

Obstetrics: The Science and The Art, by Charles
D. Meigs, M.D.

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Obstetrics: The Science and the Art - Part I. Anatomy of the Parts Concerned In Reproduction; Chapter III. Of the Child's Head and Other Presenting Parts

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CHAPTER III.

OF THE CHILD'S HEAD AND OTHER PRESENTING PARTS.

THE study of the form and dimensions of the child derives its importance from the relations of the foetus to the bony pelvis, through which it is destined to pass in the act of parturition.

To know the form and magnitude of the head, as related to the pelvic canal, is of the highest importance; and, indeed, no man should be looked upon as a qualified practitioner who suffers himself to remain ignorant of every particular of the matter now referred to.

The foetal cranium, divested of the bones of the face, closely resembles in form an ostrich egg, upon the side of the lesser pole of which the facial bones are adjusted.

In the figure of the foetal head which is annexed (Fig. 28), it is evident that if the bones of the face were removed, the remainder of the cranium would be oviform; as I have on different occasions shown it to be, by removing those bones in presence of my class at the Medical College.

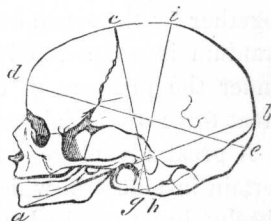
In looking at the head from above downwards, as in Fig. 29, the bones of the face are out of sight, and the cranium is evidently egg-shaped, the greater pole being at the occiput, while the lesser is at the forehead.

The foetal head (Fig. 30) is copied with the camera from a cast of a foetal head, and gives a proper idea of the true form when covered with its integuments: the child perished in the labor, its head being too large to pass through the straits without the aid of the forceps.

The longitudinal diameter of this oviform skull has, by most authors, been computed at four inches, and its conjugate at three inches and a half; both of which calculations are considerably under the mark of truth, as I have found by careful measurement.

The bones that enter into the composition of the skull, excepting

Fig. 28.



the face pieces, are the *os occipitis*, the two *ossa parietalia*, the *os frontis*, the two *ossa temporum*, and the *sphenoides*. These are the bones that make up the principal bulk of the object, for the face bones do not add very considerably to the magnitude of the mass.

Fig. 29.

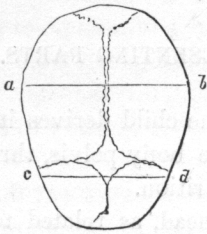
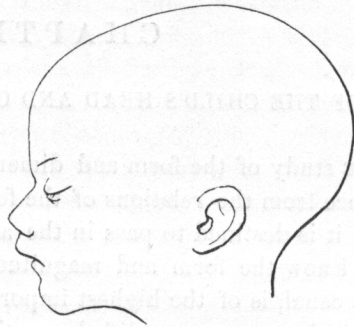


Fig. 30.



The face bones are the *maxilla inferior*, the *maxilla superior*, the *ossa malarum*, *ossa nasi*, *ossa palati*, and the *vomer*. It seems hardly necessary to mention the *ethmoides* and the *ossa unguis*.

In a new-born child, the process of ossification is not completed, and the edges of the cranial bones are not locked or dovetailed together by the serræ of the adult suture; whence it happens that the cranium is not a fixed magnitude or form, but liable to alteration under the pressure of the parts through which it is driven by the great force of the labor-pains.

A great advantage is found in this mobility of the cranial bones, in certain instances in which the pelvic circumference is too small, either absolutely or relatively; for, the child's head of four inches in its conjugate diameter may, by the pressure, become reduced or wire-drawn so as to pass through a superior strait of only three and a half inches, or even less; and that without injury to the head, which, as soon as it has escaped from the pressure, begins to recover its normal form again.

There are, however, to be met with many specimens of the foetal cranium so solid and firm in their ossification as to yield not at all in labor, which is then rendered both more painful and difficult. The young practitioner therefore should, in difficult cases, take comfort from discovering by the touch that the foetal head is of a yielding nature, and hence not likely to resist too long the moulding or modelling efforts of the throes.

