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# PROVINCIAL MEDICAL & SURGICAL JOURNAL.

## MEMOIR ON TURNING, AS AN ALTERNATIVE FOR CRANIOTOMY AND THE LONG FORCEPS, IN DEFORMITY OF THE BRIM OF THE PELVIS, &c. &c.\*

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&c., &c,

### PART II.

#### SECT. III.—THEORY OR PRINCIPLES OF THE PROPOSED PRACTICE.

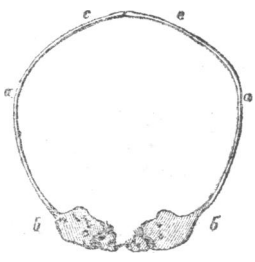
The form of the infant at birth, has often and justly been compared to that of a cone; the feet serving as the apex, and the arch or biparietal diameter of the head forming the basis of the cone, and there being a gradual tapering and increase of size from the former to the latter point. Consequently, when in cephalic presentations, the head or broad end of the cone once dilates and passes a given point, the narrow remainder of the cone, viz., the trunk and extremities, afterwards pass it without impediment. In fact, both in cranial and in footling presentations,—even in instances of contracted pelvis,—the transit of the body is usually attended with no special difficulty or delay. The obstruction is referrible to the child's head alone; and hence the necessity of accurately studying the obstetric configuration and relations of the foetal head, in order to be able to overcome the obstruction offered by this part.

Now, besides that the whole infant is, as I have just stated, of a conical figure, the head taken alone, presents more imperfectly the same configuration; for the basis of the skull is considerably narrower than the arch; or, in other words, its bimastroid diameter, (*b b*, fig. 1,) is less than its biparietal diameter, (*a a*), so that the cranium increases gradually in breadth and size, like the whole body, from below upwards.

The biparietal diameter of the head or vertex is, in

this way, the *basis* both of the cone of the whole body and of the cone of the head taken singly.

Fig. 1.—Vertical section of a foetal skull, shewing its conical form.



To understand thoroughly, however, the subject of our present enquiries, it is necessary to have some more precise and definite ideas of the degree of tapering of the cranium from its broad arch to its narrow basis; or, in other words, it is requisite to fix more accurately the degrees of difference between the biparietal and bimastroid diameters of the head. With this view, I some months ago, made upon the heads of several new-born infants a variety of measurements relative to these two points. I arrived at nearly the same conclusions as those which I afterwards found Mr. Tomlinson had previously obtained, when admeasuring the foetal head for the purpose of assisting Dr. Hull in his enquiries as to the smallest dimensions the skull could be possibly reduced to, by the operation of craniotomy. And to prevent all cavil I will here take Mr. Tomlinson's measurements as standard and correct, and the more valuable on this account, that they were made and published without any view to such a question as the present.

Mr. Tomlinson gives among other measurements of the head, the breadths of the biparietal and bimastroid diameters in six infants at birth. I shall throw them into a tabular form, and add a column, shewing the difference between these two diameters in each case.

\* Continued from page 676 of last volume,  
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TABLE I.

*Measurements of the Biparietal and Bimastoid Diameters of the heads of six Infants at Birth.*

Number of Case.	Biparietal Diameters.		Bimastoid Diameters.		Difference between the two.	
	In.	8ths.	In.	8ths.	In.	8ths.
I.	3	— 4	2	— 7	—	5
II.	3	— 6	3	— 2	—	4
III. (atwin)	3	— 1	2	— 6	—	3
IV.	3	— 2	2	— 6	—	4
V.	3	— 3	2	— 6	—	5
VI.	3	— 4	2	— 6	—	6

We thus find a difference between the bimastoid and biparietal diameters of the head, varying from three-eighths to six-eighths of an inch; or from four and a half to nine lines. Or, if we exclude, (as in fact should properly be done,) the third case, as being a twin infant, and consequently having the head and body smaller and less remarkable than in a single and full-sized child,—then we have in the remainder a difference between the biparietal and bimastoid diameters, varying from six to nine lines; that is, from four to six-eighths of an inch; or, in other words, from *half an inch to three quarters of an inch*.\* And in artificially extracting an infant through a narrow pelvis as a footling instead of a head presentation, we may gain, I believe, when necessary, this great difference between the size of the body to be extracted, by varying the method of the extraction itself. For it must be further held in view that at its base, (or bimastoid diameter,) the cranium of the infant is so strong, and its bones so firmly and densely united as to render it quite incompressible. On the other hand, in its arch (or biparietal diameter,) the cranium at birth is, in general, so thin, and its bones so loosely and imperfectly united, as to permit of the head being much flattened and compressed, or even depressed and indented at some point, without necessarily destroying life.

