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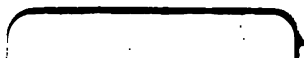


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THE

PRINCIPLES AND PRACTICE

OF

OBSTETRICS.

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INCLUDING THE TREATMENT OF CHRONIC INFLAMMATION OF THE
UTERUS, CONSIDERED AS A FREQUENT CAUSE OF
ABORTION.

BY

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WITH ILLUSTRATIONS ON WOOD.



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TO
THE ALUMNI OF THE MEDICAL DEPARTMENT
OF THE
UNIVERSITY OF LOUISVILLE,
IN THEIR WIDE DISPERSION,
This Volume
IS AFFECTIONATELY DEDICATED,
IN THE
HOPE THAT IT MAY REVIVE PLEASANT MEMORIES OF THE PAST
AND PROVE
A USEFUL SOUVENIR TO THEM, FOR THE FUTURE,
OF THE
PRECEPTS AND PRACTICE INCULCATED IN THE LECTURE ROOM,
BY
THEIRS FAITHFULLY,
THE AUTHOR.

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P R E F A C E .

SEVERAL years have elapsed since the first edition of this work was printed, under the title of *A Theoretical and Practical Treatise on Human Parturition*. I say "printed," for "published" it was not, in the technical sense of the term, having had the misfortune of falling into the hands of a new book concern, which soon became embarrassed, and possessed no facilities for giving to it an extended circulation. Notwithstanding these great disadvantages, attending its issue from the press, that edition has been, for some time, out of print, and I have been repeatedly and urgently solicited to bring out another.

Though I have felt deeply grateful for the laudatory notices which my humble labors received from the medical journals, at home and abroad, my aversion to writing, and my many engagements as a practitioner and a teacher, have hitherto operated to prevent me from undertaking the no light task of making the necessary preparation for a new edition. These hindrances have, at length, been overcome, and I have now the pleasure of offering to the medical profession a work, which, as I hope, may prove somewhat more worthy of their acceptance. Should this hope be frustrated, it will not be for want of my best efforts to realize it, for I have labored diligently, and bestowed all the time that could be spared from more pressing duties, thoroughly to revise, and greatly to enlarge the work, so as to make it something like what it now purports to be—a treatise on the *Principles and Practice of Obstetrics*.

It will still be found, however, that I have not deemed it proper to cram the work, by introducing into its pages every topic, both large and small, that belongs to obstetrics, as if there were no other book in the world, knowing, as I do full well, that there are many matters which occupy considerable space in some obstetric works, but which are of little practical value. My aim has rather been to present, in as condensed a form as possible, an exposition of the cardinal principles of obstetrics, considered as a science and an art, and to inculcate, as clearly as I could, the duties of the accoucheur, in the round of practice with which I am myself most familiar, which, it is no presumption for me, whose experience extends through thirty-five years, to suppose, embraces nearly all that most of my readers are likely to meet with in their ministrations at the altar of Lucina.

To give some account of the improvements which have been made in this second edition, it may not be improper to say that the first four chapters have been entirely re-written, with a view of giving a more complete description of the pelvis, and the sexual organs of the female, of the gravid uterus, and of the fœtus, together with its appurtenances, than was required by my original plan. And to facilitate the comprehension of these rudiments of our branch of medicine, wood-cuts have been introduced, as is very properly the fashion of the day, in which the first edition was totally deficient.

In the preparation of this elementary part of the work, especially in the anatomical description of the pelvis, and of the organs of generation, I have made heavy draughts from the work of Professor PAUL-ANTOINE DUBOIS,¹ the publication of which has not yet, I believe, been completed. Indeed, I have not scrupled frequently to translate his very words, as well as to adopt many of his ideas, without the special acknowledgment indicated by quotation points, which would have had an unseemly appearance. In making this

¹ *Traité Complet de l'Art des Accouchements, tome Premier, Paris, 1849.*

general acknowledgment, I render him his just dues, without any felt self-humiliation; for why should I have striven to find out a "more excellent way" of merely describing parts that have been so often described before, and that, too, by writers who, I am not ashamed to own, possess a happier facility in this line than I can pretend to? I am, also, indebted to his admirable work for all the figures, illustrative of the obstetric anatomy of the pelvis, and for most of those illustrative of the anatomy of the female sexual organs. Yet, great as are my obligations to the celebrated Paris Professor, and my deference to his authority, I have not implicitly adopted all his views, but have ventured to express my dissent from some of them.

Among the new chapters, introduced into the present edition, I beg to call special attention to those on "Abortion" and "Flooding," both on account of the importance of these topics, as well as the views which are therein set forth.

I am not aware that modern improvements in uterine pathology, resulting chiefly from the employment of the speculum uteri, and the more rational and successful treatment of uterine diseases, which have followed in their train, have hitherto received the full recognition which they deserve, by any author of a treatise on obstetrics. Appreciating so highly as I do these advances in the right direction, and having enjoyed such abundant opportunities of testing their value, I have thought it incumbent on me to give them their rightful place in this volume, and this was found in discussing the subject of abortion. There is no fact in pathology, of which I am more thoroughly convinced, than the frequency of inflammation and ulceration of the neck and body of the uterus during pregnancy, and I am as well persuaded that such a morbid condition of the gestative organ is among the most frequent causes of abortion. I could not, therefore, hesitate to give to specular treatment of the disease a prominent place in the prophylaxis of abortion.

I have, perhaps, entered more largely into the consideration of

the topical treatment of the inflammatory affections of the uterus, and, incidentally, of displacements of the organ, than is altogether appropriate to a work on obstetrics. But I was induced to pursue this course by the desire of embodying, in a tangible, and a somewhat permanent form—as I would fain hope—the results of my own observations on these important classes of the sexual maladies of females, and by the reflection that, if my experience be not communicated in this connection, it must, in all probability, perish with myself, as I do not contemplate the publication of a separate work on the diseases of females, and ought, perhaps, to ask pardon of the profession for obtruding this volume upon their notice. The wise man uttered no truer saying, than “of making many books there is no end;” nevertheless, this is, probably, the end of my trespasses of this kind.

In the chapter on “Flooding,” I have felt myself impelled to give expression to views at variance with those generally accepted, and, in especial, to call in question the propriety of delivery by *turning*, even in the greatest exigencies that can possibly occur, whether the flooding be of the *accidental* or *unavoidable* kind. It is very well known that, in the latter part of the last century, the doctrine was peremptorily inculcated by Dr. Rigby that, in all cases of unavoidable flooding, *i. e.*, flooding produced by the implantation of the placenta over the os uteri, delivery by turning and bringing the child by the feet, so soon as it is practicable, is the sole resource of obstetrics, on the due performance of which the salvation of the patient depends. This doctrine has been generally received and acted upon until recently; but, at this time, there are plain indications of dissatisfaction with it, and milder methods of treatment have been proposed, under particular circumstances. But I do not know that any writer has proposed the abnegation of the practice of Rigby, in all cases, and the substitution of less harsh and hazardous expedients. This I have ventured to do. I could, indeed, do no less, for I have never met with an instance of unavoidable flooding, in which I deemed it imperatively necessary to deliver by

turning. On the contrary, it has always appeared to me that to deliver by the feet, where the head of the child presents, is a high-handed measure, not only in flooding, but under any circumstances of parturition, and one which is much more likely to be productive of evil than good, either as to the mother or child. Accordingly, repugnance to this kind of delivery constitutes a leading and distinctive feature of this work, which may not be pleasing to those who pride themselves on their dexterity in operative manœuvres, but which, nevertheless, I am persuaded, is its highest recommendation.

I cannot close this preface without tendering my grateful thanks to Prof. WILLIAM H. GOBRECHT, of Philadelphia, for the hearty interest it has pleased him to take in my work, manifested not only by his vigilant supervision of the press, but also by valuable suggestions, touching the arrangement of some of its topics, which have rendered it more systematically complete.

LOUISVILLE, December, 1857.

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PRINCIPLES

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PRACTICE OF OBSTETRICS.

CHAPTER I.

THE PELVIS.

THE Pelvis is a great osseous cavity, situated at the inferior part of the trunk, resting upon the thigh-bones, and supporting the vertebral column. Containing, as it does, the generative organs of the female, some of whose functions are accomplished in its cavity, and constituting, moreover, the canal through which the foetus is transmitted in parturition, an intimate knowledge of it lies at the foundation of obstetric medicine. In studying it, we may consider, first, its osseous structure, and, secondly, the soft parts which serve to complete it, or modify its properties as a parturient canal.

SECTION I.

THE BONES OF THE PELVIS.

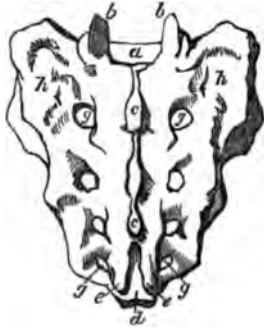
Four bony pieces, fitted and united to each other, in the manner presently to be described, compose the adult pelvis, viz., the sacrum and coccyx posteriorly, and the two innominata upon its sides and in front.

1. THE SACRUM.

The sacrum, as already intimated, is situated at the posterior part of the pelvis, interposed between the innominata, the last lumbar vertebra being above, and the coccyx below it. Its figure is

that of a flattened pyramid, whose base is directed upwards, and apex downwards. Upon it may be noted two faces, a posterior and an anterior one, two lateral borders, a base, and an apex.

Fig. 1.

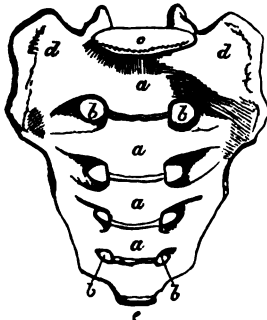


The Sacrum: posterior view.

Its *posterior face*, Fig. 1, is convex and very uneven, and upon it may be observed: (1.) At the superior part of the median line a triangular aperture *a*, which is the entrance to the *sacral canal*. (2.) Two *articular processes*, *b b*, corresponding to similar processes of the last lumbar vertebra. (3.) Below the entrance of the sacral canal, a row of eminences *c c*, which may be united, or segregate, and is called the *crest of the sacrum*. This crest bifurcates below, and the notch between its branches, *d*, is the inferior aperture of the sacral canal; the branches themselves terminate in little tubercles *e e*, denominated the *cornua* of the sacrum. (4.) Upon each side of the crest a large gutter, in which is seen a vertical row of holes *g g*—the *posterior sacral foramina*, communicating with the canal to transmit the posterior branches of the sacral nerves. (5.) Ex-

ternal to these foramina, an uneven rugose surface for the attachment of very strong ligaments, and considerable depressions *h h*, may be seen here, which receive corresponding projections of the innominate.

Fig. 2.



The Sacrum: anterior view.

The *anterior face* of the sacrum, Fig. 2, is concave, and offers: (1.) Four prominent *transverse lines*, marks caused by the fusion of the five false vertebræ which compose the sacrum. (2.) Between these lines, *quadrilateral surfaces*, slightly concave, *a a*, decreasing in extent downwards. (3.) At the extremities of the transverse lines, foramina *b b*, arranged in vertical rows—four to each row—scooped outwardly to form gutters; these are the *anterior sacral foramina* through which the anterior branches of the sacral nerves issue, being protected from painful

pressure during the passage of the child in parturition by their lodgment in the gutters.

This face of the sacrum is more or less concave in different subjects. When the conformation is natural, its concavity, Fig. 3, may be estimated at about $\frac{2}{5}$ ths of an inch, according to M. Dubois.

Fig. 3.



Concavity of the Sacrum.

Fig. 4.



The Sacrum: lateral view.

The *lateral borders* of the sacrum, Fig. 4, offer above, each, an articular facet *f*, which has been likened to the external cartilage of the human ear, and hence received the name of *auricular facet*. It is concave in the direction of its greatest diameter, and corresponds to a similar facet of the innominatum, with which it is articulated. Below this articular surface the lateral borders *g*, are thin, and become gradually thinner towards their termination at the point of the bone *h*.

The *base* of the sacrum, Fig. 2, is directed upwards, and presents: (1.) Upon the median line, an elliptical surface *c*, sloping downwards and backwards, resembling the face of the last lumbar vertebra, with which it is articulated. (2.) Upon its sides, two triangular surfaces *d d*, called wings, that enlarge the iliac fossæ, and are separated from the anterior face of the sacrum by obtuse borders, which make part of the superior strait.

The *apex* of the sacrum is directed downwards, and offers a convex oval facet *e*, Fig. 2, which articulates with the base of the coccyx.

2. THE COCCYX.

The os coccygis is situated below the sacrum, which it resembles in form and structure, but is much smaller. It offers, likewise, the

same points to our notice, which need not be particularly described.

Fig. 5.



The Coccyx.

The *base* of the coccyx, Fig. 5, is directed upwards, and has a concave elliptical facet *a*, which articulates with the point of the sacrum. Posterior to this facet are two vertical eminences *b b*, called *cornua*, which are often united to the tubercles at the extremities of the two branches of the sacral crest, already indicated. The *apex* of the coccyx *c*, is usually round, sometimes bifurcated.

3. THE INNOMINATA.

The sides and front of the pelvis are, as already stated, composed of the innominata—two large asymmetrical bones, each of which consisted primitively of three distinct bones, viz: the *ilium* superiorly *a*, Fig. 6, the *os pubis* anteriorly *b*, and the *ischium* inferiorly and posteriorly *c*.

These continue separate or only slightly united during infancy,

Fig. 6.



The Primitive Division of the Innominatum.

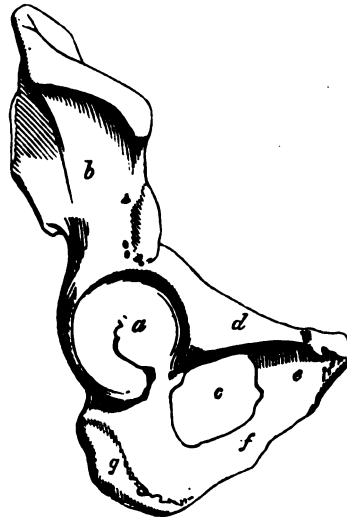
but become ultimately so completely amalgamated that all traces of their original division are obliterated. It is quite necessary for the student to make himself familiar with this piece of osteological history, inasmuch as these primitive bones bestow names, as we shall see, upon the several portions of the single bone which they form by their consolidation. The os innominatum has a very irregular figure; it has been compared to a quadrilateral, contracted in its middle and twisted upon itself at this point, so that the superior part of the bone presents its flat surfaces outwards and inwards, whilst the flat surfaces of the inferior part look

forwards and backwards. It offers to our notice two faces, an external and an internal, and four borders, viz: the superior, inferior, anterior, and posterior.

The *external face*, Fig. 7, presents upon its middle contracted part a deep hemispherical cavity *a*—the *acetabulum* or *cotyloid cavity*, the slightly undulating margin of which is notched anteriorly and inferiorly. Into this socket the head of the thigh-bone is received to

articulate the pelvis with the inferior extremity. Above the acetabulum there is an expanded surface *b*, looking outwards and downwards, which is, in at least two-thirds of its extent, concave, and designated therefore the *external iliac fossa*. Below, and in front of the cotyloid cavity, may be seen the *obturator* or *subpubic foramen*, *c*—a great opening, having a thin margin, of an oval figure, and some times called, on that account, the *foramen ovale*. At the superior part of this foramen, and towards the acetabulum, there is a gutter in which are lodged the subpubic vessels and nerves. In the recent state, the subpubic foramen is closed by a membrane which converts this gutter into a canal. In the vicinity of the foramen may be noted: (1.) Above it, the *horizontal branch of the os pubis*, *d*, which is of a prismatic form. (2.) Inwards and slightly upwards, a nearly quadrilateral surface—the anterior face of the *body of the os pubis*. (3.) Inwards and a little downwards, a flat surface, long and narrow, *f*, directed downwards and outwards—the external surface of the *ischio-pubic ramus*. (4.) Below and outwards, a larger surface *g*—the external surface of the *body and tuberosity of the ischium*.

Fig. 7.



Innominatum: external view.

