch-like (90°-100°). *Arcus* pubis.
Symphysis	Deeper. At birth its width is narrower than or equal to its height (Fehling).	Shallower. At birth its width is greater than its height (Fehling).
Joint cavity	Rare	Frequent.
Spines	Nearer together	Farther apart.
Crests	Shorter	Longer.
Insertions of gracles muscles.	Nearer together	Farther apart (Cleland).
Obturator foramen.	Higher, more oval, obturator canal narrower.	Lower, almost triangular, obturator canal wider.
Acetabula	Nearer together, show less in front.	Wider apart, show more in front.
Great sciatic notch.	Lower, more oval	Higher, more circular.
Distance from body of ischium to posterior inferior iliac spine.	Averages 40 mm	Averages 50 mm. (Cunningham).
True pelvis	Deeper, narrower, more funnel-shaped, capacity less.	Shallower, wider, not markedly funnel-shaped, capacity greater.
Superior strait	More heart-shaped and dolichopellic, transverse diameter less, plane less inclined.	More elliptical (reniform) and platypellic, transverse diameter greater, plane more inclined.
Inferior strait	Narrower	Wider.
Inclination	Less marked	More marked.

Development.—Each of the three or four upper vertebræ which form the sacrum are developed from eight centres, three of which are primary and like those of other vertebræ, namely, one for the body appearing at the fourth to the eighth month, and two for the neural arch. (See Figs. 3785 and 3786.) From these latter grow out the articular and transverse processes. There are also five secondary centres, two for the epiphyseal plates, that from the tenth to the thirteenth year form along the upper and lower surfaces of the body of each vertebra, one for the spinous process, and two situated laterally and representing costal elements. The lower vertebræ usually lack these. In addition, there are formed in the seventeenth or eighteenth year two marginal epiphyses on each side, the upper ones being connected with the auricular facets. The bone is complete from the nineteenth to the twenty-first year.

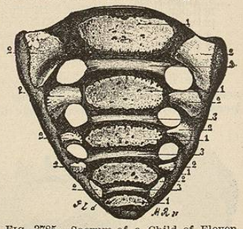

FIG. 3785.—Sacrum of a Child of Eleven Months. 1, 1, Ossific points for bodies; 2, 2, lateral points; 3, 3, intervertebral ligaments.

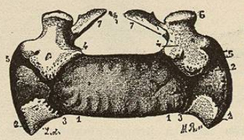

FIG. 3786.—Ossification of First Sacral Vertebra. 1, 1, Body; 2, 2, lateral points; 4, 4, centres for arch.

Each coccygeal vertebra ossifies from a single primary centre, which does not appear until from four to nine years after birth, and there appear later secondary centres representing the upper and lower epiphyseal plates, and in the upper vertebra two additional centres for the cornua. (See Fig. 3787.)

The hip bone is formed from three cartilages that originate separately, the one for the ilium appearing latest. (See Fig. 3788.) Ossification occurs by three primary and nine secondary

FIG. 3787.—Development of the Coccyx. 1, 1, Centres for bodies; 2, 2, articular processes; 3, 5, epiphyses.

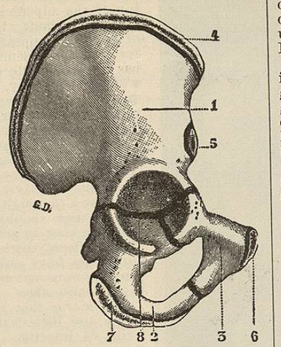

FIG. 3788.—Development of the Hip Bone. (From Testut.) 1, Ilium; 2, ischium; 3, pubis; 4, epiphyseal point for the iliac crest; 5, epiphyseal point for the anterior inferior iliac spine; 6, epiphyseal point at the symphysis pubis; 7, epiphyseal point for the ischium; 8, Y-cartilage uniting the three primitive portions of the hip bone.

centres, the primary ones being first separated in the acetabulum by a Y-shaped piece, the triradiate cartilage. In rare cases an independent centre, the os acetabuli, may remain in the acetabulum ununited. Marks of the original composition remain on the developed bone: (1) at the ilio-pectineal eminence; (2) on the ischio-pubic rami, at the seat of origin of the corpora cavernosa; (3) as a thickened bar extending from the posterior border of the acetabulum to the great sciatic notch. Ossification occurs in the order shown in the following table:

Centres.	Time of appearance.	Time of union.
Primary.		
Ilium	3d to 4th month.	17th to 18th year.
Ischium	4th to 5th month.	17th to 18th year.
Pubis	5th to 7th month.	17th to 18th year.
Secondary.		
Epiphyses acetabuli.		
Between ilium and pubis	12th year	18th year.
Between ilium and ischium	12th year	15th to 16th year.
Between ischium and pubis	12th year	15th to 16th year.
Epiphyses marginales.		
Iliac crest	15th to 16th year.	21st to 25th year.
Symphysis pubis	18th to 20th year.	20th to 21st year.
Tuberosity of ischium	15th to 16th year.	17th to 22d year, female. 21st to 24th year, male.
Anterior inferior spine of ilium	15th to 16th year.	16th to 17th year.
Spine of pubis	18th to 20th year.	20th year.
Spine of ischium	15th to 16th year.	17th to 18th year.