Now, when the brim of the pelvis is morbidly contracted at one part,—let us imagine, for instance, its conjugate diameter to measure only three inches instead of four,—then the child, upon being forced down upon it as a head-presentation, meets with difficulties which, probably, no uterine effort could possibly surmount. A round body, the diameter of which is some lines *above* three inches, is attempted to be pushed through an opening measuring *only* three inches. But, turn the child, extract it footling, and let the head

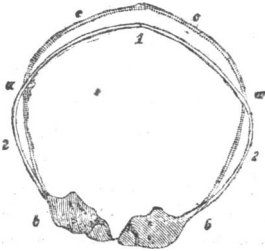
pass through the contracted brim by engaging in it, first the base or bimastoid diameter of the cranium, and the difficulty may possibly be overcome; for then we have the head entering the contracted brim of three inches as a body *less* in its diameter than three inches, and capable of having its broader upper portion flattened, and reduced to the size necessary for its complete transit, by the force which we can apply to the already protruded body of the infant, producing the requisite degree of lateral compression of the cranium against the opposed sides of the contracted pelvic brim.

Or, let us take another and perhaps simpler view of the subject. Suppose, in want of a better wood-cut, we take the letter **A** as a round cone simulating the figure of the infant, the apex of the letter corresponding to the feet of the infant, the base of it corresponding to the biparietal diameter of the head, and the cross-bar of the letter representing the incompressible floor or basis of the skull, and the two divergent feet of it representing the elastic and compressible arch of the cranium. Now, if we desired to pass this round cone **A** through an oblong aperture **O**, the diameter of which was somewhat *less* than the diameter of the basis of the cone, would we succeed best by pushing it through the oval opening with its basis foremost, or by dragging it through it with its apex foremost? If we extract the cone through the aperture by bringing its narrow end foremost,—or, in other words, if we bring the child by the feet instead of the head,—then two objects are gained; for, first, we have the power of using any justifiable degree of force that may be required, by the command we thus obtain of the protruded and narrow end of the cone; and, secondly, the elastic sides of the base of the cone situated above the cross-bar,—or, in other words, the sides of the cranium itself above its basis,—will yield and become compressed together to such an extent as to enable the collapsed body to pass through the supposed opening. If, on the other hand, we attempt to make the broad basis of the cone, (or the vertex of the head,) to pass first through an aperture less than its own diameters, then we are apt, the more we press, to increase rather than diminish the difficulty attendant upon its transit; for the more force we apply we are liable to render that part which is already too broad still broader, by flattening it against the sides of the aperture, and making its limbs or parietes at one point or another diverge and widen, instead of converge and contract. It is true that if we can insinuate *obliquely* or otherwise, the basis of the compressible cone (or the arch of the head,) into the contracted aperture, so as to get *its* sides compressed between the sides of the opening, and consequently its biparietal diameter lessened by the force with which the body of the cone is pushed downwards, a similar object would be gained, but in a more uncertain and imperfect degree. Besides, there is always in this way the chance of making the two sides of the cranial arch, (2 2, *fig. 2*.)

\* "From the one parietal protuberance to the other, a transverse line measures from three inches and a quarter, ( $3\frac{1}{4}$ .) to three inches and a half, ( $3\frac{1}{2}$ .) From one mastoid process to the other along the base is about two inches, (2.) From the one temple to the other is two inches and a half, ( $2\frac{1}{2}$ .)"—*Dr. Burns' Principles of Midwifery*, 10th Edition, p. 25.

spur out, and diverge lower down at their basis, in proportion to the amount of force applied to the upper surface of the arch itself, (*c c*, *fig. 2*), so that while we contract the sides of the arch above by the kind of pressure applied to it, the direction of that pressure may

*Fig. II.*—Illustrating the effect of pressure upon the top of the arch of the foetal cranium, as happens when the head presents.



*Description of Fig. II.*—The dotted line *c b b c* is the vertical section of a normal foetal skull, as seen in *Fig. I*. The outline 1, 2, 2, shews the disadvantageous alteration in form produced by the presentation of the head to a contracted pelvis.