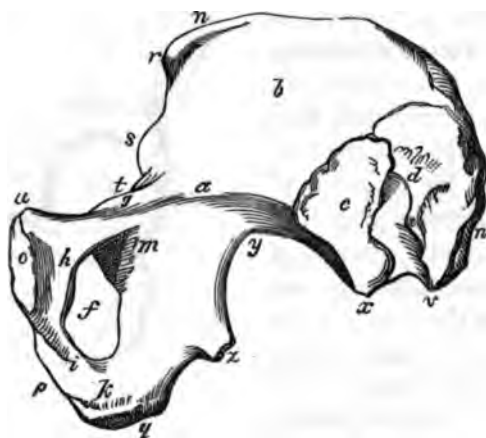
The *internal face* of the innominatum, Fig. 8, offers at its contracted middle, behind the acetabulum, a concave line, slightly prominent and obtuse, *a*, which divides it into two regions, one superior, the other inferior.—This is the *linea innominata*, and is a part of the superior strait of the pelvis. Above this line, the internal surface of the bone presents a large and smooth concavity *b*, looking inwards and upwards—the *internal iliac fossa*. Posterior to this fossa may be observed an uneven facet *c*, resembling that on the corresponding border of the sacrum, and exactly adapted to it. Behind this articular facet there is a rough surface *d*, for the attachment of ligaments. Below the *linea innominata*, the internal surface of the bone presents the internal face of the obturator foramen *f*, and about

this opening the following osseous planes: (1.) Superiorly, the posterior face of the *horizontal branch of the os pubis*, *g*. (2.) Inwards, the internal face of the *body of the os pubis*, *h*. (3.) Inferiorly, the internal face of the *ischio-pubic ramus*, *i*, and the internal face of the *ischium*, *k*. (4.) Outwards, a nearly quadrilateral surface *m*, consisting in great part of the posterior face of the cotyloid cavity.

The *superior border or crest of the ilium*, *n n*, is convex and twisted to the shape of the Italic letter *S*. It gives attachment to numerous powerful muscles, which are concerned in parturition.

The *inferior border*, *o, p*, comprises two parts very different in

Fig. 8.



Innomiatum: internal view.

their direction and uses—one superior, thick and nearly vertical; the other inferior, thin and oblique. The former presents a rough facet *o*, which articulates with a similar facet of the opposite bone, and forms the *symphysis pubis*; the latter, *p*, is the anterior border of the ischio-pubic ramus, which is flaring, and slightly twisted. Lower still, the border is thick and rough, forming the *tuber ischii*, *q*.

The *anterior border*, *r, u*, forms, by its junction with the superior, an angular eminence *r*, which can be felt through the skin—the *antero-superior spinous process of the ilium*. Below it is a notch, and then another eminence *s*—the *antero-inferior spinous process of the ilium*. Anterior to this last process, there is a convex surface, slightly rough, *t*—the *ilio-pectineal eminence*: then comes the superior face of the horizontal branch of the os pubis; a little further on, the *spinous*

process of the os pubis, *u*, and lastly, where this border joins the inferior is the *angle of the os pubis*.

The *posterior border*, *q*, *v*, where it meets the superior, forms a sharp prominence *v*—the *postero-superior spinous process of the ilium*. Below this spine is a slight notch, and then a second eminence *x*, formed by the posterior sharp extremity of the auricular facet—the *postero-inferior spinous process of the ilium*. Below this is a large notch *y*—the *great ischiatic notch*—succeeded by the *spinous process of the ischium*, *z*, and finally, the posterior border is confounded with the inferior in the tuberosity of the ischium *q*.

SECTION II.

ARTICULATIONS OF THE PELVIS.

The several bones of the pelvis which have been described, are connected together by articulations, called symphyses, of which there are four, viz: the *symphysis pubis*, *two sacro-iliac symphyses*, and the *sacro-coccygeal symphysis*.

1. SYMPHYSIS PUBIS.

The reciprocal union of the pubic bones is secured by somewhat rough articular surfaces upon the superior parts of the inferior borders of the innominata. The posterior and middle portion of each of these surfaces is nearly plane, while the anterior, superior and inferior portions are oblique or beveled, and the whole of it is covered by a thin lamina of cartilage. The plane surfaces correspond to each other, and are firmly united by the fusion of their cartilages, except very near the posterior face of the pubes, where there is a linear space in which the cartilages of the opposite sides are only contiguous, and covered by a synovial membrane. The beveled portions of the articular surfaces are occupied by a very dense and solid fibrous substance, called the *inter-pubic ligament*, which adheres very firmly to the cartilaginous layers, and completely fills up the void between them; so that it is quite thick in front, above, and below, but very thin behind. The upper part of this ligament, occupying the superior triangular space, is called the *superior pubic ligament*; the opposite part, filling the inferior triangular space, is the *inferior pubic* or *triangular ligament*, which is at the summit of the pubic arch.

The inter-pubic ligament is composed of fibrous fasciculi, which pass obliquely downwards from one os pubis to the other, decussating each other in their course: they become less oblique towards the superior and inferior parts of the articulation, so that the fibres of the superior and inferior pubic ligaments run nearly transversely. The ligamentous tissue is very compact, but contains a small quantity of a glutinous substance in its interstices. To these ligaments the symphysis pubis chiefly owes its stability; there is, however, a capsular ligament which, in front, is called the *anterior pubic ligament*, whose fibres arise from each of the spinous processes of the ossa pubis, and run obliquely downwards, reciprocally crossing each other upon the anterior face of the opposite os pubis, adhering closely to the subjacent inter-pubic ligament. Posteriorly the capsular ligament is identified with the periosteum, constituting a very strong layer under the name of the *posterior pubic ligament*, which is very intimately united to the inter-articular cartilage of the ossa pubis, and resembles in structure the inter-pubic ligament, for it is composed of little fasciculi running obliquely downwards, from one os pubis to the other.

2. THE SACRO-ILIAC SYMPHYSES.

The articular surfaces of the sacro-iliac symphyses include the auricular facets of the sacrum and innominata, together with the numerous inequalities of both bones posterior to their facets. The articular facets correspond exactly to each other, and the unequal surfaces behind them are so fitted to each other, that the sacrum and innominata, on each side, are interlocked, the eminences of one being received into corresponding depressions of the other, and thus contributing greatly to the firmness of their articulation. This is strikingly seen in the reception of the postero-superior spinous process of the ilium into a cavity of the sacrum external to its second foramen.

Each articular facet is covered by a thin layer of cartilage, having the form of the surfaces, being convex on the innominata, and concave on the sacrum.

The ligaments which secure these articulations are both numerous and strong.

First. There are the *posterior sacro-iliac ligaments*, Fig. 9, just behind the articular facets, occupying the kind of triangular space between

the posterior face of the sacrum and the corresponding parts of the internal surface of the innominatum. To these belongs a ligament that has received a distinct name, viz: the *posterior vertical sacro-iliac ligament, f*, which is inserted into the postero-superior spinous process of the ilium, and descending vertically, is attached to a tubercle, external to the third posterior sacral foramen.

Secondly. The *ilio-lumbar ligament, g*, which passes from the transverse process of the last lumbar vertebra to the middle of the iliac crest.

Thirdly. Two *sacro-sciatic ligaments* on each side, one greater, *h*, and the other lesser, *i*. The *posterior* or *greater sacro-sciatic ligament* arises from the internal margin of the tuber ischii, and passes obliquely upwards, inwards, and backwards, to be inserted into the border of the coccyx and of the inferior part of the sacrum. Thick and contracted in its middle, it is expanded towards its two attachments. The *anterior* or *lesser sacro-sciatic ligament* arises from the spinous process of the ischium, passes horizontally inwards and backwards in front of the greater, to which it is internally united, and is inserted into the inferior part of the borders of the sacrum and the coccyx. These ligaments convert the great sciatic notch into two foramina.

In front, the sacro-iliac symphyses are strengthened by a fibrous layer, scarcely distinguishable from the periosteum, which passes from the base and anterior face of the sacrum to the neighboring parts of the innominata, and is called the *superior* and the *anterior sacro-iliac ligaments*.

Fig. 9.



Pelvic Ligaments: posterior and external view.

3. SACRO-COCCYGEAL SYMPHYSIS.

This symphysis is composed of the articular facets upon the apex of the sacrum and base of the os coccygis, which have been described. The two bones are united by a fibrous substance, analogous to that interposed between the bodies of the vertebræ, which adheres strongly to the articular facets, and, like the inter-articular cartilage of the pubic symphysis, has sometimes a synovial mem-

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brane in its centre. The ligaments are the *anterior* and *posterior sacro-coccygeal*, which pass in a layer from the faces of the sacrum to those of the coccyx.

The articulation of the pelvic bones, with other portions of the skeleton, need not be described for obstetric purposes; but the connection of the sacrum with the last vertebra of the loins merits some notice at our hand. This articulation (the *sacro-vertebral*) is formed substantially as those between the several vertebræ of the spine, but it must be observed that the articular facets of the sacrum and last lumbar vertebra have such a degree of obliquity that, when they are brought together, the sacrum, directed backwards, makes with the spine a salient angle in front, denominated the *sacro-vertebral angle* or *promontory*, which is often referred to in describing the pelvis.

SECTION III.

THE PELVIS AS A WHOLE.

The different bones which have been described, when joined together, constitute a basin-like cavity, of an irregularly conoidal figure, the base of which is directed upwards and forwards, whilst the truncated apex looks downwards and backwards. A glance at the internal surface of this cavity discovers that it is naturally divided, by a sort of ply, called the superior strait, into a superior and an inferior portion. The superior, widely-expanded portion is denominated the greater pelvis: the inferior, narrower and deeper, is the lesser pelvis, or, as it is often called, the pelvic excavation.

THE GREATER PELVIS.

The greater pelvis is of comparatively little importance in obstetrics proper. The gravid uterus, it is true, is sustained by it, and its structure admirably fits it for this office, but it has no special relation to parturition. In cursorily examining it, we may note: (1.) *A great vacuity in front*, not found in the pelvis of quadrupeds, comprised between a line extending from the antero-superior spinous process of one ilium to that of the other and the horizontal branches of the pubes. Occupied in the living body by soft and extensible tissues, this vacuity permits the uterus to gravitate forwards during advanced pregnancy, and thus relieves the pelvic viscera from its pressure. (2.) The *internal iliac fossæ* on the

sides, whose concave surfaces look obliquely forwards and inwards. (3.) Behind, the *sacro-vertebral promontory*, and, on either side of it, deep gutters between it and the posterior parts of the iliac fossæ.

The border of the greater pelvis, deficient in front, owing to the great vacuity, is formed by the base and posterior margins of the wings of the sacrum and the anterior three-fifths of the crests of the ilia.

As to the capacity of the greater pelvis, its *transverse dimension*, *i. e.*, from the middle of one iliac crest to the other, is about ten inches; from one antero-superior spinous process to the other being an inch less, whilst its *depth* from the highest part of the iliac crest to the superior strait is three and a half inches.

THE LESSER PELVIS, OR PELVIC EXCAVATION.

The lesser pelvis, called also the true pelvis, inasmuch as it alone is concerned in transmitting the fetus, is that part of the basin that is inferior, in point of situation, to the greater. Being somewhat contracted at its superior and inferior apertures (straits), and widened towards its middle, it is composed of walls of diverse length and direction, the study of which is of indispensable importance to the accoucheur. In our examination of it, we may consider: (1.) The middle part of it—the *excavation proper*. (2.) The *superior aperture* or *entrance*, *superior* or *abdominal strait*, *brim* of the pelvis—for by all these names it is distinguished. (3.) The *inferior aperture* or *outlet*, called also the *inferior* or *perineal strait*.

Excavation of the Pelvis.—The excavation may be regarded as a conoidal canal, curving forwards, which we may divide, by imaginary lines, into four regions, *viz.*, an anterior, a posterior, and right and left lateral regions.

The *anterior region*, Fig. 10, is comprised between the two lines *ee*, extending vertically from the iliopectineal eminences to the internal surfaces of the ischiatic tuberosities. In this region may be observed: (1.) The symphysis pubis, which not unfrequently appears as a prominent

Fig. 10.

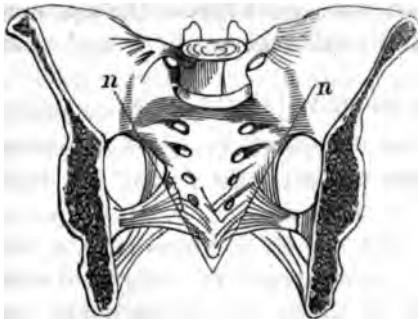


Pelvic Regions: anterior and internal view.

crest, on account of the projection of the bones or of their intervening cartilage. (2.) On either side of this, the internal surface of the body of the os pubis. (3.) The subpubic foramina and the membranes closing them. (4.) Above these foramina, the internal surfaces of the horizontal branches of the pubes. (5.) Internally and inferiorly to the foramina, the internal faces of the ischio-pubic rami and a part of the ischiatic tubers.

The *posterior region*, Fig. 11, is included between the two lines *n n*, descending obliquely from the superior and anterior part of each sacro-iliac symphysis to the inferior edges of the great sacro-sciatic ligaments, near their insertion into the sacrum and coccyx.

Fig. 11.

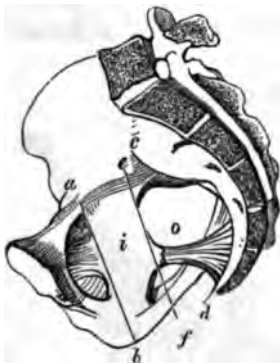


Pelvic Regions: posterior and internal view.

of the primitive division of the sacrum into false vertebræ, together with the articulation between the sacrum and coccyx. (2.) Two rows of holes, five in each, with their gutters—the anterior sacral foramina.

The *lateral regions*, Fig. 12, are necessarily included between the two lines *a b* and *c d*, which bound the preceding regions. They are slightly concave, and may, according to M. Dubois,¹ be decomposed into two oblique planes, one anterior, the other posterior, which are confounded in forming a very obtuse angle along a line *e f*, which cuts the base of the spinous process of the ischium. These two surfaces represent, on each side, nearly the half of a lozenge. The anterior plane *i* is formed by the greater part of the posterior face of the

Fig. 12.



Pelvic Regions: lateral and internal view.

¹ *Traité Complet de l'Art des Accouchemens*, Paris, 1849.

cotyloid cavity and the posterior half of the internal face of the tuber ischii. It is therefore entirely osseous, and looks obliquely inwards and backwards. Forwards, it is confounded with the obturator fossa, which may be regarded as its natural prolongation. The posterior plane *o*, is formed by the internal face of the ischiatic spine, by the anterior faces of the sacro-sciatic ligaments, and by the two ischiatic foramina and the muscles, &c., that occupy them. It is therefore essentially composed of soft parts, and looks obliquely forwards. These two surfaces have been called the *anterior* and the *posterior inclined planes* of the pelvis, and great consequence has been attributed to them, on account of their supposed influence in imparting to the head of the foetus a certain movement, in its transit through the pelvic canal.

It is very curious that although obstetric writers are generally agreed that there are two planes, on each side of the excavation, diversely inclined, hardly any two concur in their descriptions of them.

Dugès,¹ for example, accepts the two inclined planes; but one of them is *inferior* as well as anterior, and the other is *superior* as well as posterior; and the line that divides them runs horizontally across the ischium from the root of its spinous process. According to him, the *antero-inferior* plane is due to the flaring of the lower part of the ischium; and, any body sliding along it, is directed towards the pubic arch; whilst the *postero-superior* conducts, on the contrary, into the hollow of the sacrum. "These inclined planes," he observes, "favor the rotation by which the great diameter of any voluminous body, traversing the pelvis, becomes antero-posterior, when it arrives at the perineal strait, instead of continuing transverse, as it was in entering the abdominal strait." It is specially the rotation which the head of the foetus executes, in its passage through the pelvis, that is referred to in the above quotation, which is ascribed to the direction imparted by these planes.

From the discrepancy between these masters in obstetrics, it is certain that the planes in question cannot be very well marked or distinguished from each other. Indeed, after repeated careful examination of the pelvis, and with a strong predisposition, from the force of authority, to see as others have seen, I cannot admit that there are two planes on each lateral wall of the pelvis, having any

¹ Manuel d'Obstétrique.

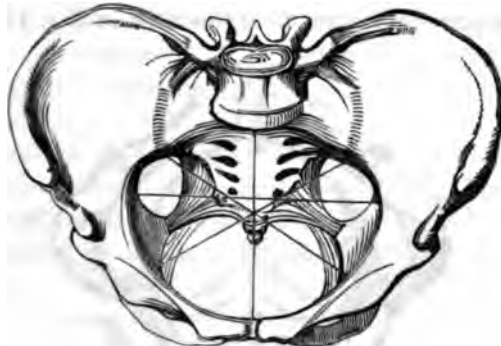
such uses as have been ascribed to them. All that I can see, is what must strike any one who looks, without preconception, into the pelvic excavation from above, viz: that the lateral walls have a decided inclination towards each other, insomuch that they are nearer each other, by an inch, at the inferior strait than at the superior. There is manifestly, then, *one* inclined plane on each side of the pelvic canal, which may be called the inclined plane of the ischium, because it is formed chiefly by the inner face of this bone. These planes, or, in other words, the simple convergence of the ischia do, as we shall see, influence labor, not by impressing a rotatory movement upon the head, but by causing it to become flexed as it engages more and more deeply in the pelvis.