Size of the Fœtal Head.—In the foetal head at term, of which there is a drawing at Fig. 30, we are in the habit of imagining certain lines called diameters, which are represented in Fig. 28. There is a line traced from the chin *a*, to the vertex or point of the head or occiput *b*, called by the English writers the oblique diameter, but which the French authors have induced us, of late, to denominate occipito-mental diameter, a phrase that explains itself. The next one is the line from *d* to *e*, called the occipito-frontal diameter, as indicating the distance from the occiput to the most salient point of the forehead. After this comes the perpendicular diameter, from *c* to *h*; and lastly, in Fig. 29, the transverse or bi-parietal diameter, which passes from one parietal protuberance to the other, from *a* to *b*; and the temporal diameter, from *c* to *d*.

As to these diameters, I have never deemed it expedient that the Student should charge his memory with all of them; yet he ought to know that the occipito-mental diameter is above five inches in length. He ought to know this, in order that he may also know that such a diameter cannot be see-sawed, or reversed, after the head has once fairly entered into the excavation, in which no space exists large enough to render such a change possible. If the extremity *b* descends first, it must escape first, or be returned above the superior strait; and if the extremity *a* descend first, it must escape from the inferior strait first, or be returned above the linea ileo-pectinea, in order to be there see-sawed.

The occipito-frontal diameter *c a* is four inches and ten-twelfths of an inch in length—a diameter too considerable to admit of its being see-sawed in the excavation, except under very extraordinary circumstances, for there is, in general, not space sufficient for that end.

I speak with very great confidence as to the above estimate, for I have carefully measured and recorded the size of three hundred crania of mature children that I received in the course of my obstetric practice. The Student will be in error if he adopts the common estimate of the authorities, which is too low at four inches.

In a single series of one hundred and fifty heads, I found the occipito-frontal diameter in fifty-two of them to exceed 5 inches. In 11, it was $5\frac{1}{2}$ ths; in 8, $5\frac{3}{4}$ ths; in 3, it was $5\frac{3}{4}$ ths; in 1, $5\frac{4}{4}$ ths; in 1, $5\frac{6}{4}$ ths; in 2, $5\frac{7}{4}$ ths; and in 1, $5\frac{9}{4}$ ths.

The sum of my occipito-frontal measurements was seven hundred and twenty-nine inches and seven-twelfths of an inch for one hundred and fifty crania. The mean was four inches ten-twelfths. The sum of the bi-parietal diameters of the said one hundred and fifty crania

was five hundred and eighty-six inches and seven-twelfths—the mean, three inches and eleven-twelfths of an inch.

The bi-parietal diameters exceeded four inches in sixty-eight of the children. In 19 it was 4.1; in 5 it was 4.2; in 6, 4.3; in 3, 4.4; in 1, 4.5; in only one case was it less than 3.6, the usual estimate, and in that case it fell to 3.4.

A paper containing statements of the above series was read by me at the centennial celebration of the Amer. Phil. Society, on the 25th May, 1843, and was published in the *Proceedings*, &c., vol. iii. p. 127.

I measured one hundred and twenty-six occipito-mental diameters of neonati at term, of which the sum was six hundred and ninety-nine inches and five-tenths, so that the mean or average of the one hundred and twenty-six diameters was five inches and a half. I know no one who has measured so many, and I am sure that greater accuracy is not to be attained by any person.

Upon these grounds, therefore, I am to inform the Student that the occipito-mental diameter of the foetus is five inches and a half, the occipito-frontal four inches ten-twelfths, and the bi-parietal three inches eleven-twelfths.

The above statements ought to show that it is not a matter of small moment whether the head presents in labor by the vertex, the crown, or the forehead.

Upon the presentation depends the circumference of the advancing body; if the vertex presents, we have a circumference equal to thrice the bi-parietal diameter, which would equal a circle of eleven inches and three-quarters in circumference. The occipito-frontal diameter would give a circumference of upwards of fourteen inches, while the occipito-mental circumference would not be much under sixteen inches.

Fontanels.—The bones of the head are divided from each other by the sutures. In Fig. 29, showing a top view of the skull, may be seen the sagittal suture, a straight line which extends from the middle, and sometimes from the base, of the os frontis backwards, to the upper angle of the occipital bone, where it appears to divide, branching into the two legs of the lambdoidal suture. In passing from the forehead backwards, this sagittal or arrow suture crosses the transverse or coronal suture, and at the place of crossing there is a large vacuity, as to bone, which is occupied, however, by the skin and by strong membranes which constitute what is commonly called the mould of the head—technically, the anterior fontanel, the great fontanel, the

frontal fontanel, or the bregma. It is of various size in different specimens. When the ossification is precocious, it is small; in the contrary case it is large, and sometimes it is found to be very large.