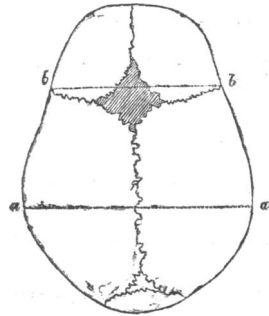
possibly widen and open the limbs of the arch below, and so far increase, for the time being, the difficulty accompanying the transit of that part.

But this transverse or lateral form of flattening and compression of the cranium is very far indeed from being always obtained when the vertex is allowed to present at the brim of a distorted pelvis; for frequently the whole, or the greater mass at least, of the head remains obstinately above the brim, despite the action of the propelling efforts upon it of labour-pains, both dangerous in the amount of their duration, and dangerous in the amount of their force. By bringing, however, the apex of our cone, or the narrow diameters of the cranium foremost, we not only improve and simplify the mechanism of the labour by so far converting the entrance and passage of the child's head into the contracted pelvic brim, from a matter of comparative chance into a matter of comparative certainty; but further, we effect, thus, in the course of minutes by turning, what it might require the course of hours or days to accomplish, provided the transit of the foetal head were left as a head-presentation to nature alone, or to nature assisted at last artificially by the long forceps or crotchet.

But other advantages are obtained by turning, as compared with embryulcio and the long forceps, in the class of cases which we are considering. We not only bring the tapering or cone-shaped foetal head through the distorted brim, by making its narrow extremity enter first into the contracted aperture, and afterwards using the sides of that aperture to compress the elastic parietes of the broader and higher part of the cranium, but in some cases we in this way, I believe, eschew altogether engaging the broadest part of the head (*a a*, *fig. 3*), in the narrowest part of the contracted pelvic opening,—a circumstance and adjustment that, in a

head-presentation, would be otherwise quite unavoidable. For besides being found of a conical form when looked at vertically, the infantile head shews the same configuration also when viewed antero-posteriorly. The accompanying outline, for instance, of the foetal head as seen from above, is an exact copy of that given in

*Fig. III.*—Outline of the foetal head as seen from above.—(From Chailly.)

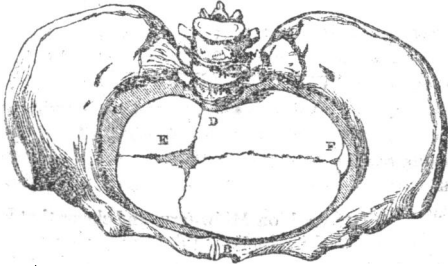


Chailly's late work on Midwifery, and shews that while the head is very broad behind in its biparietal diameter (*a a*, *fig. 3*), it gradually tapers and diminishes in breadth as we proceed forward to its bitemporal and bifrontal, (*b b*, *fig. 3*) diameters; and its bitemporal diameter is in general fully half an inch less than its biparietal. But, in the mechanism of head cases, the neck, as is well known, becomes early flexed in the labour, so that the chin is brought towards the top of the sternum, and the vertex or upper and back portion of the head first becomes pushed downwards into the pelvic aperture, and thus constitutes the presenting part,—in other words, the broadest part of the cone of the whole child, because the broadest part of the head, or its biparietal diameter, is thus naturally first driven downwards into the pelvic cavity, and is first directed against the contracted brim. The same head, when extracted as a footling presentation through the same distorted pelvis, will in some instances entirely escape, having this, its broadest part, placed and engaged in the narrowest part of the pelvic aperture; for, as the extremities and the body of the child are gradually extracted in the operation of turning, the head, in ultimately adapting itself to the shape of the pelvis, comes to have its bitemporal, and not its biparietal, diameter implicated in the narrowest or conjugate diameter, the parietal protuberances passing into the wider lateral space opposite the sacro-iliac synchondrosis. That such is the fact, the position of the mark or indentation upon the skull, produced by compression against the protruding promontory of the sacrum in Case I, and in other instances which I shall afterwards quote, amply proves.\* The injury and depression of

\* See, for example, the figures of indented foetal skulls given by Professor Sandifort, in pl. xxxiv. of Vol. II. of his *Museum Anatomicum*.

the cranium, if any, seems always situated before the ear, and consequently much before the parietal protuberance; or, in other words, it is, as I have said, in the temporal region. The anterior edge of the parietal bone, or the anterior edge of it and the corresponding posterior edge of the frontal, are generally the osseous points that are depressed and indented, as represented in the accompanying diagram.