The dimensions of the pelvic excavation ought not to be overlooked. Its *antero-posterior diameter*, or a line stretched from the middle of the posterior face of the symphysis pubis to the junction of the second piece of the sacrum with the third, measures about 4.8 inches. Its *transverse diameter*, or a line from one side to the other, crossing the first at a right angle, measures the same. Measured by two other lines, or *oblique diameters*, extending from the posterior face of each of the subpubic foramina to the centre of each sacro-sciatic hole, the same dimensions are obtained, so that the excavation, at its middle, is of equal capacity in all directions. This is not the fact in regard to its entrance, nor, in the opinion of many, its outlet, as we shall presently see. The varying height of its walls should be, particularly noticed. There is, in this respect, according to M. Capuron, a constant relation between them—the anterior or pubic wall being one-third the height of the posterior or sacral, and one-half the height of the lateral walls. The height of the pubic wall is $1\frac{1}{2}$ inch, and consequently, by the rule of proportion, the height of the lateral walls is $3\frac{1}{2}$ inches, the height of the sacral wall is $5\frac{1}{2}$ inches.

The Superior Strait.—The superior strait is formed posteriorly by the sacro-vertebral angle and the anterior margins of the wings of the sacrum, by the linea innominata on the sides, the ilio-pectineal eminences in front, and the posterior borders of the horizontal branches and bodies of the pubes. To give an idea of its figure, it has been compared to an oval, an ellipsis, a triangle, and to the heart of playing cards. We shall probably represent its figure most nearly by saying that it is elliptical, with a scallop posteriorly, produced by the projection of the sacro-vertebral angle.

Four diameters are attributed to this strait, viz: an *antero-posterior, sacro-pubic* or *conjugate* diameter *a a*, Fig. 14, extending from the sacro-vertebral angle to the superior border of the sym-

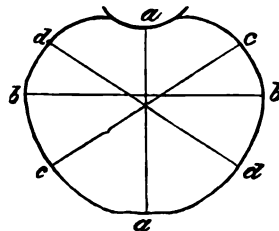
Fig. 13.



Diameters of the Superior Strait.

physis pubis; the *transverse* or *bis-iliac*, *b b*, extending from the middle of the linea innominata of one side to the same point of the opposite side, crossing the preceding at right angles; *two oblique* or *diagonal*, *d d*, *c c*, one from each ilio-pectineal eminence to the diagonally opposite sacro-iliac symphysis, and distinguished as right or left, according to the ilio-pectineal eminence from which they proceed. The transverse diameter is the greatest, and the antero-posterior is the least; but, as to the average length of these several diameters, there is nothing like agreement among authors. Professor Meigs measured the straits of ten pelves in his collection, the mean of which, at the superior strait, was, for the antero-posterior diameter, 4.2 inches; for the transverse diameter, 5.1; and for the oblique diameter, 4.9, which accords very nearly with the results of the few measurements which my limited opportunities have enabled me to make.

Fig. 14.



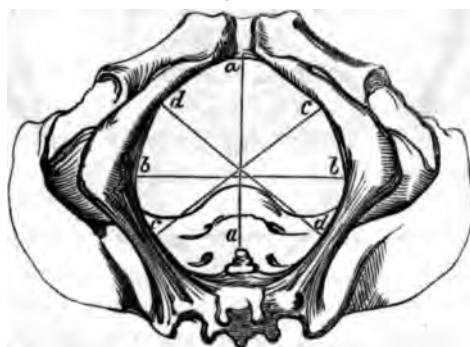
Diameters of the Superior Strait.

The Inferior Strait.—The inferior strait, perineal strait, or outlet of the pelvis, is formed, posteriorly, by the point of the coccyx and the conjoined sacro-sciatic ligaments, laterally, by the inferior

margins of the greater sacro-sciatic ligaments and the internal surfaces of the ischiatic tubers, and anteriorly by the inferior borders of the ischio-pubic rami, together with the triangular ligament of the pubes.

There is greater difficulty, on account of its irregularity, in determining the figure of this strait; but it is nearer an oval than any other geometrical figure, as represented in Fig. 15.

Fig. 15.



Diameters of the Inferior Strait.

The figure of the inferior strait is not, like that of the superior, fixed and unalterable; on the contrary, being composed, in part, of fibrous and somewhat extensible tissue, and one of the points of its boundary, the coccyx, possessing mobility, its figure may be altered and its capacity increased, when it is forcibly distended by the pressure of the foetus in childbirth.

Its circumference, instead of being plane like that of the superior strait, is marked by three triangular projections, and three scallops. The posterior projection is formed by the coccyx, and the two lateral by the ischiatic tuberosities. Two of the scallops are posterior and lateral, formed by the curved borders of the sacro-sciatic ligaments; the other, much deeper and more important, is anterior, and constitutes the *pubic arch*.

The same diameters are reckoned to the inferior strait as to the superior, viz., the *antero-posterior* or *coccy-pubic*, *a a*, Fig. 15, extending from the point of the os coccygis to the summit of the pubic arch; the *transverse* or *bis-ischiatic*, *b b*, from the middle of the internal surface of one ischiatic tuber to the same point of the opposite side, and *two oblique*, *c c*, *d d*, which are drawn from the middle of the sacro-sciatic ligaments of each side to the middle of the height of the ischio-pubic ramus of the opposite side.

With regard to the length of the diameters of the perineal strait, there is not quite so great a difference among authors as in reference to the abdominal. The verdict of a clear majority is in favor of their being estimated as equal, measuring 4 inches each; but the coccy-pubic, according to this same verdict, is capable of being lengthened, by the yielding of the coccyx, to the extent of $\frac{1}{2}$ to 1 inch, so as to become virtually the longest, when required by the exigencies of parturition. This may be considered as the predominant opinion among accoucheurs, and yet it is not, by any means, well established. Professor Meigs, in the measurements to which reference has already been made, found that the mean of the antero-posterior diameter of this strait was only 3.7 inches, that of the transverse diameter being 4.3. He does not give the length of the oblique diameters, which he appears, in fact, to ignore at the inferior strait.

Here, again, my own finding, as far as it goes, corresponds with that of the distinguished teacher of Midwifery in the Jefferson Medical College, and I am persuaded that the utmost retrocession of the coccyx cannot make this diameter surpass the transverse and oblique. This is the statement of Dr. Rigby¹ also, as far as comparison between the *oblique* and *antero-posterior* diameters is concerned, for he says that the latter measures 3.8 inches, and the former 4.8, but allows that the coccyx may be pushed back during labor to the extent of a whole inch, and make them equal. To the transverse diameter he allows only 4.3. I have not been able to confirm Dr. Rigby's accuracy in the measurement of the oblique diameters, and I doubt whether they exceed the transverse; so that, on the whole, I incline to the belief that the transverse and oblique diameters are equal, measuring about 4.3 inches, and that the antero-posterior may be made commensurate with them by the yielding of the os coccygis.

From what has been now declared, we can form a true idea of the pelvic excavation, considered as a parturient canal. We have seen that it is widest transversely at its entrance; but that in consequence of the convergence of the ischia and the concavity of the sacrum, its dimensions in the middle are equal in all directions. At its outlet, this equality is broken by the forward projection of the coccyx, so that the transverse and oblique diameters again predominate over the antero-posterior; but this may be obviated, when

¹ System of Midwifery, Phil. ed., 1841.

needful, by the retrogression of the coccyx. This view is in conflict with the long-established and deeply-rooted notion, already alluded to, viz., that the cavity is most capacious antero-posteriorly at its inferior aperture—a notion which, as we shall see, has pervaded almost every description of the mechanism of labor, since the days of Smellie. Nor is it exactly in accordance with the statements of Dr. Rigby, according to whom the *oblique* dimensions of the excavation, at its middle, measure more than either the transverse or antero-posterior. But it must be remembered that these oblique

Fig. 16.



Relation of the Axis of the Body to the Axis of the Pelvic Excavation, in the erect position.

diameters are measured from the sub-pubic to the sacro-sciatic *holes*—occupied by soft parts in the living body—and in stretching a line between them, in the dried pelvis, it is difficult to make proper allowance for these absent soft parts. According to the best estimate I can make, and after a careful examination of the recent pelvis, I judge that Dubois is right in reckoning all the diameters equal in this part of the excavation.

Direction of the Pelvic Excavation.—In consequence of the angular connection of the pelvis with the spine, already referred to, its excavation is not placed in the direction of the axis of the abdominal cavity, in the erect position, but, on the contrary, is removed so far behind it that a perpendicular line *a a*, Fig. 16, representing this axis, falls upon the symphysis pubis, and leaves the excavation nearly entirely behind it. Thus situated, the pelvic organs are removed, in a great measure, from the pressure of the super-incumbent viscera of the abdomen, which are sustained chiefly by the parietes of

the inferior region of the abdomen. It is important that the obstetric student should have an accurate idea of the degree of this inclination of the pelvis, and the direction of its axis, which he can get by attending to the

Planes and Axes of the Pelvis.—Any plane surface, a piece of milliner's board, for example, adapted to the pelvic straits, so as to close them, will represent what are called their planes. In the diagram, Fig. 17, of the pelvis of a woman standing, if a straight line, *ba*, be drawn from the middle of the sacro-vertebral angle to the superior part of the symphysis pubis, it will indicate the direction of the *plane of the superior strait*, and it will be seen that the surface of the plane is directed obliquely upwards and forwards. Let another straight line, *dc*, be drawn from the point of the coccyx to the inferior part of the symphysis pubis; this will indicate the direction of the *plane of the inferior strait*, which is seen to be higher behind than in front, and the surface which it represents is directed obliquely downwards and backwards. If the anterior extremities of the two planes be produced, they will intersect each other at the distance of an inch or two from the pubes, and if, before they meet, they are made to cross the horizontal line *fe*, the prolonged plane of the superior strait will form with this line an angle of about 60 degrees; whilst the plane of the inferior strait forms with it an angle of only 11 degrees.



Planes and Axes of the Pelvis in the erect position.

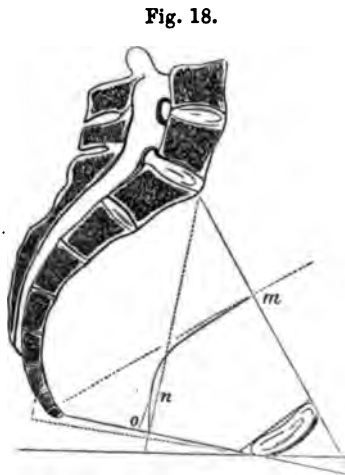
These planes diverge from each other posteriorly, where they are separated by the whole length of the sacrum and coccyx, whereas anteriorly only the symphysis pubis is interposed between them. It may serve to convey a more exact idea of the actual inclination of the plane of the superior strait, to add that a horizontal line, touching the top of the symphysis pubis, will strike the middle of the coccyx.

The *axes of the straits* are imaginary straight lines, passing through the centres of their planes, perpendicularly to their surfaces. Such are the lines *gh* and *ik*, the former representing the axis of the superior strait, the latter the axis of the inferior strait. The axis of the superior strait, produced upwards and forwards in the

living subject, would pass out of the abdomen, near the umbilicus; produced downwards and backwards, it would strike the os coccygis. The axis of the inferior strait, produced upwards and forwards, would cross the axis of the superior strait towards the middle of the excavation, forming with it an obtuse angle, and reach the sacro-vertebral angle. Produced in the opposite direction, in the upright living body, it passes obliquely downwards and backwards through the soft parts near the anus.

The axes of the straits indicate the direction which the fœtus

must take as it traverses these apertures, but they do not represent the intermediate direction it must follow in the excavation itself, viz., the *axis of the excavation*. This is represented by a curved line *m n*, Fig. 18, which, confounded with the axes of the straits at its extremities, traverses the pelvic cavity, equidistantly from its walls. It is evident, upon close inspection, that in the superior two-fifths of the excavation, this central line is but slightly curved, and is parallel nearly with the axis of the superior strait, because the superior portion

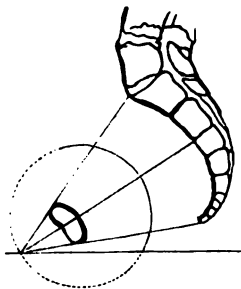


Axis of the Pelvic Excavation.

of the sacrum and the symphysis pubis are only slightly curved;

but, in the inferior three-fifths, the line becomes much more curved in conformity with the increased curvature of the sacrum and coccyx. Hence it is evident that Carus's curve, as it is called (though it is due to Camper), is not a true representation of the axis of the excavation. This somewhat famous curve is projected, as exhibited in Fig. 19, by describing in the pelvic excavation a circle, having for its centre the middle of the posterior face of the symphysis pubis, and for one of its radii half the sacro-pubic diameter of the superior strait. So much

Fig. 19.

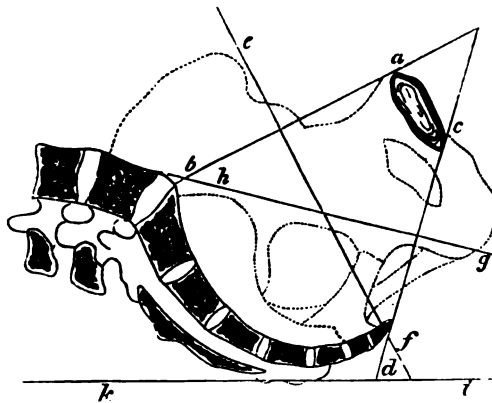


Curve of Carus.

radii half the sacro-pubic diameter of the superior strait. So much

of this circle as is included between the intersections of the antero-posterior diameters of the straits, is the curve in question, in accordance with which the foetus is presumed to move in traversing the excavation. But the curvature of the sacrum, as I have said, is not the arc of a circle; and because the axis of the excavation must necessarily be conformed to this curvature, it cannot be represented, as in Carus's curve, by the arc of a circle. For a correct representation of it we must look again at Fig. 18. It should be particularly observed that the posture of the body may change materially the direction of the planes and axes of the pelvis, and it behooves the obstetrician to familiarize himself with these changes, inasmuch as a just appreciation of them is necessary in the performance of his most ordinary operations. *First*, let him note the effect, in this respect, of recumbence on the back—the common posture for delivery

Fig. 20.

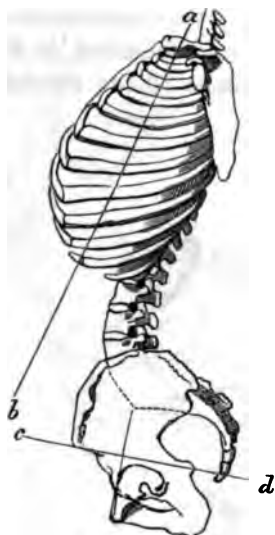


Direction of the Pelvic Planes and Axes in the recumbent position.

with the French, and not unusual with us, especially in instrumental deliveries—the relation of the pelvic planes and axes to the horizon is not at all the same as in the erect position, as a glance at Fig. 20 will show. The plane of the abdominal strait *a b*, instead of being directed upwards and forwards, looks upwards and backwards, and its axis *e f*, instead of being directed from before backwards, and from above downwards, is directed from behind forwards, and from above downwards. The plane of the perineal strait *c d*, instead of looking backwards and downwards, looks forwards, and its axis *g h*, instead of being directed somewhat backwards, is directed nearly straight forwards.

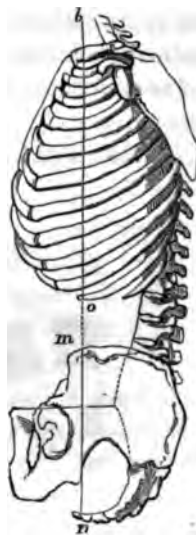
Secondly. The mutual mobility of the pelvis and trunk changes continually the relation of the pelvic axes and planes to the trunk. In a person standing with the trunk thrown backwards, as in Fig. 21, the direction of the axes and planes will be changed, so that they will no longer have the same relation, either with a horizontal line or with the axis of the trunk, which they have in the simply erect position. The axis of the superior strait *c d*, produced forwards, instead of passing to the umbilicus, will fall considerably below it, and be far removed from the direction of the axis of the trunk *a b*.

Fig. 21.



Relative Direction of the Axes of the Trunk and Pelvis with the body thrown backwards, in the erect position.

Fig. 22.



Relative Direction of the Axes of the Trunk and Pelvis, with the body bent forwards.

But now let the trunk be slightly bent forwards, as in Fig. 22, the direction of the planes of the straits will approach the horizontal line, and the axis of the superior strait, produced, will pass quite above the umbilicus, and become coincident with the central line of the thoracic cavity. When this coincidence is established, the contraction of the diaphragm and abdominal muscles is much more available in seconding the efforts of the uterus to expel the foetus, and hence parturient women instinctively assume the posture which brings it about, flexing the head upon the trunk, and the trunk

upon the pelvis. There is, therefore, wisdom, of nature's teaching, in the exhortation of considerate matrons, so often heard in the lying-in room, to *tuck the chin on the breast*—for this simple movement goes far towards bringing about this advantageous adjustment.