At the posterior terminus of the sagittal suture is found the posterior fontanel, often called the occipital fontanel.

There is a very great difference between the anterior and posterior fontanels; the former being quite large, quadrangular, and yielding to the pressure of the finger; the latter being so small that it can only be distinguished by the three suture lines that radiate from a common centre. Let the Student carefully learn to make this discrimination; for, if he should not do so, he will in practice find himself embarrassed in his diagnosis of the two fontanels.

Too much care can hardly be bestowed upon the mastering of these two points; nor can one become too familiarly acquainted with the differences between them; for, in trying to ascertain the precise position of any head-presentation, the accoucheur always seeks to place his index finger upon one or the other of these openings. It is clear that they must serve as points of departure in an exploration—for, if the index finger be in contact with the posterior fontanel, and the place that finger occupies in reference to any fixed point in the pelvis be well understood, the surgeon ought thence to deduce the very place of any and every other part of the cranium of the foetus. To know where the fontanel is, is to know where to conduct the hand, the forceps, the perforator, or the crotchet.

It has been seen, in a preceding page, that the various positions assumed by the head when it presents in labors are enumerated as first, second, &c., and that they are determined by reference to the point on the pelvis to which the posterior fontanel is addressed.

Presentations.—The Student who shall have made himself master of the subject of the pelvic diameters is now enabled to appreciate the differences that arise in labors exhibiting various presentations and positions of the head. He knows that the bi-parietal circumference of the head is not too great to admit of its ready transition through the excavation—and he as clearly understands that the occipito-frontal or the occipito-mental circumference would prove too large for the canal. Therefore, in any case of delay or difficulty, he would provide for effecting a coincidence of the bi-parietal circumference with the planes (of the excavation) through which it must necessarily pass.

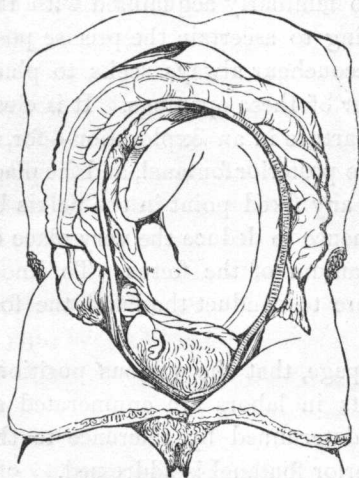
If the pelvis be only four inches in its antero-posterior diameter at the superior strait, the occipital pole of the occipito-frontal diameter

must dip so as to allow the vertex to descend, and thus become the presenting part. In fact, the foetus lies so packed up in the womb that it is truly said to be in a state of universal flexion—the legs being bent upon the thighs, the thighs upon the trunk, and the arms and forearms and whole spinal column in flexion—so that even the head is found to be flexed on the neck as a normal condition of the foetus in utero.

The form of the flexed foetus is like that of an olive. One pole being directed to the fundus, and the other to the os uteri, gives thus two distinct, primary presentations—one cephalic, and the other pelvic, as shall be more clearly shown by and by.

The drawing exhibits very naturally the usual presentation and

Fig. 31.



position of a child at the beginning of a labor. It represents the womb opened, with the foetus in what is called a vertex presentation in the first position; *i. e.*, the posterior fontanel is turned towards the left acetabulum of the mother's pelvis, and the vertex, or occipital pole of the cranium, dips sufficiently to allow of its entering the pelvis through the plane of the superior strait.

The drawing also shows how very much the spinal column is curved. It is manifest that, if pressure should be made upon the pelvic extremity of the column,

in a direction from above downwards, it would be still more considerably bent—it would be an elastic resisting arch, and the outward thrust of the cervical extremity of that arch would tend to flex the head, more and more, in proportion to the increasing violence of the thrusting effort, so that the lower the head descends, the more must the chin be pressed against the breast, and the more perfect the coincidence of the bi-parietal circumference with the planes of the excavation through which it happens to be passing.