Frank Baker.

PEMPHIGUS.—The word pemphigus does not convey to the mind the idea of a clear-cut disease. The pemphigus diseases have been divided into a number of groups whose only common bond of union is the occurrence of bullæ at some time in their course. Any particular group of bullous affections may differ in every other respect from the other groups. Although these bullous diseases differ widely from one another, yet owing principally to the obscurity of their causes, it has been found difficult to segregate them or to remove any particular group from the conglomerate class of pemphigus diseases, and put it under a distinct heading. Duhring and Brocq have done much to simplify the study of pemphigus by removing altogether from this class the group of cases that Duhring has called dermatitis herpetiformis, and Brocq has called dermatitis polymorpha dolorosa. Brocq, under the term dermatitis polymorpha dolorosa, includes rather more cases than Duhring does under the term dermatitis herpetiformis. Some of Brocq's cases are not herpetiform at all.

PEMPHIGUS NEONATORUM.—Pemphigus neonatorum is an instance of what has been before mentioned of groups of cases being removed from the class of pemphigus diseases and classified under a different head. This disease in future will have to be described under the heading impetigo contagiosa, to which class it really belongs. It is described here for two reasons: first, its name is still a familiar one in medical literature, and, secondly, its most striking symptom, sometimes its sole symptom, is a bleb, leading the observer most naturally to look for its description under the heading pemphigus.

Pemphigus neonatorum is an acute contagious disease characterized by the occurrence, during a limited time, of crops of blebs.

Symptoms.—In otherwise apparently healthy infants of from three to eight days old, blebs suddenly arise. They vary from a pea to a hazelnut in size, or they may be even larger. They are at first tensely filled with clear yellow serum, and are scattered anywhere over the cutaneous surface, and spring from an apparently normal or a reddened skin. After a short time the bullæ become flabby and the contents grow turbid. Then shortly the delicate covering of the bleb gives way, exposing a red weeping surface upon which the epidermis has more or less perfectly formed, according to the time, whether early or late, at which it has broken. The blebs arise, become turbid, burst, and heal in a few days. The duration of the disease is from one to two weeks, in which time it produces several crops of bullæ. This constitutes the whole disease, which usually affects only the skin, and seems but rarely to have an influence on the constitution. It may, however, run a severe course, and cause death in a very short time.

Most of the recorded cases are reported as epidemics in foundling asylums. It is probable, however, that even a larger number occur scattered throughout the community, but are left unnoted. The sporadic cases are usually seen only by the obstetrician or midwife, who, seeing that the general health is not affected, adopts some indifferent treatment under which the patients generally recover.

Diagnosis.—In the hereditary bullous syphilide the bullous eruption is particularly marked on the palms and soles, situations that remain free in pemphigus neonatorum. Besides this, in syphilis the base of the bulla is infiltrated and frequently ulcerated, and the eruption is polymorphous, consisting of papules, pustules, and large erythematous infiltrations. In addition, in syphilis, there are snuffles, mucous patches, and condylomata. In varicella the lesions are vesicles rather than bullæ and are rarely large. In Ritter's disease the erythema, usually beginning near the mouth and spreading over large areas or the whole cutaneous surface, is the principal symptom. The bullæ are subsidiary to this. Besides, in Ritter's disease the connection between the horny layer of the skin and the rete Malpighii is loosened as in pemphigus foliaceus, so that the horny layer either comes away spontaneously or can be taken off in large masses or ribbons by a stroke of the finger. It must be mentioned here that Richter, in a recent and careful study, has concluded that Ritter's disease is not an independent affection at all, but an unusually malignant variety of pemphigus neonatorum.

Pathology.—The opinion is gaining ground that pemphigus neonatorum, some cases of pemphigus febrilis, impetigo contagiosa, and possibly Ritter's disease are identical affections. The pronounced contagiousness of pemphigus neonatorum, its confinement to the very surface of the skin, its frequent lack of constitutional symptoms, its self-limitation, and its duration, all correspond