SECTION IV.

THE PELVIS MODIFIED BY SEX.

There is a general resemblance between the pelvis of the male and female, correspondent to the common uses subserved by it. But to qualify the female for the peculiar part imposed on her, in the continuance of the species, some peculiarities in the conformation of the pelvis are indispensably necessary. These may be best appreciated by comparing the pelvis in the two sexes, as illustrated by the diagram, Fig. 23.

Fig. 23.



Male and Female Pelves.

In looking at the pelvis of the female, No. 2, and comparing it with that of the male, No. 1, we cannot fail to remark the preponderance of the transverse and antero-posterior diameters over the vertical; in other words, it is wider and more shallow, a capital recommendation of the parturient canal, in which difficulties are so often encountered notwithstanding its width and shallowness.

This is the fundamental peculiarity of the female pelvis, and all others, worthy of note, are subordinate to it or necessarily grow out of it. Thus, the *superior strait is more elliptical in the female*, owing to the greater curvature of the linea innominata; but the sacrum being no wider, and often narrower than in the male, the capacity of the superior strait could not be increased in any other manner. The *curvature of the sacrum is greater*, and more regular

from base to apex; but this is indispensable to the acquisition of increased dimension in the antero-posterior diameter of the excavation. The *symphysis pubis* is shorter; but this follows of course from the shallowness of the excavation.

The *tuberosities of the ischia* are wider apart, and the ischio-pubic branches *diverge* more and form a *less acute angle* at their junction under the symphysis pubis; but the inferior strait could not be otherwise enlarged. This strait is still further enlarged by the *eversion* of the internal borders of the ischio-pubic branches, another notable peculiarity of the female pelvis, which gives to its outlet the greatest possible amplitude.

SECTION V.

THE SOFT PARTS IN CONNECTION WITH THE PELVIS.

It is not my purpose, in this section, to describe the soft parts connected with the pelvis, for this would include no inconsiderable portion of anatomy, but simply to indicate such of these parts as materially affect the pelvis, considered exclusively as a parturient canal.

In this point of view, on looking into the recent pelvis, our attention is first attracted to the fleshy cushions on the sides of the greater pelvis, formed by the *psœ* and internal iliac muscles. These fill the gutter on either side of the last lumbar vertebra and raise the surfaces of the internal iliac fossæ, diminishing at the same time their obliquity, so that their declivity toward the excavation is more decided. The greater pelvis thus becomes, we may say, the mouth of the lesser, because any voluminous body, moving along its slopes, must needs be conducted into the excavation, without the possibility of lodging on the oblique surfaces of the iliac bones.

We should observe, in the second place, that the excavation is closed by soft parts at the inferior strait, and thus converted into a cavity, continuous with that of the abdomen, for containing and protecting important viscera, and among these the generative organs of the female. The soft parts, occupying this strait, may be called the *perineal floor*, which consists of several tissues. The firm basis of this floor is laid by the pelvic fascia, a fibrous membrane, which, after having lined the excavation and completed it by covering over

its osseous vacuities, stretches across the perineal strait, closing it perfectly except three openings for the vagina, bladder, and rectum; and even these openings are not, properly speaking, perforations, for the fascia is reflected from their borders upon these organs, so that its strength is maintained. This fascia is still further fortified, within the pubic arch, by several layers of perineal fascia, descending from the pubic bones.

The external convex surface of this fibrous web is covered by muscular and consequently contractile tissue, belonging to several muscles, of which the levator ani is the most conspicuous. This great fan-like muscle arises from nearly the whole of the internal surface of the excavation, and also from the fascia, to which it is adherent, and is inserted into the bladder and vagina, as well as into the rectum. It constitutes the greater part of the muscular stratum of the perineal floor, which is completed by cellular tissue and common integument.

Having now glanced at the more important soft parts connected with the pelvis, let us consider next how its obstetric uses are affected by them.

1. The figure of the abdominal strait, surmounted and overlapped by the *prææ* muscles, is no longer elliptical, but it is made to assume the shape of a triangle, whose truncated apex is towards the sacro-vertebral angle and base towards the pubes, the muscles themselves forming its sides. It is still more important to remark that the overlapping of these muscles abridges the transverse diameter of the strait, and gives the ascendancy to the oblique diameters, which are then the greatest diameters of this aperture. Accordingly it is to one of them that the long diameter of the child's head is usually found offering in vertex presentations.

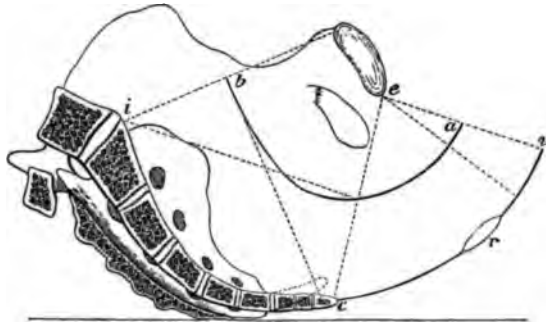
2. Notwithstanding that the pelvic excavation is converted into a cavity by the perineal floor, yet, in its obstetric relations, it retains the characters and uses of a canal. The opening of the inferior strait is replaced by that of the vagina, which is smaller and more anterior. The axis of this new opening, *i. e.* the axis of the vagina, crosses the axes of the straits in the middle of the excavation, and makes with the axis of the superior strait a less obtuse angle than does the axis of the inferior strait, which passes more posteriorly, and strikes the perineal floor between the vulva and anus.

3. The perineal floor is extensible, and it is owing to this property that it is developed, in a high degree, during parturition, by

the pressure of the foetus, urged against it by the uterine contractions. At the same time the vulva is dilated, and carried forwards, and when its dilatation is complete, the opening it offers is nearly as great as that of the inferior strait. Under these circumstances, the dilated vulva, and not the inferior strait, is really the outlet of the excavation, and as this condition of things—though of transient duration—exists in every case of labor, at the moment the child is ushered into the world, it ought to be clearly apprehended by every accoucheur.

In this new condition—the climax of the parturient act—the pelvic canal, as the cut shows, is much longer and more curved,

Fig. 24.



The Pelvic Canal extended by the dilated soft parts at the climax of the parturient act.

than it is without the soft parts. The posterior wall is doubled in length, and consists of two parts, one posterior and superior, *i c*, extending from the sacro-vertebral angle to the point of the coccyx, and the other, inferior and anterior, *c v*, soft and extensible, which continues, pretty regularly, the curve of the first, and extends from the point of the coccyx to the inferior commissure of the vulva. This last part comprehends two portions, one great, *c r*, extending from the coccyx to the rectum, and the other less, *r v*, from the rectum to the inferior commissure of the vulva.

The lateral walls are likewise composed of two parts of different structure; one, superior, extending from the superior faces of the psoæ muscles to the inferior borders of the ischio-pubic branches and the ischiatic tuberosities, is formed by the internal borders of the psoæ muscles, and the solid sides of the pelvis; the other, extending from the inferior termination of the former to the sides of

the vulva, is composed of the lateral regions of the perineum, greatly elongated.

The anterior wall, extending from the superior part of the symphysis pubis to the superior commissure of the vulva, is formed superiorly by the posterior parts of the bodies of the pubes, and inferiorly by the urethra and the superior part of the vagina.

The vulva, greatly dilated, is the terminal opening of this new portion of the pelvic canal, and, in a person lying on the back, its plane is directed obliquely upwards and forwards, *e v*, forming an obtuse angle with the anterior face of the pubes. Its axis may be represented by a line traversing its centre, and terminating a little below the coccyx. To represent the curved axis of this new part of the canal, all that is necessary is to prolong the central line of the osseous pelvis *a b*, from the inferior strait *e c*, to the centre of the vulva *a*, the point of its incidence with the axis of this opening. It will be seen then that the axis of the excavation, in its state of complete evolution, that is, with its soft supplement fully developed, is nearly a semicircle about the pubes, which indicates the track of the foetus in its exodus, and the course of the accoucher's hand in its introduction.

CHAPTER II.

THE SEXUAL ORGANS OF THE FEMALE.

SEVERAL organs, of diverse structure and uses, but intimately united, compose the sexual apparatus of the female, destined to concur largely in the reproduction of the species. These, reckoning from without inwardly, are: 1. The vulva, or pudendum. 2. The vagina. 3. The uterus, or womb. 4. Fallopian tubes, two in number. 5. The ovaria, also duplicate. The first of this series is usually denominated the external organ of generation, whilst the others are included under the common appellation of internal organs of generation, and are contained, or buried, as it were, in the excavation of the pelvis.

It will be well for the student to get a good general idea of this concourse of organs before he proceeds to examine them in detail, and this he can easily do, so far as the internal organs are concerned, by casting his eye upon Fig. 25, in which *o o*, are the ovaries; *u*, the uterus; *t t*, the Fallopian tubes; *l l*, the broad ligaments; *r r*, the round ligaments; and *v*, the vagina.

In describing the sexual organs, writers pursue methods varying according to the points of view from which they are regarded. Thus, a very common method is to describe the external organ first, and then *seriatim*, the internal organs. But Dubois reverses this order, commencing with the ovaria and ending with the vulva, proceeding upon a distribution of the organs under the following categories, viz: 1. Organs which produce and contain ovules (the ovaria). 2. Organs which seize and transport ovules (the Fallopian tubes). 3. The organ to which ovules are transported and in which they are retained for a determinate time (the uterus). 4. The organ that gives issue to the ovules when developed (the vagina). 5. The vulva, at once the organ of transportation and copulation. This, it is needless to say, is an arbitrary division, founded upon only

one of the uses which the several parts of the sexual apparatus subserve, and has, therefore, no special claims to our adoption.

Fig. 25.



The Internal Organs of Generation.

The method which I have long followed in the lecture-room appears to me best calculated to introduce the student to such an acquaintance with these parts as is most useful for obstetric purposes; it is that of M. Dugès and Madame Boivin, in their great work on the maladies of females, in which the uterus, as the central and by far the most important organ of the sexual system, obstetrically considered, is described first, and the others are treated as its annexes, internal and external.

SECTION I.

THE UTERUS.

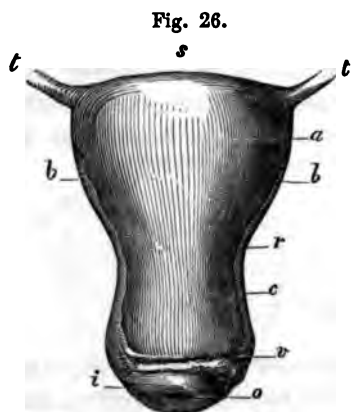
The uterus is a hollow organ, situated in the median and superior part of the pelvic excavation, between the bladder and rectum, and above the vagina, to the upper extremity of which it is connected. Its figure is that of a conoid, flattened upon its anterior and posterior surfaces, with its base directed upwards and its truncated apex downwards. It has, also, been likened to a small flat gourd, with its body upwards and neck downwards. As to its position, it should be observed that it is placed nearly in the direction of the axis of the

superior strait, so that when the woman is standing, its base or fundus inclines forwards and reaches as high as the level of the superior strait, whilst its neck is directed backwards and is not more than an inch above the floor of the pelvis.

Since the time of Levret and Roederer, it has been customary to divide the uterus, by certain imaginary lines, into three parts, viz., fundus, body, and neck: but nature has clearly indicated only two parts as belonging to it, namely, *body* and *neck*; the former comprising, in the nulliparous or virgin uterus, the superior, and the latter, the inferior half of the organ. This natural division is indicated by a contraction at its middle, where the neck joins the body, and it is the only one which will be recognized in this work. It is, nevertheless, to be observed that special names have been bestowed upon particular portions of the uterus, of its body and of its neck, which it is convenient to retain, and from which no harm can arise, if we keep in mind the fundamental division which we have adopted. Thus, the superior convex part of the body is denominated the *fundus*, limited inferiorly by a line drawn transversely between the orifices of the Fallopian tubes. The neck (*cervix*) is considered as consisting of two portions, one superior, extending from the contraction already mentioned to the attachment

of the vagina, and distinguished as the *supra-vaginal portion* of the neck: the other inferior, projecting into the vagina, and called by some the *vaginal portion* of the neck, by others, the *chirurgical neck*, because it is accessible to surgical treatment.

All this is illustrated by the drawing, Fig. 26, which represents a posterior view of the uterus of a virgin: *a*, body of the uterus; *c* neck or cervix; *r*, contraction indicating the limit of the body and neck; *s*, superior border or fundus



Virgin Uterus: posterior view.

of the uterus; *b b*, lateral borders; *t t*, Fallopian tubes; *v*, insertion of the vagina; *i*, vaginal portion of the neck; *o*, external orifice.

Being a hollow organ, the uterus has, of course, an external and an internal surface, each of which merits a particular examination.

The External Surface.—This surface presents: (1.) *Two faces*, an anterior and a posterior face, which are smooth and convex; the anterior face is in relation with the bladder, to which it is connected inferiorly; the posterior face is towards the rectum, to which it is simply contiguous, not connected. (2.) *Three borders*, one superior (the fundus), which is remarkably affected by the parturient offices of the organ, being nearly plane in women who have never been pregnant (nulliparæ), but convex in such as have borne children (multiparæ), the convexity increasing in proportion to the frequency of parturition: two lateral borders, convex superiorly and inferiorly, but concave at their middle, opposite the contracted part of the uterus. (3.) *Two superior angles*, where the lateral borders meet the superior border, indicated by the insertion of the Fallopian tubes. (4.) *An inferior angle*, the vaginal portion of the neck or os uteri, forming a more or less conical projection into the vagina. Upon the summit of the cone, viz: its most dependent part, there is an aperture, in the shape of a transverse fissure, which is the *external or vaginal orifice* of the uterus. This orifice is bounded by two labia, the anterior and the posterior, and presents very different appearances, according as the woman has or has not borne children, which will be presently noted. In the meanwhile, let the reader inspect Fig. 27, which gives an external view of the multiparous uterus, and compare it with the nulliparous, in Fig. 26.

It will readily be perceived that the body gains prodigiously upon the neck, in consequence of child-bearing, and that the fundus is, in a special manner, developed and rendered much more convex. Not less striking are the changes induced in the vaginal portion of the neck, and with these, as well as everything pertaining to this small part of the organ, the obstetric physician ought to be very familiar. The characteristics of the vaginal neck of the virgin uterus are, its mammillary shape, the greater thickness and roundness of the anterior labium, the os appearing as a small transverse fissure, each end of which is turned slightly backwards, and the

Fig. 27.



Multiparous Uterus: external view

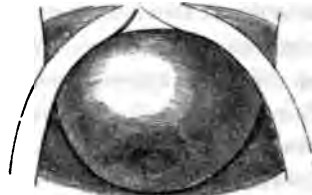
smoothness, evenness, and firmness of its whole surface. When viewed through the speculum it is, as Mr. Whitehead has said,¹ of a reddish gray color, excepting the margins of the orifice, which have a pinkish or salmon hue. This rough sketch, Fig. 28, copied from his book, may serve to give an idea of the orifice, specially of the deflection of its commissures, which causes it to resemble the aperture from which it derives its name of *os tinæ*.

Fig. 28.



Os Tinæ of Virgin Uterus.

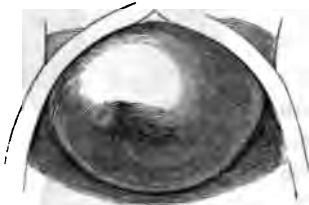
Fig. 29.



Os Uteri, before child-bearing.

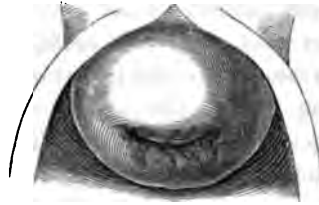
In women who have borne children, this part is altered in all its features. It is no longer conical, but cylindrical, in consequence of the enlargement of its free extremity; the orifice is larger and more slit-like, loses the slight bend at each of its extremities, and its margins, instead of being even, as in the virgin, are often notched by slight lacerations produced by parturition. The whole cervix is, moreover, enlarged and not so compact in texture. These alterations are represented in Figs. 29, 30, and 31;—Fig. 29 showing the os uteri in a woman who has not borne a child; Fig. 30, the same part after one child has been borne, and Fig. 31, after many have been borne.

Fig. 30.



Os Uteri, after birth of one child.

Fig. 31.



Os Uteri, after birth of many children.

The Internal Surface.—In looking into the cavity of the uterus,

¹ Causes and Treatment of Abortion and Sterility, 2d Am. ed., p. 162.