Unfortunately, the occipital extremity of the occipito-frontal diameter does not always dip, and the frontal extremity of it is sometimes found to be the dipping pole. In such an instance, the chin is said to depart from the breast, and we discover a presentation of the crown of the head, of the forehead, or even of the face, the head in the last-

named case becoming completely extended, instead of descending in flexion. But the account of these accidents must be deferred until we come to treat of those special presentations, which we hope to be able fully to explain and describe.

The child at full term is about nineteen inches in length. Specimens are occasionally met with of children twenty-one inches high; but they are rare.

The average weight of a new-born child is somewhat above seven pounds; very many of them weigh eight pounds; and it is by no means a rare occurrence to find a child weighing nine, ten, eleven, and twelve pounds at birth.

I have never seen one yet that weighed fourteen pounds. The largest one I have weighed was thirteen pounds and a half avoirdupois. The mother soon afterwards perished with inflammation of the womb and bowels. To witness the birth of such a monster is appalling. I have heard of children of seventeen, and even of eighteen pounds' weight at birth. Such relations always lead me to suppose that some mistake has occurred in weighing the infant. M. Velpeau shrewdly remarks that children of that weight are children of three months old, and that such magnitude is impossible at birth. My own clinical experience, which has been very abundant, has never enabled me to see a child of fourteen pounds' weight at birth.

The head of the child exceeds, in its smallest circumference, the circumference of the thorax and shoulders, of the abdomen or the hips: wherever the head can pass, there will, therefore, be space for the transmission of the natural body.

The length of the child, folded up in the womb in flexion, is about eleven inches from the summit of the head to the lower extremity of the pelvis or buttocks.

In about forty-nine out of fifty cases of pregnancy, the head is at the os uteri—in one out of fifty cases, the pelvis is at the os uteri, giving us the breech, feet, or knee presentation.

When the head presents in labor, it is to be supposed that it has presented during the entire gestation, and *vice versa*.

The vulgar notion that the child lies in the womb with its head to the fundus until labor is about to commence, and then turns its head downwards to the mouth of the organ, in order to escape head-foremost, is erroneous—for the child is eleven inches long, and cannot turn itself in a womb only seven or eight inches in conjugate diameter. If, in like manner, the breech presents in labor, we infer that it has presented for many months antecedent to the commencement of the parturient efforts: cross presentations are rare events.

Hippocrates said the child packed up is in shape like an olive in a narrow-necked flask: if one or the other pole of the olive presents itself at the aperture, it may escape; otherwise, it must be turned or broken, or the flask must be broken, in order to extract it.

The same is true in midwifery. Either the cephalic or the pelvic pole of the foetal oval must descend, in order to its birth; and it is a matter of little moment which should be the pole, whether the cephalic or the pelvic, all other things being equal.

Upon the whole, the head presentation is the most favorable for both mother and child, since nature provides that its frequency shall be in the ratio of forty-nine to fifty.

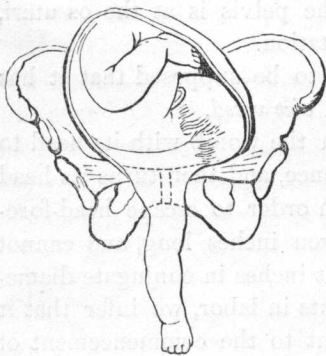
Two Presentations only—Cephalic and Pelvic.—Rigorously speaking, there are but two presentations in midwifery: one of the head, Fig. 31; the other of the pelvis, Fig. 33. The idea expressed in the word Presentation, is one relative to the part of the foetus that comes to the opening; while the idea conveyed by the word Position, refers to some relation betwixt a cardinal point on the walls of the pelvis, and a cardinal point on the presenting part. Thus, in the pelvis, the cardinal point is always the left acetabulum—on the head, the cardinal point is the vertex or the chin. On the breech, the cardinal point is the sacrum of the foetus. For the shoulder presentation, the cardinal point is the whole head of the child.

As to the head presentation—it may deviate, and allow a shoulder to come to the os uteri: but this is a mere accident of a cephalic presentation: an accident that has arisen from the impinging of the head upon the margin or brim of the pelvis, whence it has glanced upwards to the iliac fossa, permitting the shoulder to take its place. This is to

be seen by inspecting the cut, in which the child's head, which originally presented, has deviated, and gone above the plane of the superior strait, lodging itself in the left iliac fossa, while the shoulder has come to the strait, and allowed the arm to prolapse.