Fig. IV.—The form in which the bones of the fetal cranium are compressed in passing through a contracted brim.



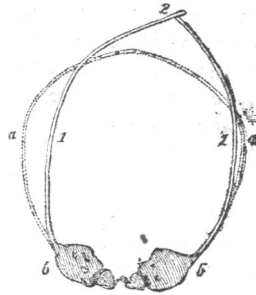
Description of Fig. IV.—A. Promontory of sacrum. B. Symphysis pubis. C. Unoccupied space between the ilium and forehead of the child. D. Depression in child's head corresponding to the promontory of the sacrum. E. Anterior fontanelle. F. Posterior fontanelle.

Now, the child's head narrows greatly from behind forwards, from the occiput towards the forehead as seen in fig. 3; and in the temporal region its diameter is generally from three to five-eighths of an inch, or from four and a half to seven and a half lines less than between the two parietal protuberances.\* Hence it is evident that a great gain is effected by the head passing through the narrowest part of the brim, with a diameter at least several lines less than it otherwise would offer, provided it happened that the vertex of the head had been kept and retained as the presenting part.

In order that the full-sized fetal head may pass through a contracted pelvic brim we require to have the head flattened laterally, and its sides at its anterior parietal or temporal region collapsed and compressed. The outline *a b b a*, fig. 5, is the outline of the vertical section of the infant's skull that I have already given in fig. 1. The line 1, 2, 1, fig. 5, marks what we may presume, for the sake of illustration, to be the shape and degree of compression to which the head would require to be reduced in order to pass the contracted pelvic aperture.

\* See preceding note from Dr. Burn's *Midwifery*. Chailly gives the biparietal diameter as three inches and a quarter ( $3\frac{1}{4}$ ) to three inches and a half ( $3\frac{1}{2}$ ); and the bi-temporal diameter as two inches and a half ( $2\frac{1}{2}$ ) to three inches, (3).—See his *Treatise on Midwifery*, 1844, translated by Dr. Bedford, p. 62.

Fig. V.—Illustrating the effect of lateral compression upon the sides of the arch of the fetal cranium, as happens when the child is extracted footling.



Description of Fig. V.—The dotted line, *a b b a*, is the vertical section of a normal fetal skull, as seen in fig. 1. The outline 1, 2, 1, shows the advantageous alteration in form produced upon the fetal cranium by extracting the child footling through a contracted pelvis.

Would this necessary degree of compression be effected more easily and by less amount of force if the head were drawn through the narrow pelvis as a footling presentation, than if it were driven into it as a cephalic presentation? I certainly believe that less power would be required to produce the same degree of lateral compression and collapse in the cranial arch, provided the compressing force were applied, (as in cases in which the child is extracted footling,) directly to the two sides or lateral surfaces (1, 1, fig. 5,) of the arch itself, than under the alternative condition supposed. For if the child descended into the pelvic brim as a head presentation, the uterine contractions would drive it against the narrow points of the pelvic brim, so that the reacting compressing power of these points would be applied either to the two upper surfaces of the arch, (*c c*, fig. 2,) or partly to one of them (*c*), and partly to one of its opposite lateral surfaces, (*a a*, fig. 5.) In such circumstances the compressing powers would be acting much more indirectly and far more at a disadvantage in effecting the required compression, than if they were applied, as in extracting the child footling, directly and immediately to the sides themselves, (*a a*, fig. 5,) that are to be compressed.

“Does the head, (asks Dr. Radford,) elongate more readily upwards than downwards? If only (he answers,) the same degree of extractile force is used, it does not.” But what I have stated shews that the same degree of extractile force will produce the desired effect more easily, and as we shall afterwards see, more safely also, when the child passes with the pelvis, than when it passes with the head first. And this I believe, affords us another advantage in the mechanism of footling as compared with cephalic presentations in instances of diminished pelvic brim. We are enabled to produce by it the same amount of compression of the fetal head by a less expenditure of compressing force, for we apply it to the lateral surfaces or piers of the cranial arch, (*a a*, fig. 5,) and not to its pedentures.



or upper surfaces, (c c, fig. 2.) We effect a saving of force by the *direction* in which we apply the force.