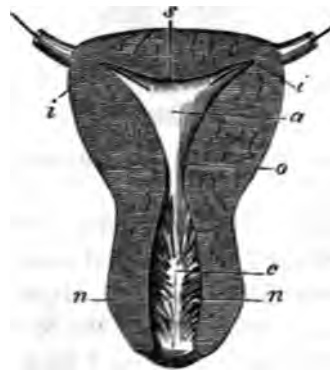
it will be observed that it is narrower at the point corresponding to the contraction seen externally, than it is above or below. This narrow part, called the *internal orifice* of the womb, marks the division into the cavity of the body, and cavity, or, as it is frequently called, canal, of the neck. Notwithstanding that the internal orifice opens a sufficiently free communication throughout the interior of the organ, this division is not, as some suppose, arbitrary, but natural, the two cavities differing, as we shall see, in anatomical structure and physiological uses.

The student should, first, acquaint himself with the condition of the internal surface of the *virgin uterus*, and then he can appreciate the changes induced by parturition. Such a uterus is represented in Fig. 32, in which it is seen that the *cavity of the body*, *a*, is triangular in shape, its base being upwards, and the apex downwards at the internal orifice *o*. It has an *anterior* and a *posterior wall*, which are nearly plane and contiguous, being separated only by a thin layer of mucus, so that it presents, as Dubois has well said, the elements of a cavity rather than a real cavity. It is bounded by *three borders*—one superior, *s*, or the fundus of the cavity of the body, and two lateral. Each of these borders is curvilinear, and offers its convexity towards the cavity itself. The junction of the superior with the lateral borders produces the *two superior angles* of this cavity, where the minute orifices of the Fallopian tubes *i i*, are found.

The lateral borders approach each other in descending to the internal orifice, where they may be said to terminate by forming the *inferior angle* of the cavity of the body.

The *cavity of the neck*, *c*, is a canal, flattened antero-posteriorly, dilated at the middle and slightly contracted at its extremities. Both its anterior and posterior walls present, in the median line, a longitudinal crest, from which proceed outwardly numerous folds towards the lateral borders of the cavity *n n*, where they terminate in vertical eminences less prominent than the median crests. These folds run a little obliquely upwards, being

Fig. 32.

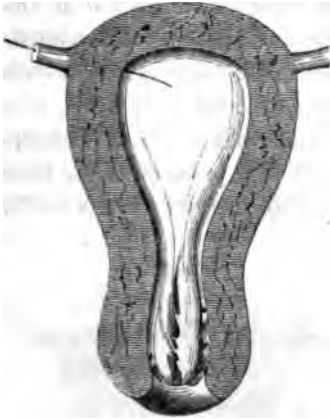


Internal Surface of the Virgin Uterus.

regularly arranged one above another, and from their arborescent appearance have been denominated the *arbor vitæ*. The internal surface of the body of the uterus, being perfectly smooth and of a deeper color withal, offers a striking contrast with this plicated appearance of the neck.

Let the student now look at the *uterus of a multipara*, Fig. 33: he will perceive that the cavity of the body is oval instead of triangular, its borders having become concave, instead of convex—the large extremity of the oval being formed by the fundus. The form of the neck is not materially altered, but its internal orifice is more patent, and is, on account of the hypertrophy of the body, removed to a greater distance from the fundus.

Fig. 33.



Internal Surface of a Multiparous Uterus.

body, 9 lines; thickness of the body, from 9 to 10 lines; thickness of the neck, 6 lines; thickness of the contraction, 4 lines; thickness of the walls of the body, about 4 lines; thickness of the neck, about 3 lines; projection of the borders of the orifice, $4\frac{1}{2}$ lines; size of the utero-vaginal orifice, 3 lines. Weight, one ounce. (2.) *Of the multiparous uterus.* Total length, 3 inches; breadth of the body, 2 inches; breadth of the neck, 18 lines; breadth of the contraction, 15 lines; thickness of the body, 14 lines; thickness of the neck, 10 lines; thickness of the contraction, 8 lines. Thickness of the walls of the body, 6 lines. Size of the utero-vaginal orifice, 6 lines. Weight, about two ounces.

Structure of the Uterus.—The uterus is composed of three different tunics or coats, together with bloodvessels, lymphatics, and nerves.

1. Its *external tunic* is derived from the peritoneum—the great serous membrane that lines the cavities of the abdomen and pelvis, and invests all their viscera—and is, on this account, very properly called its *peritoneal coat*. It covers the superior three-fourths of the anterior face of the uterus, the fundus, and the whole of the posterior face; nay, it descends, in that direction, to cover the superior and posterior fifth of the vagina. The vaginal portion of the neck is not, of course, invested by the peritoneal coat, nor is the whole of the anterior face of the supra-vaginal portion, nearly a half inch of which is in contact with, and united by cellular tissue to, the inferior part of the posterior face of the bladder. The external surface of this tunic presents the smooth and polished aspect of the peritoneum elsewhere, whilst its internal surface adheres intimately to the subjacent coat of the uterus, specially at the fundus, and along the median line of its anterior and posterior faces.

The peritoneal tunic is reflected from the uterus to the bladder and rectum: to the bladder, from the inferior part of the anterior face of the uterus; to the rectum, from the superior part of the vagina, after having furnished the posterior face of the uterus with a complete covering. These reflections form *two culs-de-sac*—one anterior or *utero-vesical*, and another posterior or *utero-rectal*, which are the lowest points of the peritoneal cavity, the latter being the lowermost of the two. Let the student not fail to observe that in the utero-rectal cul-de-sac, the peritoneal cavity, and the vaginal canal, are separated only by the peritoneal membrane and the coats of the vagina, and that punctures or lacerations here will necessarily penetrate the cavity of the peritoneum.

On each side of these culs-de-sac the peritoneum presents falci-form folds, which are made conspicuous by forcibly separating the uterus from the bladder and rectum. These are the *vesico-uterine* and *utero-sacral ligaments*, which do not consist of the peritoneal membrane alone, but include fasciculi of fibres that arise from the proper tissue of the uterus, and are inserted into the posterior face of the bladder, and the lateral walls of the rectum, and anterior face of the sacrum.

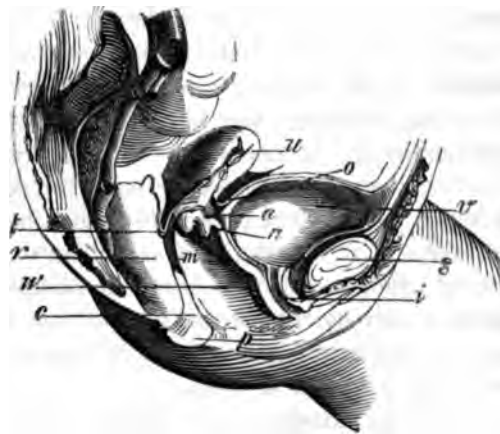
Again: the peritoneal coat is reflected from the angles of the uterus and its lateral borders to the lateral parts of the pelvic excavation, forming what are called the *broad ligaments*, which, with the uterus, make a transverse septum, dividing the pelvis into two

cavities. The superior border of each of these ligaments is divided into three secondary folds, an anterior, a middle, and a posterior; the first, containing the round ligament; the second, the Fallopian tube; and the last, the ovary. Each broad ligament consists of two layers, one derived from the anterior face of the uterus, and the other, from its posterior face, where they are slightly separated from each other, and the space between them is occupied by cellular tissue. Through this tissue the bloodvessels and nerves pass on their way to the uterus.

These ligaments fix the uterus to the walls of the pelvis, and serve to envelop and sustain the tubes and ovaria.

The relations of the uterus and vagina to adjacent organs, as well as the important points in the anatomy of its peritoneal tunic, are well exhibited in Fig. 34, in which *u* indicates the uterus; *w*, the

Fig. 34.



Relations of Uterus and Vagina to adjacent parts.

vagina laid open; *v*, the bladder opened; *i*, the urethra opened; *r*, the rectum opened; *o*, the utero-vesical cul-de-sac; *t*, the utero-rectal cul-de-sac; *n*, the connection of the vagina with the uterus and the circular utero-vaginal cul-de-sac; *a*, the connection of the bladder with the uterus, limited superiorly by the utero-vesical cul-de-sac *o*, and inferiorly by the connection, *n*, of the vagina with the uterus; *c*, the recto-vaginal septum, thin above, *m*, where the walls of the vagina and of the rectum are nearly contiguous, thick below at the point *p*, or perineum; *s*, the left half of the symphysis pubis.

2. Beneath the peritoneal envelop the next coat in order is the *muscular*, or, as it is frequently designated, *the proper tissue*—the *parenchyma* of the uterus. This tissue is of a delicate rose color, and is remarkable for its density, especially in the neck, where it is of the consistence of fibro-cartilage. In the body it is less dense and more highly colored, on account of the greater vascularity of this portion of the organ.

Concerning the nature of this tunic there has been much diversity of opinion; but it evidently consists of fibres which, in the unimpregnated uterus, are closely compacted and intricately interlaced, resembling a piece of felt. The muscularity of these fibres is evinced by the contractility which is excited by the presence of any irritating body in the cavity, and is demonstrated by the changes which they undergo in the gravid condition of the organ. During pregnancy they are very much elongated, and many of them assume a definite arrangement, whilst their color is heightened, so that they look more like muscular fibres in other parts of the system. These important changes in the muscular coat of the uterus, preparatory to parturition, when its contractile powers are to be called into requisition, will be more particularly described in the chapter on pregnancy. From the sides and anterior face of the uterus, near its superior angles, two cylindrical fasciculi of fibres are detached from the muscular coat of the uterus to the anterior face of the bodies of the ossa pubis. These are the *round ligaments* of the uterus, which pass outwards, forwards, and upwards, enveloped in the anterior secondary folds of the broad ligaments, to the inguinal canals, through which they pass, and come out at the inguinal rings, to be unravelled and lost in the cellular tissue of the *mons veneris* and *labia pudendi*.

3. The cavity of the uterus is lined by a *mucous membrane*, which may be considered as the third coat of the organ. Until quite recently this mucous coat has been described with great brevity, or its existence even, except in the cervix, has been called in question. For example, in Dr. Edward Rigby's *System of Midwifery*, republished in this country in 1841, all that is said of it is comprised almost in a single sentence to this effect: "The inner surface of the uterus is lined by a smooth or somewhat flocculent membrane of a reddish color, which is continued superiorly into the Fallopian tubes; inferiorly it becomes the lining membrane of the vagina." In another shorter sentence, it is added: "The mucous membrane

which lines the cervix uteri is corrugated into a number of rugæ, between which the mucous follicles are chiefly found." M. Moreau¹ denies that the cavity of the body is furnished with mucous membrane, and recognizes only a *perspiratory surface* in this portion of the organ, intermediate, in respect to its structure and uses, between the serous and mucous tissues. This view, it is proper to admit, was adopted in the first edition of this work, but I am now well satisfied that it is erroneous.

The uterine mucous membrane has been made the subject of most elaborate microscopical research, and its physiology and pathology have been so clearly elucidated that our knowledge of it may be said to be complete. Amongst others, we are indebted to M. Coste,² M. Dubois,³ M. Robin,⁴ and Dr. Tyler Smith,⁵ for our better acquaintance with this important tissue, and I shall gladly avail myself of their works in describing it, whilst I will endeavor to avoid minutiae of no practical utility.

The mucous coat of the uterus, instead of being a thin layer that merely lines its cavity, is a complex tissue of such thickness that, even in its normal condition, it constitutes about a fourth of the thickness of the uterine walls, and when hypertrophied, as it is, by menstruation and pregnancy, its thickness is greatly increased. It belongs essentially to the cavity of the body, at least it is in this part of the organ that it retains its true characteristics, which will be presently described. It is not of uniform thickness, being thicker towards the middle part of the body and fundus, and becoming gradually thinner towards the superior angles of the uterus and the cervico-uterine or internal orifice. Possessing only moderate consistency, it may be readily torn in shreds from the subjacent tissue, especially when the uterus is a little altered—which has led some to mistake it for a membrane of new formation.

This membrane adheres so intimately to the parenchyma that it can only be distinguished from it by the difference of aspect and structure, which will be presently pointed out. Its free surface is smooth, and pierced with so many minute holes as to give it a

¹ *Traité Pratique des Accouchemens*, t. i. p. 124.

² *Histoire Générale et Particulière du Développement des Corps Organisés*, Paris, 1847.

³ *Traité Complet de l'Art des Accouchemens*, Paris, 1849.

⁴ *Memoire*, in *Archives Générales de Médecine*, t. xvii. and xviii. (fourth series).

⁵ *Pathology and Treatment of Leucorrhœa*, Am. ed., 1855.

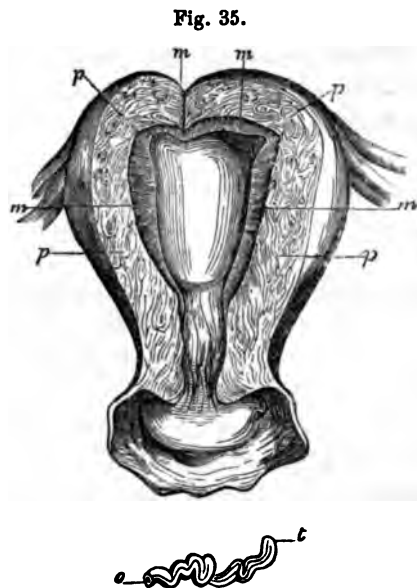
cribriform appearance—a peculiarity of the internal surface of the uterine body, which has attracted the notice of many observers, who yet were ignorant of its significance.

The structure of the mucous membrane is very remarkable. When we examine it after having made a section of the uterus, it appears to be composed of filaments, applied one upon another, and all of them looking towards the uterine cavity, in a direction perpendicular to the cavity, which gives to a section of the internal membrane a smooth, regular, homogeneous aspect, which contrasts with that of the proper tissue, whose fibres cross each other in all directions, displaying a considerable number of vascular orifices.

The internal membrane is also distinguished from the proper tissue by its grayish tint, or, if it be congested, by its bright red color. The cut, Fig. 35, will assist in giving a more sensible view of these differences between the mucous and muscular coats of the uterus. It represents the organ opened from above downwards, and a part of the anterior wall cut away: *p p*, proper tissue, in which are seen numerous vascular openings, resulting from the division of blood-vessels; *m m*, mucous membrane, distinguished by its regularly striated appearance.

The principal elements that constitute the uterine mucous membrane are, *glandules*, *cellular tissue*, *bloodvessels*, and *epithelium*.

The glandules, which are very numerous, are in the form of small, flexuous, vermicular tubes, closed at one of their extremities, and terminating at the other in a bulbous expansion with a very minute orifice. One of these glandules is represented at the bottom of the figure of the uterus; *t*, is the blind extremity; *o*, is the bulb-



Multiparous Uterus laid open by removing a part of its anterior wall, showing the muscular and mucous coats.

ous extremity with its minute orifice. These glandules are closely packed, parallel to each other, like the cells of a honey-comb: their closed extremities are in contact with the uterine parenchyma, whilst their other extremities are directed towards the cavity of the uterus, and their numerous minute orifices give to the surface of this cavity the cribriform appearance already noticed.

Numerous vessels penetrate this mucous membrane, but they are all in the state of very fine capillaries, and hence a section of it discloses no such vascular openings as are seen in the proper tissue of the uterus.

The glandules of the mucous membrane are tied together by very lax cellular tissue, and there are also interposed between them other tissues and organic matters quite peculiar, which need not be particularly described. There is, however, one of these, viz: fibro-plastic tissue, constituting, it is estimated, nearly one-half of the mucous membrane, which deserves notice, on account of the fact that it is not found in any other organ of the body in a normal state, but belongs elsewhere to abnormal tissues, or such as are in process of reparation. The modifications which the uterine mucous membrane undergoes, especially during pregnancy, may explain this peculiarity in its structure.

Lastly. The internal surface of the uterine mucous membrane is lined with cylinder-epithelium, the free margins of whose cells are fringed with cilia.

The description which has now been given, in as condensed a manner as possible, is applicable to the mucous membrane of the cavity of the uterine *body*. In respect to the *neck*, Dubois merely observes that its mucous membrane is very thin and its glandules are much shorter, being nothing but utricles or little bags that secrete a viscid ropy mucus. There is, therefore, no essential anatomical difference between the mucous membrane here, and in other parts of the body; but this portion of the uterus plays so important a part in its physiology and pathology, that it deserves our somewhat special study.

The rugous arrangement of the mucous membrane of the cervix has already been described; but the student will get a better idea of it by inspecting this drawing, showing its appearance to the naked eye, in the virgin uterus laid open, Fig. 36, in which it is plainly seen that there are four longitudinal columns of rugæ, arranged in an oblique, curved, or transverse direction, two on either side of

the crests on the median line. To obtain a clear insight into the glandular structure of the cervical canal, the microscope must be used, and even under a low power, the fossæ between the rugæ are seen to be subdivided by smaller rugæ into a great number of

Fig. 36.