The cut may serve to show how the hand and arm have merely prolapsed; making what is commonly denominated an arm presentation: but is it not clear, the head having gone up, that the shoulder still really presents, and that the arm has only fallen down or prolapsed?

Fig. 32.

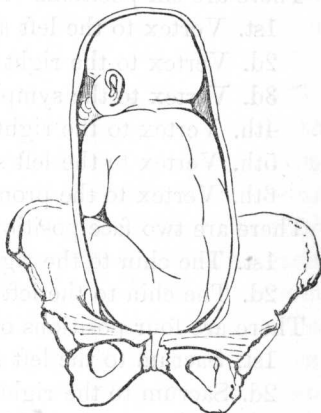


From the above, it appears that we have—

- 1st. Cephalic presentations;
- 2d. Cephalic presentations deviated, with descent of the shoulder; and, lastly,
- 3d. Cephalic presentations deviated, with descent of the shoulder, and prolapse of the arm.

Here is a drawing representing a breech presentation, or presentation of the pelvic extremity of the foetal oval. This is the second normal presentation of the child, the cephalic being the first. In this case, an accidental deviation might cause the buttock to glance upwards on the brim of the pelvis, to take its lodgment in the left iliac fossa. Such an accident would give rise to a footling labor, or to a presentation of the knees.

Fig. 33.



A footling presentation, then, is only an accident happening in the course of a pelvic presentation—and the same may be said of the knee cases, which are very rarely met with.

I recommend these views of presentations to the Medical Student, who, if he should adopt them, will find his notions of midwifery greatly simplified, and his memory not loaded with useless divisions and descriptions that serve only to embarrass him as a student and perplex him as a scholar or practitioner. These are the divisions I have proposed in my public lectures; and, having found them convenient also at the bedside, I with confidence advise him to prefer them to the long catalogue of presentations in the books. Knowledge in its nature is simple, pure, not complex; it owes its seeming complexity and abstruseness only to man.

If the Student should ask me where I will place the presentations of the belly or the back of the foetus, I cannot inform him, for I do not know whether they be derived from deviations of the pelvis or from deviation of the head. I am sure, however, that all such cases are accidents either of the cephalic or of the pelvic presentation, which is the essential point.

Positions of a Presentation.—The word position, as I said, refers to a relation between a certain cardinal part of the presentation, and a certain cardinal part of the pelvis. Thus, in vertex presenta-

tions, the posterior fontanel may be in the fifth position, that is to say, the occiput of the child may be directed to the left sacro-iliac junction, and its forehead to the right acetabulum; but the cardinal point on the pelvis is the left acetabulum, from which we count the first, second, third, fourth, fifth, and sixth positions.

Care should be used to avoid confounding the terms presentation and position.

A vertex presentation is one in which the head presents in flexion. A face presentation is one in which the head presents in extension.

There are six positions of the vertex presentation:—

- 1st. Vertex to the left acetabulum.
- 2d. Vertex to the right acetabulum.
- 3d. Vertex to the symphysis pubis.
- 4th. Vertex to the right sacro-iliac junction.
- 5th. Vertex to the left sacro-iliac junction.
- 6th. Vertex to the promontory of the sacrum.

There are two face positions:—

- 1st. The chin to the right side of the pelvis.
- 2d. The chin to the left side of the pelvis.

There are four positions of the pelvic presentation:—

- 1st. Sacrum to the left acetabulum.
- 2d. Sacrum to the right acetabulum.
- 3d. Sacrum to the pubic symphysis.
- 4th. Sacrum to the promontory.

In the shoulder presentations there are four positions—two positions for each shoulder.

First RIGHT-SHOULDER-position; the head is in the left iliac fossa, the face looking backwards.

Second RIGHT-SHOULDER-position; the head is in the right iliac fossa, the face looking forwards.

First LEFT-SHOULDER-position; the head to the left, looking forwards.

Second LEFT-SHOULDER-position; the head to the right, looking backwards.

These being the principal presentations, with their several positions, I shall enter into fuller details of them when I come to treat of the special labors in which they require to be managed by the accoucheur.