I am well aware both that it is exceedingly difficult to state accurately and intelligibly the opinions one may happen to entertain on such a subject as we have been discussing in the present section, and that I am far from having succeeded in making the demonstration so simple as I could wish. It may assist, however, our comprehension of the matter if, before concluding it, we try to re-capitulate and sum up the advantages which, in regard to the mechanism of labour, are, in the contracted states of the pelvic brim, obtained by the child passing as a footling instead of as a cephalic presentation. These advantages, as far as I have hitherto attempted to trace them in the preceding remarks, (for we shall trace out more of them afterwards,) amount to the following :—

1. The foetal cranium is of a conical form, enlarging from below upwards, and when the child passes as a footling presentation, the lower and narrower part of the cone-shaped head is generally quite small enough to enter and engage in the contracted pelvic brim.

2. The hold which we have of the protruded body of the child, after its extremities and trunk are born, gives us the power of employing so much extractive force and traction at the engaged foetal head, as to make the elastic sides of the upper and broader portion of the cone, (viz., the biparietal diameter of the cranium,) become compressed, and, if necessary, indented, between the opposite parts of the contracted pelvic brim, to such a degree as to allow the transit of the entire volume of the head.

3. The head in being dragged downwards into the distorted pelvis, generally arranges itself, or may be artificially adjusted, so that its narrow bi-temporal, instead of its broad bi-parietal, diameter, becomes engaged in the most contracted diameter of the pelvic brim.

4. The arch of the cranium or head is more readily compressed to the flattened form and size required for its passage through a contracted brim, by having the compressing power applied, as in footling presentations and extraction, directly to its sides or lateral surfaces, than by having it applied, as in cephalic presentations, partly to the lateral and partly to the upper surfaces of the arch.

Lastly, I may add, as a result of the whole mechanism, that the *duration* of the efforts and sufferings of the mother is greatly abridged by turning, when used as an alternative for craniotomy and the long forceps, and that thereby her chances of recovery and safety are increased. But as this is in itself a matter of the highest moment, in reference to the whole question of the proposed practice, we shall devote a special section to the consideration of it.

(To be continued.)

## OBSCURE CASE OF SUDDEN DEATH: ENLARGED THYMUS.

TO THE EDITOR OF THE PROVINCIAL MEDICAL AND  
SURGICAL JOURNAL.

SIR,

I venture to send you the following case for publication in the *Provincial Journal*, being quite unable to satisfy myself as to its nature, and hoping that some one of your readers may do me the favour to assist in enlightening me,

I am, Sir,  
Your obedient servant,  
T. OGIER WARD, M.D., OXON.

Kensington, Dec. 13, 1847.

September 28th, 1847. A. B—, aged seventeen months, a male child, of delicate constitution, was taken out by his mother into Kensington when the air was cold, and scarlatina was prevalent. On her return she laid him down to sleep, from which he awoke crying and shivering, and would not be pacified until she took him down stairs into the shop, (a blacksmith's,) where his father was at work. After this he ate a good dinner of apple-pudding, but as he became feverish, and seemed to have a sore throat, she procured a powder from the druggist's, and gave it to him at night. It opened his bowels, but the fever continuing the next day and the day following, she sent to me in the evening. I found the child hot and a little flushed, and restless, and I was told he had had frequent startings of the body and limbs, but I observed none, nor had he any cough or difficulty of breathing, nor any head symptoms; his bowels had not been opened for two days, and though his mother said he was teething, she was averse to my lancing his gums then, as he was quieter than he had been for some hours. I could not detect any external enlargement of the tonsils, and I prescribed a warm bath, and a saline aperient mixture.

The next day, October 1st, he was so much better, and his bowels had been so well relieved by the mixture, that I ordered it to be continued at longer intervals, and lanced one of his eye-teeth that seemed to be most prominent under the gum. He was much better when I saw him the following day, about eleven a.m., and I ordered him a saline mixture, with nitric æther, (more as a placebo than because he really seemed in want of any medicine,) to remove the remains of the fever.

At one p.m., at his parents' dinner, he took a bit of finger-biscuit, which his father dipped in his beer for him, his appetite having been very bad previously. About half-past three p.m. he grew worse, and his breathing became difficult, and at half-past six p.m. I was sent for, and found him with a rapid pulse; a warm, damp, but not livid, skin; rapid breathing, interrupted by occasional gasps, and making a weak moaning cry every four or five breaths. The breathing seemed to be performed almost entirely by the diaphragm, and on applying my ear to the chest, there was no vesicular murmur, but harsh bronchial respiration. Percussion also was not clear, as usual, indicating the entrance of very little air into the