Rugous Arrangement of Mucous Membrane
in Virgin Cervix Uteri, laid open.

crypts. Under a high magnifying power, of eighteen diameters, when only two or three of the ridges and fossæ are taken into the field, it will be seen that the rugæ themselves, and even the secondary septa, are covered with mucous follicles. "The crypts in the furrows are still further divided and subdivided, so as to double or treble the number of follicles

and laminæ seen with the lower power. In a portion of the cervix, comprising only three rugæ, and their two interspaces, Fig. 37, upwards of five hundred mucous follicles were easily counted, so that it is within the limits of moderation to say that a well-developed virgin cervix uteri must contain at least ten thousand mucous follicles; indeed, even this number is probably greatly exceeded."¹

Bloodvessels of the Uterus.—The uterus is bountifully supplied with blood through the *ovarian* and *uterine arteries*. The former

Fig. 37.



Two of the Transverse Rugæ, with one perfect
Fossa between them, from the virgin cervix.—
Magnified 18 diameters.

¹ Tyler Smith on Leucorrhœa, Am. ed., p. 38.

arise directly from the aorta or the renal artery, and descending, in a tortuous manner, along either side of the lumbar *vétebræ*, get between the duplicatures of the broad ligaments. They furnish many branches to the ovaries, and are finally distributed upon the fundus and superior part of the body of the uterus.

The latter (the uterine arteries) arise from the internal iliacs, and, passing also between the two layers of the broad ligaments, proceed to the inferior part of the body and the cervix. They divide into a great number of branches, which spread over the surface or penetrate into the substance of the uterine walls. All the branches of these arteries are tortuous, and have frequent anastomoses with each other.

The *veins*, which are very large, accompany the arteries, and have the same names; the ovarian vein of the right side returning its blood into the inferior vena cava, that of the left side into the renal vein. The uterine veins open into the internal iliac veins. The uterine veins are larger relatively to the arteries, and they are particularly distinguished by the intimate adhesion of their internal coats to the muscular tissue of the uterus. It is in consequence of this peculiarity that when they are divided by a section of the uterine parietes, they are left gaping. To it, likewise, they are indebted for the diminution of their calibre, and the closing of their orifices, subsequent to delivery—the uterine fibres serving as a muscular coat to them.

Nerves of the Uterus.—The uterus is supplied with nerves in great abundance, and from the two great centres of the nervous system, namely, from the great sympathetic and the cerebro-spinal axis. For a full description of the uterine nerves, the reader is referred to the work of Dr. Robert Lee, of London,¹ who has labored more successfully, as it appears to me, in this branch of obstetrical anatomy, than any of his predecessors. I shall attempt nothing more than to give an abstract of his observations, and, in doing this, use, as much as possible, his own language.

The nerves that are sent immediately to the uterus from the great sympathetic are derived from the *hypogastric plexuses*, and a large, oblong *ganglion* upon either side of the neck of the organ. The hypogastric plexuses are situated upon the sides of the pelvis, be-

¹ The Anatomy of the Nerves of the Uterus, with two plates, London, MDCCCXLI; Lectures on the Theory and Practice of Midwifery, delivered in the theatre of St. George's Hospital. Amer. edit., sect. 11.

hind the peritoneum, and in the vicinity of the bloodvessels of the same name, viz., the hypogastric arteries and veins. These plexuses are formed by the numerous branches of the right and left hypogastric nerves, which issue from a plexus higher up, namely, the *aortic*, formed by the two cords of the great sympathetic nerve, over the last lumbar vertebra, at the bifurcation of the aorta. The trunks of the hypogastric nerves proceed through their plexuses to the lower part of the uterus, where they terminate in the cervical ganglia, already mentioned. Each of the hypogastric plexuses gives off several branches to the ureter, rectum, and uterus; those sent to the uterus being of considerable size, and spreading themselves extensively under its peritoneal coat. The uterine arteries and veins receive large branches, which accompany them in their ascent along the sides of the organ, and, becoming thin and broad, terminate in great plexuses that completely encircle the vessels. These plexuses about the vessels are joined by several branches from the cervical ganglia, and they send branches to accompany all the ramifications of the vessels, passing with them into the muscular coat of the uterus.

The body of the uterus is encircled by a great transverse plexus of nerves—regarded by Dr. Lee as the special nervous system of the uterus—into which nerves, both from the hypogastric plexuses and the cervical ganglia, enter. This transverse plexus is described as arising near the mesial line on the posterior surface of the organ, from a mass of fibres which adheres so firmly to the peritoneum as well as to the muscular coat, that it is difficult precisely to determine their arrangement; and from thence the plexus proceeds across the uterus, in the form of a thin web, to unite with a plexus on the anterior surface of the organ, spreading out into a great web under the peritoneum. This great transverse plexus is loosely attached through its whole course to the subjacent muscular coat, by soft cellular tissue. From every part of it, branches of nerves are seen passing between the fibres of the muscular coat, and, like nervous branches in other muscular organs, dividing into smaller branches as they enter.

The *spermatic nerves*, from a higher source of the great sympathetic, attend the spermatic vessels in their course to the ovary, and after supplying these organs with many branches, form anastomoses with branches of the hypogastric and uterine plexuses.

Finally. From the second, third, and fourth sacral nerves, but

chiefly from the third, branches pass into the posterior borders of the ganglia at the cervix, and are lost in their mass. These accessions to the ganglia are, of course, from the cerebro-spinal system of nerves; and now let Dr. Lee's account of the nerves proceeding from the ganglia be particularly noted. From their inner surfaces, he says, numerous small, white, soft nerves are given off to the neck of the uterus, some of which ramify under the peritoneum, and others pass deep into the muscular coat. From their anterior and inferior borders, many large nerves are given off to the bladder and vagina, and from their posterior margins to the rectum.

SECTION II.

THE INTERNAL ANNEXES OF THE UTERUS.

1. THE OVARIA.

The relations of these organs to other parts, as well as their external appearance, are exhibited in Fig. 25, to which the reader is requested to revert. The ovaria are two oblong bodies, whose length does not exceed an inch and a half, placed on each side of the uterus, towards which one of their extremities is turned, whilst the other looks towards the sides of the pelvis. Their anterior and posterior surfaces are flattened, their superior border is convex, and their inferior border nearly straight. They are included in the posterior folds of the broad ligaments, and connected to the superior angles of the uterus by round cords, denominated the *ovarian ligaments*. These ligaments, not quite an inch long, are composed of the proper tissue of the uterus, being nothing more than prolongations of this tissue from the angles of the uterus to the internal extremities of the ovaria. They are, of course, included in the same folds of the broad ligaments as the ovaria themselves.

The external surface of the ovaria, which is of a yellowish gray, sometimes rose color, is tuberos, partly smooth, and partly rugous and fissured, growing out of their peculiar functions.

The anatomical composition of these organs consists of: (1.) An *external* or *serous coat*, which is, in fact, nothing more than the folds of the broad ligaments in which they are lodged. This furnishes a complete envelop except along the inferior, straight border, where the lamina of broad ligament, which covers the anterior surface, separates from that covering the posterior surface, to join the

posterior lamina of the middle fold of the broad ligament. It is through this free space that vessels and nerves have access to the ovary, just as access is had through similar spaces and for the same purpose, to the borders of the uterus, as already explained.

(2.) A *fibrous coat*, of a whitish color, dense and resisting, which is a complete covering or capsule, and adheres closely to the peritoneal coat.

(3.) *Parenchyma, proper tissue, or stroma*, imbedding the *Graafian vesicles*. The proper tissue is composed of cellular fibres, so interwoven as to form a spongy structure, exceedingly vascular, which is intersected by septa derived from the fibrous coat. In this spongy tissue are imbedded a great number of miliary or pisi-form bodies, called the vesicles of De Graaf, after the anatomist who first well described them. If a section of the ovarium be made from above downwards, dividing it into halves, as in Fig. 38, the stroma and Graafian vesicles will be brought into view. The *vesicles* are variable in size and indeterminate in number; some are deep-seated and others superficial, the deeper-seated being more minute, the superficial large enough to raise the ovarian envelopes and appear as transparent and slightly colored nodes upon the surface.

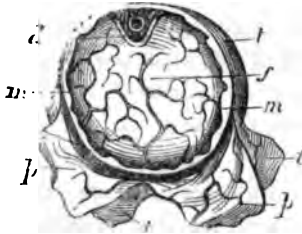
Fig. 38.



Section of an Ovary.

Each vesicle is composed of *two concentric envelopes*, the external being fibrous and elastic; the internal, which is the proper coat or ovisac, soft and thick like mucous membrane; both of them receive vessels from the surrounding tissues, and are quite vascular. The *cavity* of the vesicle contains an albuminous fluid, holding a multitude of granules in suspension, which are of a yellowish white color, and so minute as to require a considerable magnifying power to discover them. The condensation of a portion of this granular matter upon the inner surface of the internal coat forms the *proligerous membrane*, which is thickened to form a disk in the part of the vesicle that is towards the periphery of the ovarium. In this disk the ovule, the proper germ, is enchased, and it is hence denominated the *proligerous disk*, from *proles*, "offspring," and *gero*, "I carry." Fig. 39 represents a matured Graafian vesicle after M.

Fig. 39.



Matured Graafian Vesicle.

Coste: *t t t*, is the external or fibrous coat; *p p*, the internal coat, highly vascular; *m m*, the proligerous membrane; *d*, proligerous disk; *o*, the ovule lodged in the proligerous disk; *f*, cavity of the vesicle, lined by the proligerous membrane, through which are seen the numerous vessels of the internal coat.

The ovule itself occupies but a small portion of the Graafian vesicle, a mere corner, so to speak. It is, in the human female, so minute that it cannot be seen by the naked eye; yet, under the microscope, it resembles the eggs of oviparous animals, and is found to contain all their essential elements. It has a *vitellus* or yelk, inclosed by a transparent capsule, the *vitelline membrane*, which is very firm and thick relatively to its contents, and destitute of any traces of organization. The yelk consists of semi-fluid albuminous matter, and a great number of granules of different sizes, resembling fat. Enveloped by the granules of the yelk and near to the vitelline membrane there is a very transparent vesicle, the *germinative vesicle*, containing a corpuscle, a mere speck, denominated the *macula germinativa*. This exceedingly minute vesicle is the germ which, when fecundated by the semen masculinum, is developed into the new being whose origin is thus enveloped in the mystery of minuteness. Small as is the store of nutriment provided for it in the yelk, compared with the bird's egg, it is yet sufficient until the embryo acquires the faculty of imbibing nutritive juices from the maternal organs with which it is brought into relation.

In the mammalia, including the human species, the ova in the ovaria advance through regular stages of development to maturity, independent of any agency of the male semen, and are discharged through small fissures in their capsules. Extruded from the ovaria, they are received into the Fallopian tubes, and conveyed to the uterus; if fecundated in their transit, they are retained in the uterus, and completely developed; if not fecundated, they wither and perish unseen. Their discharge is effected in this manner: the Graafian vesicle approaches the periphery of the ovarium, and becomes protuberant upon its surface, as if urged by some internal force. The point where it is pressed most strongly against the peritoneum, is made to project as a small nipple, and becoming

gradually thinner and less vascular here than elsewhere, its coats, as well as those of the ovary, are finally ruptured. Through the small rent thus made by the combined power of pressure and absorption, the ovule escapes, bearing with it the proligerous disk and membrane.

The empty Graafian vesicle becomes the *corpus luteum*, a name bestowed on it on account of the yellowish color it assumes whilst passing through the changes it undergoes previous to its final disappearance. These changes have been variously described; but the brief reference to them with which I shall content myself is, in substance, taken from M. Coste. The rent in the coats of the vesicle, as, also, in those of the ovary, is soon repaired, but its cavity is not so soon obliterated, especially if the germ be fecundated, and pregnancy ensues. Its obliteration is gradually effected by granulations growing from the internal surface of the ovisac, at this time very vascular and thrown into convolutions, resembling those of the brain, by the contraction of the outer or fibrous coat of the vesicle. A plastic secretion, viscid, transparent, and sometimes colored with blood, occupies the cavity, which is absorbed, as the granulation proceeds. These granulations give to the corpus luteum its peculiar color; in proportion to their growth is the diminution of the cavity, until eventually they meet and coalesce in the centre, when the cavity is entirely obliterated. While these changes are going on, the prominence upon the surface of the ovary subsides, and finally the solidified corpus luteum is altogether removed by absorption, or only a small vestige of it is left. It is to the elimination of ova, and the subsequent reparation of their tissue, that the ovaria owe the noduled and fissured appearance of their external surfaces.

The maturation and emission of ova in the mammalia are governed, more or less strictly, by the great law of periodicity, whose influence is seen in so many other phenomena, pathological as well as physiological. In the inferior animals of this class, it occurs at the period of heat, when only the aptitude for procreation exists, and the observations of Bischoff¹ have incontrovertibly proved that it takes place as certainly in animals restrained from coition as in those to which the male is admitted. The proof, in their case, is full and complete. Not only were corpora lutea

¹ Maturation and Discharge of Ova independent of Coition; translated by Profs. Gilman and Tellkamp. New York, 1847.

found in the ovaria when they were killed, but ova were also detected in the Fallopian tubes. In the human female, ova are matured and emitted at the menstrual periods, between which and the periods of incalescence in the inferior animals there are many points of resemblance. Thus, although the aptitude for procreation in her is not so strictly limited to the catamenial periods, yet it undoubtedly exists in greater perfection, and the menstrual discharge is not essentially different from the mucous discharge, tinged with blood, that issues from the genitals at the incalescent periods, the one being blood mixed with mucus, the other, mucus with a small admixture of blood. The proof that ova are matured and discharged at the catamenial periods is not so complete as in the case of the inferior animals; it is, nevertheless, so strong that it cannot well be resisted. It consists in this: that, where opportunities have occurred of examining the sexual organs of healthy females who have died suddenly during, or shortly subsequent to, menstruation, by suicide or casualty, corpora lutea have been found in the ovaria. As yet, ova have not been discovered in the Fallopian tubes, so far as I know; but this is not surprising when we consider their exceeding minuteness, and the impracticability of searching for them at the time when they are most likely to be found. A vacant Graafian vesicle, with a door through which its late tenant might escape, is all the evidence that can be reasonably demanded in the case of the human female, and this has been found by numerous observers, whose testimony need not be particularly cited. I will only refer to the *Traité Philosophique de Médecine Pratique*, tome ii., of Dr. Gendrin, for the details of five observations of this kind. It may not be improper to add that the corpora lutea of menstruation, though essentially the same as those of pregnancy, differ in respect to their magnitude and duration. Their evolutions are completed by the next menstrual period, so that hardly a trace of them is to be found; whereas, the corpora lutea of pregnancy, incited by the exalted and sustained vital activity of the uterus, are more largely developed, and persist for a much longer time. They continue, in fact, throughout gestation, and do not disappear until some time after delivery.

2. THE FALLOPIAN TUBES.

The Fallopian tubes are conduits, extending from the superior angles of the uterus to the ovaria. They may be said to proceed

from the uterus, enveloped in the middle folds of the broad ligament outwardly towards the superior strait, where they curve backwards and inwards towards the external extremities of the ovaries, to which they are attached in a manner that will be presently explained. These tubes are four or five inches long; in receding from the uterus, they become more or less flexuous, and their caliber, very fine at their origin, becomes gradually larger. The external extremity of each of them presents a trumpet-like expansion (suggestive of the name, *trompes de Fallope*, conferred on them by the French), which is divided longitudinally into a number of shreds with dentate margins, resembling a fringe, and hence the name of *fimbria* bestowed upon this portion of the tube. The fimbriæ are free except one of their divisions, which, longer than the rest, reaches to the external extremity of the ovary and attaches itself to it. It is in consequence of this disposition that, in the state of venereal orgasm, the fimbriæ are drawn to the ovaria and spread over their surfaces, as represented in Fig. 25. At such time, the tubes are affixed to the ovaries, and form conduits, by which a continuous communication is established between them and the uterus. These conduits, as already intimated, are very small at their uterine extremities, where their orifices will barely receive a hog's bristle; they widen towards their ovarian extremities, where, at the base of the fimbriæ, they are as large as a middle-sized goose-quill.

The office of the Fallopian tubes is to receive ova and convey them to the uterus. They are also the *itineræ ad ovaria* of the spermatozoa, which must penetrate thus far into the genitalia, else there could be no such fortuity as extra-uterine fœtation.

The structure of the Fallopian tubes is the same as that of the uterus, of which they are in truth prolongations. They have a muscular coat, lined by mucous membrane, and a peritoneal envelop, which is nothing more than the folds of broad ligament in which they are included. The muscular coat consists of longitudinal fibres externally, and circular fibres internally. The mucous coat is thrown into longitudinal folds, and its epithelium is ciliated like that of the uterus. The ciliary motion is probably in accordance with the course of whatever is traversing the tubes, viz., outwardly, or from the uterus for spermatozoa; inwardly, or towards the uterus, for ova.

SECTION III.

THE EXTERNAL ANNEXES OF THE UTERUS.

1. THE VAGINA.

Although usually reckoned among the internal organs of generation, the *vagina* is, so far as its relations are concerned, as much an external portion of the sexual organs as the *meatus auditorius externus*, or passage leading to the tympanum, is an external portion of the organ of hearing. It might, indeed, be called the *meatus uterinus externus*. Then, again, this collocation of the *vagina* is justified by its anatomical resemblance to the skin, in certain points, which will be presently noted. The *vagina* is a membranous canal extending from the uterus to the vulva, interposed between the rectum and bladder. Through it the uterus communicates with the exterior, but its direction is different; for, whilst the uterus is placed nearly parallel with the axis of the superior strait, the axis of the *vagina* crosses that of the inferior strait—its inferior extremity being raised towards the pubes, and its superior extremity depressed into the hollow of the sacrum, forming nearly a right angle with the uterus.

We speak of the *vagina* as a canal, and so indeed it is, when distended; but in its quiescent condition, its anterior and posterior walls are more or less closely in apposition; and, when separated, by any cause, they come together again so soon as the distending body is removed. The length of this canal is about five inches, and its diameter, when gently opened without being distended, is an inch and a quarter to an inch and a half in virgins—rather more in women who have had children. But its dimensions may be much increased, even to the extent of becoming as capacious as the pelvic cavity itself. It is owing to this great extensibility that the *vagina* is capable of fulfilling one of its uses in giving passage to the foetus.

The walls of the *vagina* are not of equal length, the anterior being the shorter and slightly concave, whilst the posterior is convex—the curvature of its canal corresponding to that of the inferior part of the pelvic excavation. The anterior wall is connected with the inferior part of the bladder and with the urethra by cellular tissue, the walls of the connected organs, together with the inter-

vening tissue, forming the *vesico-vaginal* and *urethro-vaginal septa*, which are not unfrequently the seat of fistulous openings, resulting from injuries in childbirth.

The superior fourth of the posterior wall of the vagina is covered by peritoneum, as has already been explained; but, its inferior three-fourths are connected with the rectum by cellular and adipose tissue, constituting the *recto-vaginal septum*. This septum is thin above, where the rectum and vagina nearly touch each other; thicker below, where these organs diverge from each other to the extent of about an inch and a half, leaving a triangular space between them.

The superior extremity of the vagina is connected with the cervix uteri, near the middle of its length, leaving a portion of it (the os uteri) pendent in the vagina, and forming a circular groove, the *utero-vaginal cul-de-sac*, which is deepest posteriorly, in consequence of the vaginal attachment being higher there.

The inferior extremity of the vagina terminates under the symphysis pubis in the *ostium vaginae*, or mouth, or orifice of the vagina, frequently referred to by females as the mouth of the womb. This is the most contracted part of the canal—being surrounded by the *constrictor vaginae muscle*, and underneath the muscle is a spongy, erectile tissue—the *bulb of the vagina*—of considerable thickness on the sides of the orifice.

The vagina is furnished with three tunics:—

(1.) *An external tunic*, cellular and fibrous in its structure, and possessing contractility.

(2.) *A proper coat*, composed of erectile tissue, which is not of equal thickness—being quite thick in the inferior part of the anterior wall, but thin in its superior part and throughout the posterior wall.

(3.) *A mucous coat*, lining the internal surface of the vagina, and reflected upon the os uteri to cover its external surface.

This reflected portion of the vaginal mucous membrane is continued to, or slightly within, the margin of the external orifice of the uterus, where it terminates—the cavity of the uterus being lined by a mucous membrane of its own, different from the vaginal. This portion of the uterine neck is, therefore, doubly entitled to be called the vaginal portion, being not only pendent in the vagina, but receiving a tunic from it.

The structure of the vaginal mucous membrane gives to the internal surface of the canal a very peculiar appearance. This

consists in longitudinal eminences on the median line of its anterior and posterior walls, called the *columns of the vagina*—that upon the anterior wall being most prominent, and forming a conspicuous tubercle at the ostium vaginæ. Then there are numerous transverse rugæ in the inferior part of the vagina, particularly close and prominent on the anterior column, near the vulva, more scattering and less notable in the superior part of the canal. These rugæ, as indeed their name implies, have usually been considered as folds of the mucous membrane; but an eminent authority in anatomy, M. Cruveilhier, asserts that they are composed of large and prominent *papillæ*, arranged in linear series, which, like the cutaneous papillæ, are organs of sensation, and this opinion is probably correct. At any rate, the rugæ cannot be merely folds, for no amount of distension will obliterate them. They may, therefore, be reckoned as one of the elements of the vaginal mucous membrane. These papillæ, as well as the spaces intervening between them, are covered over by a layer of squamous epithelium, which, according to Dr. Tyler Smith, is thicker in the upper part of the vagina than near its orifice—a kind of covering resembling the epidermis, and making one of the points of analogy between this mucous membrane and the skin, its papillary structure being another. Just within the external orifice of the uterus, squamous epithelium is succeeded by the cylinder and ciliated epithelium of the uterine mucous membrane.

Lastly: the mucous membrane of the vagina contains glandular follicles; but anatomists are not agreed as to their distribution, some asserting that they are most numerous in the superior part of the canal, whilst others altogether deny their existence there, but allow that they may be found, in sufficient abundance, about the orificium vaginæ. There is, indeed, no controversy as to their existence in this region, for they are so large that their orifices may be seen by the naked eye. Dr. Tyler Smith, who has made this point the subject of microscopic investigation, thinks that the glandular element is very scanty in the upper part of the vaginal mucous membrane. Deeming the whole of the vagina of less importance in relation to morbid discharges—the particular object of his inquiries—than the vaginal portion of the uterine neck, his investigations were limited to the latter. He found that, immediately beneath the layer of epithelium, the whole of this surface is studded with papillæ or villi, using these terms convertibly, but no mucous follicles were discovered. Examined with a high

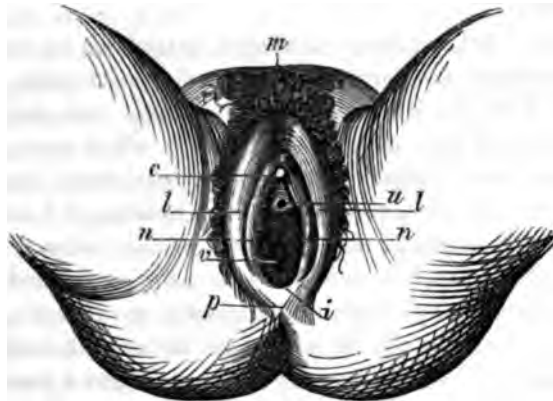
power of the microscope, the points of the villi appear nipple-shaped and in the centre of each of them a depression is seen, giving them an appearance very similar to that of mucous follicles, for which they have, he thinks, been mistaken. These villi he describes as vascular and not nervous, each of them containing a looped bloodvessel, passing to the end of the villus and returning to its base, where it inosculates with the bloodvessels of the neighboring villi. From the liberal supply of blood possessed by the villi, Dr. Smith suspects, at least this is one of his suspicions, that "they are concerned in the secretion of the fluid plasma which the external portion of the os and cervix and the upper part of the vagina pour out," in which case they are glandular, and it matters little whether they be papilliform or follicular.

The *vaginal arteries* are branches of the internal iliacs re-enforced by branches from the uterine arteries. The *veins*, which are numerous and frequently anastomosing, return their blood into the internal iliac veins. The vagina receives its *nerves* from the hypogastric plexuses.

2. THE VULVA, OR PUDENDUM.

The *vulva*, specially the organ of copulation, is a fissure in the soft parts *under* the symphysis pubis, and extending upwardly *over*

Fig. 40.



The Vulva, or Pudendum.

M, is the mons veneris; *p*, the perineum; *l l*, the labia; *f*, the fourchette or inferior commissure of the vulva; *n n*, the nymphæ; *c*, the clitoris; *u*, the orifice of the urethra; the space between this orifice and the clitoris is the vestibule; *v*, the vaginal orifice.

the inferior part of the symphysis, with labia on each side, by which it is ordinarily closed. It consists of a number of organs united, which are represented in Fig. 40.

(1.) *The Labia*, called, also, the *greater labia*, or *labia externa*, to distinguish them from the lesser and more deeply-situated labia, presently to be described; but as I shall designate the latter by another name altogether, there is no necessity of such distinction, and they will, therefore, be denominated simply the labia or labia pudendi, whenever there is occasion to refer to them in this treatise. They are two muco-cutaneous folds on the sides of the genital fissure, cutaneous on their outer convex aspects and mucous on their inner plane surfaces, by which they come in apposition. The labia, more prominent superiorly than inferiorly, extend upwards over the bodies of the ossa pubis to be merged in the *mons veneris*, a fatty roundish prominence upon the pubes and inferior part of the abdomen. Their superior extremities are usually described as converging towards each other and uniting to form the superior commissure of the vulva; but there is plainly no such commissure.

The labia, when traced upwards, are simply confounded with the *mons veneris* on each side of the symphysis pubis, whilst the intervening portion of the *mons* becomes thinner as it descends, and assumes more and more the appearance and nature of mucous membrane. Upon this median mucous tract no hair grows, albeit the exuberant growth of the surrounding *mons* and labia may cover it over.

The inferior extremities of the labia do coalesce to form the inferior or posterior commissure of the vulva, otherwise called the *fourchette*. Here the labia dwindle into a thin fold, which constitutes the anterior edge of the perineum, by which name, indeed, it is most frequently designated in obstetric parlance, inasmuch as the *perineum* is much concerned in labor, holding, if I may so say, the key which controls the dilatation of the vulva. This little space of about an inch in extent, between the genital and intestinal apertures, consisting principally of muscles, aponeurosis, and skin, is capable of resisting the impulse of the foetus for a long time, and must be made to yield, before the vulva can open a passage for it. At such time, it is liable to laceration, and the *fourchette* is, in fact, not unfrequently torn.

The labia, besides the cutaneous and mucous tissues already

mentioned, are composed of cellular and adipose tissue, with an abundance of bloodvessels and sebaceous glands. Such is also the anatomical construction of the mons veneris. Their *arteries* are derived from the internal and external pudics and the obturators. Their *nerves* come from the lumbar plexuses and the internal pudics.

(2.) *The Nymphæ*.—Attached to the inner surfaces of the labia are two salient crests, resembling a young cock's comb, which, though concealed in the ordinary condition of the parts, may be easily brought to view by separating the labia. These are the *nymphæ*, called also, as already intimated, the lesser labia, and consist of folds of mucous membrane of a rosy hue, each having an uneven convex border, which may project somewhat above the level of the labia. The nymphæ extend upwards to the clitoris, converging as they ascend, and downwards to about the middle of the vaginal orifice, becoming narrower as they descend. The superior extremity of each nymphæ divides into two branches, the inferior branch being inserted into the inferior part of the body of the clitoris, whilst the superior branch spreads itself over the glans clitoridis to meet that of the opposite side, the two together forming the prepuce of the clitoris.

The proper tissue of the nymphæ is erectile in its nature, and is included in the mucous folds as envelops. These are studded with papillæ, and numerous sebaceous follicles are lodged in the substance of the nymphæ, whose white unctuous secretion has a peculiar and penetrating odor.

The nymphæ receive their bloodvessels and nerves from the same sources as the labia.

Different uses have been assigned to these structures besides that of directing the course of the urine, from which they derive their name of nymphæ. Probably the most correct view is, that they serve to complete the vulva considered as the organ of sexual connection, indued with special sensation. The most cursory examination may suffice to show that but for the nymphæ it would be deficient in front, and the aphrodisiac sense would consequently be much less expanded.

(3.) *The Clitoris*.—By separating the nymphæ, a little conical projection is brought to view, which is situated in front of the symphysis pubis and beneath the commissure of the nymphæ. This is the *clitoris*, or rather it is the free extremity of the clitoris—a cavernous body, similar to the corpora cavernosa penis, which is adherent to the symphysis pubis at its inferior border, and then

divides into two branches, which are inserted into the ischio-pubic rami and covered with muscular fibres. Only the *glans clitoridis* is visible, the rest of the organ being concealed by the nymphæ and mucous membrane of the vestibule.

The clitoris is composed of spongy and erectile tissue, its glans being covered by very delicate and highly sensitive mucous membrane; whilst its body and branches are invested with a double fibrous tunic. It receives its sanguineous and nervous supplies from the internal pudic arteries and nerves.

(4.) *The Vestibule*.—Below the glans clitoridis, and between the nymphæ, is a smooth triangular space, about an inch in extent, formed by the vulvar mucous membrane, called the vestibule, which is bounded posteriorly by

(5.) *The Meatus Urinarius*, or orifice of the urethra—a small circular aperture, in the median line, half an inch from the symphysis pubis, and immediately above a rugous tubercle formed by the termination of the anterior column of the vagina.

The urethra, of which this meatus is the outlet, is the excretory duct of the bladder, and is much shorter and wider and more extensible than in the male, being but little over an inch in length, and only slightly curved anteriorly. From the bladder, its direction is a little oblique from above downwards and from behind forwards. Behind the symphysis pubis it is in connection with cellular tissue; its posterior face is intimately connected with the vagina, through the anterior wall of which it may be easily felt by the finger.

The shortness, width, extensibility, and comparative straightness of the urethra furnish an explanation of the fact that females are much less liable than males to stone in the bladder. They are, perhaps, equally subject to urinary deposits, notwithstanding the opinion to the contrary of a highly esteemed author;¹ but any concretions that may form in the bladder or descend to it from the kidneys, are washed out by the urine, which, as is well known, escapes in a more impetuous torrent. Even calculi of enormous magnitude have been known to be expelled through the female urethra by the unaided contractions of the bladder. For the same reason, lithotomy is seldom called for in cases of stone in the bladder of females; the urethra may be sufficiently dilated to permit the introduction of forceps into the bladder, with which the stone,

¹ Gross on the Urinary Organs.

unless it is very large, can be extracted through its channel. In August, 1849, a young girl, not quite 15 years of age, was brought to me from Mead County, Kentucky. She had been the subject of stone in the bladder for several years, and her sufferings from it were extremely severe. Having put her under the influence of chloroform, I easily passed the common forceps for nasal polypus into the bladder, and extracted, with a little management, a stone larger than the largest almond, weighing 264 grains. The surface of it was very rough, and thickly set with prickles, like a Jamestown bur. In its extraction, the mucous membrane of the urethra was a good deal lacerated, and hung out of the meatus in shreds, which were snipped away. She suffered but little from the operation, and returned home well in a few days. I presented the calculus to my friend and quondam colleague, Prof. Gross, now of the Jefferson Medical College, Philadelphia, who has it yet, I presume, in his collection.

(6.) *The Vaginal Orifice.*—The rugous tubercle, already mentioned as being below the meatus urinarius, is a part of the border of another aperture, the *vaginal orifice*, which is at the inferior part of the vulva, and can only be brought to view by separating, pretty widely, the labia and nymphæ, when it appears as a nearly closed circular opening, presenting other tuberculous inequalities besides the large median tubercle near the meatus urinarius. Being surrounded by the constrictor vaginæ muscle, the orifice is more contracted than the vulvo-uterine canal above it, and offers greater resistance to the introduction of any foreign body.

(7.) *The Hymen.*—The vaginal orifice is still further contracted in virgins by the *hymen*, a membrane in the form usually of a crescent, with its convex border attached to the posterior part and sides of the vaginal orifice, and its concave free edge directed towards the meatus urinarius. Instead of being of a semilunar form, the hymen may be circular, viz., fixed to the whole circumference of the vaginal orifice, with or without a central perforation, and when imperforate, the vagina is, of course, occluded. I have seen one very curious anomaly in the construction of the hymen; the specimen was procured in the dissecting-rooms of the University of Louisville, and preserved by Dr. G. W. Bayless, at the time demonstrator of anatomy. It is semilunar, with a band passing from the middle of its free border to the median vaginal tubercle, halving the orifice.

The hymen is composed of a fold of mucous membrane, includ-

ing cellular tissue, bloodvessels, and nervous filaments, and hence its rupture by sexual intercourse is more or less painful, and followed by some effusion of blood.

The solidity of the hymen is variable. In some females, it is easily ruptured by the first sexual connection; in others, it is more resisting, and it may be so firm and strong as to withstand repeated marital impulses, and preclude sexual intercourse altogether. Such a case recently fell under my observation, in which the husband, though married several months, and using, it is to be presumed, all due diligence, had not been able to penetrate beyond the barricade of a perverse hymen. I found the vulva much inflamed, and very tender to the touch, so much so that I was compelled to give the patient chloroform in order to enable her to bear the necessary examination. The entrance to the vagina was found so much contracted by a firm hymen, of full dimensions, that only the tip of the finger could be passed beyond it, and the edge of the hymen was sharp and almost cutting. With a probe-pointed bistoury passed over its tense edge, the hymen was freely divided down to its attachment, so as to permit a tube speculum to be introduced up to the os uteri, which proved to be in a state of inflammation. The os uteri was cauterized with the nitrate of silver, and likewise the cut edges of the hymen, to prevent their coalescence. At an examination made ten or twelve days subsequently, the hymen had not reunited, but there was still inflammation of the vulva and os uteri. Cauterization was again practised, and mucilaginous injections directed, since which I have seen nothing more of the case, but suppose that all is right.

(8.) *The Carunculæ Myrtiformes.*—The rupture of the hymen and the cicatrization of the shreds into which it is torn, give rise to a variable number of little fleshy tubercles on the contour of the vaginal orifice, called *carunculæ myrtiformes*, or more properly *hymeneal caruncles*, as they are the débris of the hymen. By many anatomists they are considered independent of the hymen, but there is reason to believe that morbid growths of the mucous membrane may have been mistaken for the veritable caruncles, which occupy so invariably the semi-circumference of the vaginal orifice where the hymen had been attached, that it is difficult to see how they can be anything else but its relics.

SECTION IV.

THE SECRETIONS AND PERIODICAL EVACUATIONS OF
THE FEMALE SEXUAL ORGANS.

1. MUCOUS SECRETIONS.

From the description which has now been given, it appears that the female sexual apparatus is lined throughout, from the fimbriæ of the Fallopian tubes to the vulva, by mucous membranes, which may be collectively denominated the genital mucous membrane. Every portion of this extensive tract is provided with glandular arrangements for secreting a fluid to preserve it in a proper state of lubrication, and this fluid is, of course, mucus, which, until recently, was believed to be identical in its physical and chemical properties. It is now, however, satisfactorily ascertained that the mucus of the tubes and cavity of the uterus, which we may designate "uterine mucus," is a very different product from the mucus of the vagina, and the points of difference deserve to be particularly noticed.

Uterine mucus is a white, viscid, and perfectly transparent fluid, with an admixture of very minute granular corpuscles; it possesses alkaline qualities, restoring the blue color to reddened litmus paper, and stiffens linen that imbibes it, leaving a dirty white stain. The tubes and cavity of the *body* of the uterus secrete but an inconsiderable quantity of this mucus—the *neck*, with its thousands of follicles, being its great laboratory. It is not at all uncommon, especially when the cervical glands are in a state of irritation, to see this mucus, in specular examinations, protruding at the os uteri, being prevented from issuing by its great tenacity, which causes it to adhere to the labia uteri, from which it cannot be easily wiped away.

The *mucus of the vagina*, on the other hand, is a white, milky fluid, perfectly opaque, much more liquid than uterine mucus, slightly if at all viscid; it possesses acid properties, reddening blue litmus paper, and contains scaly corpuscles, which are not a constituent part of it, as granular corpuscles are of uterine mucus, but derived from the desquamation of the epithelium of the vaginal mucous membrane.

This accidental but constant admixture of epithelial scales with vaginal mucus, is particularly insisted on by M. Donné (*Cours de Microscopie*) as a characteristic which distinguishes vaginal from uterine mucus. The same ingenious observer first noticed the acidity of vaginal mucus and discovered the general law that the secretion of surfaces covered by squamous epithelium is always acid, whilst that of surfaces covered by cylindrical epithelium is as uniformly alkaline. He has, moreover, in a very interesting manner, connected the difference of secreted products with the difference of structure and function of the secretory organs. The uterine mucous membrane, which is so deeply situated as to be removed from external impressions and is furnished with cylindrical epithelium, secretes an alkaline mucus, containing mucous globules. The mucous membrane of the vagina and vulva, which is much nearer to the cutaneous surface and is merged in it, which is, moreover, like the skin, an organ of tactile sensation, and provided with pavement epithelium, secretes an acid mucus, mingled with epithelial débris. For these reasons, it can scarcely be deemed extravagant in M. Dubois to call the vulvar and vaginal mucous membrane an introversion and modification of the skin.

Though I have described the mucus secreted by the tubes and cavity of the uterus under the common denomination of uterine mucus, yet, in respect to the uterus, there is a difference between the mucus of its body and that of its neck, both in regard to quality and quantity, which I must not fail to point out.

They agree in the leading particulars in which they have been contrasted with vaginal mucus; but, as might have been anticipated from the different structure of the mucous membrane in the body and neck, they also differ in some important respects. It is not necessary again to describe the cervical mucus, for it is specially that which has already been described as "uterine mucus," on account of our greater familiarity with it, through specular examinations. It is, moreover, the cervical mucus which is so frequently thrown out in superabundance, on account of the proneness of the glands which yield it, to take on exaggerated action. We probably seldom meet with opportunities of examining the *mucus of the body of the uterus* in the living; never, indeed, unless this portion of the uterus be diseased, and then its secretion is vitiated.

Hence, M. Robin, to whom we are indebted for a very complete description of it, obtained his information from the dead. We

need not follow him in all his details; but he describes it as a *brownish-gray liquid, semi-transparent, moderately viscid and tenacious*, which forms a thin layer upon the surface of the mucous membrane. It owes its tint to a great number of anatomical elements of different sorts, held in suspension, which need not be specified. But there is one of these elements which ought to be mentioned, because it is significant; I allude to blood, which, we are told by M. Robin, is very commonly found mingled with the mucus, even in women who had never complained of any uterine affection. This portion of the uterus is much more vascular than the neck, and the rich network of bloodvessels immediately underneath its epithelium has been the admiration of other observers besides M. Robin. When, therefore, it is irritated or congested, it is prone to sanguineous effusion, rather than to increased mucous secretion.

2. MENSTRUAL DISCHARGE.

The last observation leads me to consider the so-called secretion, which takes place in the female genital organs periodically, and on account of its monthly recurrence during the whole of the child-bearing period of life, except when suppressed by pregnancy or nursing, is denominated the "menses" or "catamenia." Concerning the *nature* of the menstrual fluid, as well as everything else connected with this remarkable phenomenon, there has been interminable controversy. All admit the close resemblance it bears to the blood that circulates in the veins; its color, density, and, in a word, its general aspect is the same, and it is not otherwise distinguishable, except that it does not possess the property of coagulability, and consequently remains fluid for an indefinite length of time. On this account it has been regarded as a secretion, a fluid *sui generis*, or at least as blood that has undergone a material modification by being divested of its fibrin, in which the power of coagulation resides. Coagulability is, however, only one of the accidents of blood, of which it may be divested, while the substance remains, and its liquidity is, therefore, no proof of its defibrinization. The addition, for example, of an acid to blood, in which the fibrin is freely soluble, may destroy its coagulability by the chemical change the fibrin undergoes, and it may be that the acid of the vaginal mucus exerts a similar influence upon the fibrin of menstrual blood. What I have put as supposition is unequivocally testified by M.

Donné, in the work to which reference has already been made, who says: "The menstrual blood does not differ, under the microscope, from ordinary blood either in its quantity of red corpuscles or of its fibrin; the only difference it exhibits consists in an acid, instead of an alkaline reaction, which is the case in normal blood; this is owing to its mixture with a great quantity of vaginal mucus, which always exhibits acid properties. Amongst the menstrual blood, also, are found numerous lamellæ of epithelium of the vaginal mucous membrane, which the fluid entangles in its passage."

If the premises be granted, the conclusion is inevitable that the catamenial discharge is a mixture of pure blood from the cavity of the uterus with the acid mucus of the vagina. The experimental investigations of Mr. Whitehead,¹ it is not too much to say, have demonstrated the correctness of this doctrine in the most complete and satisfactory manner, so that the nature of the menstrual fluid is now perfectly comprehended. He obtained more than a dozen specimens of the sanguineous element of the menstrual discharge, by introducing a tube speculum and carefully removing, by a piece of lint or sponge, all the mucus from about the os and cervix uteri. In consequence of the irksomeness of the procedure, he was seldom able to collect more than from ten to twenty grains, a quantity sufficient, however, for determining its sensible properties, as well as for microscopic examination. He observed, what I have myself seen oftener than once, that the menstrual fluid sometimes trickled from the os uteri as pure blood, but more frequently it escaped, partly in the form of a thin, colored serum, and partly in flattened clots, of the size of small orange seeds. If any of it were allowed to drop into the vagina, it became broken down and dissolved in the vaginal mucus, escaping at the *ostium externum* in the usual uncoagulable fluid form; whilst that which was received into the speculum, and kept pure from mucus, invariably coagulated—the separation into serum and crassamentum being completed in three or four minutes. His microscopic examinations are, in my judgment, unessential to the point in controversy, and their results need not, therefore, be detailed. It is well known that the strong, if not the only argument in favor of the opinion that the menstrual fluid is a secretion, is derived from its alleged want of fibrin, as proved by chemical analysis; now, the ready coagulation of the

¹ Causes and Treatment of Abortion and Sterility.

fluid, received by Mr. Whitehead fresh from the uterus, furnishes an ample refutation of all the analyses ever made, seeing that there is no other principle of the blood, besides fibrin, possessed of coagulability.

That the acid vaginal mucus is a solvent of fibrin, and is capable of destroying its coagulability, is proved by other observations and experiments of Mr. Whitehead, made on systemic blood itself. The observations were made in instances of what seemed to be natural menstruation during pregnancy and the nursing period, wherein the discharge appeared, both to him and the patients, to be precisely similar to that under normal circumstances; but on examining with the speculum, during the existence of the menstrual phenomena, the blood was found issuing from diseased surfaces situated upon or about the *labia uteri*, none escaping from the interior of the organ. His experiments were performed on blood drawn from the veins or collected from a scarified surface, and consisted in the addition of acetic acid—the same acid which exists in a free state in the vaginal mucus—or of vaginal mucus, and their intimate diffusion through the blood, with the effect not only of preventing its coagulation but also obliterating all traces of fibrin.

The uterus has been referred to in general terms as the *source* of the menstrual blood; but accuracy requires that we should be more explicit on this point, and determine, if we can, whether it comes from the whole internal surface of the organ or only from a portion of it. It was the opinion of Baudelocque¹ that the menses distil from small orifices, which may be observed over the whole extent of the uterine cavity, including its neck and perhaps the vagina, and others have thought like him. But Madame Boivin² affirms, very positively, that she has often had occasion to examine the uteri of young girls, who died at the menstrual period, and has found the internal surface of the organ covered with a layer of bright-red blood; that compression causes it to escape in numerous little drops from the body, but *never from the neck*, and that it is now satisfactorily demonstrated that, in health at least, the menstrual discharge has its seat in the cavity of the body alone. No other author, so far as I remember, confirms this

¹ L'Art des Accouchements, t. i. p. 176.

² Mémorial de l'Art des Accouchements, p. 62.

statement of Madame Boivin, but neither does any expressly contradict it. Many, it is true, say, in a loose way, that the menstrual blood exudes from the uterus, and even from the vagina, but it is evident that they have not made its precise source the subject of particular observation, and until this is done, we are bound, by all the rules of evidence, to accredit Madame Boivin's testimony.

We may, in the last place, inquire into the significance of the menstrual discharge. Is it an isolated phenomenon—the periodical evacuation of only a few ounces of blood—an inconvenient tribute imposed on woman for the privilege of fecundity, or has it some deeper meaning?

It has already (Sec. II.) been shown that menstruation takes place contemporaneously with ovulation or the periodical maturation and emission of ova. It is, therefore associated with a function indispensable to procreation. Ovulation may be performed, in exceptional cases, without the occurrence of menstruation, but menstruation is so closely dependent on the ovaria, that if they be wanting or dormant, it is suppressed. We may hence understand why menstruation is, as all experience testifies, so essential to female health; why, when it is morbidly suppressed, the whole system suffers, and when it is restored, the glow of health revisits the cheeks. It is not that the patient needs depletion, else blood-letting were an ample substitute; but a prime function is at fault, the derangement of which must necessarily affect other functions in sympathy with it.

Nor is the flow of blood from the uterus the only, or even the principal uterine phenomenon at the ovular epochs. Important changes take place in this organ, and especially in its mucous membrane, the object of which is to prepare it for the fitting reception of the ovum. These changes consist chiefly in the increased vascularity of its tissues, the softening and reddening of its muscular fibres, some of which affect a definite arrangement, like that which belongs to gravidity, and hypertrophy of the mucous membrane, developing specially the tubular glandulæ to such a degree that the opposite sides of the uterine cavity are brought into apposition, and the membrane itself is thrown into convoluted folds.¹ In such a condition of the uterus, the ovum is intercepted—caught between the mucous folds—and hindered from

¹ For the warrant of this statement, consult M. Coste's great work hereofore cited.

falling *headlong*, if the expression will be allowed, to its most dependent part. Should it be fecundated, either before or after its arrival in the uterus, it is in a position, safest for the mother and itself, to effect its attachment to the uterus: if, on the contrary, it be not fecundated, it will be allowed to pass away, when the orgasm, raised for its behoof, shall subside.

These two scenes—the ovarian and uterine—of the first act of the drama of reproduction, it would seem, require an extraordinary putting forth of the vital energies, sustained by an extraordinary turgescence of the bloodvessels. What wonder, then, that blood should percolate through their coats, and thus save them, perhaps, from rupture?

Dr. Tyler Smith maintains, not without reason, that the cervical glands are periodically excited to pour out their peculiar viscid secretion, and that this takes place immediately subsequent to menstruation. In a healthy state of these parts, he truly states, none of this secretion is known to issue from the os uteri: but at all times the cervical canal is occupied by it, except at the approach of the menses, when it is washed away. When the menstrual flow ceases, the cervical mucus is again secreted, and, becoming inspissated, serves to block up the passage from the vagina to the cavity of the body until the next menstrual period, the mucous follicles meanwhile becoming comparatively inactive. The use of the cervical mucus, according to the same ingenious author, is twofold. “In the first place, it closes the cervix uteri, and defends the cavity of the fundus from external agencies, as completely as though it were a shut sac. In the second place, it appears to afford a suitable medium for the passage of the spermatozoa, through the cervix uteri, into the uterine cavity.”

CHAPTER III.

THE CLINICAL EXPLORATION OF THE
FEMALE SEXUAL ORGANS.

DISEASES of the female sexual organs, of dissimilar seat and nature, are attended with so many symptoms in common, that it is frequently necessary to resort to physical, rather than interrogatory examination of the patient, in order to obtain that certitude of diagnosis which is essential to rational treatment. Nothing, indeed, can be imagined more vague and unsatisfactory than the attempt to individualize the multitudinous maladies of these organs by attending only to their symptomatology as rehearsed by the patient herself. We are compelled, therefore, either to draw our therapeutic bow at a venture, or resort to a mode of investigation repugnant to the feelings of our patient. It is to be feared that too many practitioners choose the former alternative, which prescribes only a pleasant routine, rather than the latter, which imposes duties that are repulsive, or, it may be, offensive, to their morbidly delicate sense of propriety.

Clinical exploration consists in the application of certain of the senses to discern the condition of the sexual organs; and the senses employed in this kind of investigation are: the TOUCH, SIGHT, and HEARING; the SMELL may also occasionally be appealed to, but it is only incidentally, and the information it affords is not very reliable.

SECTION I.

THE TOUCH AS A MEDIUM OF INFORMATION.

Whilst I acknowledge our indebtedness to the French for their minute and valuable instruction on the clinical uses of the touch, I cannot too strongly deprecate the apishness and pedantry of those who seek to substitute "toucher" for touch (equivalent terms), and

who seem to fancy that the acuteness of their feeling, as well as the value of their diagnostics, is enhanced by the exchange of words.

The touch may be employed in several modes, which I shall successively consider.

1. THE TOUCH THROUGH THE WALLS OF THE ABDOMEN;
PALPATION SUS-PUBIENNE OF DUGES AND BOIVIN.

The abdomen is divided by all anatomists into certain regions, for the purpose of indicating with precision the locality of its viscera, and obstetricians need such a division to note the encroachment of the uterus or ovaria upon the abdomen, under certain circumstances. There is not exact agreement among authors as to this arbitrary division, but that more commonly adopted is as follows: Let a line be drawn from the under margin of the ribs, and continued round the body, and another one, parallel to this, over the crest of the ilium, on each side; decussate these by two vertical lines from the cartilage of the eighth rib, on each side, down to the centre of Poupart's ligament, which answers to the top of the acetabulum. *Nine regions* are thus obtained, three of which are above, three below, and three intermediate. The three superior regions are: the *epigastric* in the centre, and laterally, the *right and left hypochondriac*; the three inferior regions are: the *hypogastric* in the centre, and on its sides, the *right and left iliac*; the intermediate regions comprise the *umbilical* in the middle, and the *lumbar* on each side.

For the abdominal touch, the patient ought to lie on the back, with the head and shoulders elevated, and the inferior extremities properly flexed. The abdomen should be divested of all covering except the chemise, or, at least, all garments external to this should be loosened, so as to permit the hand or hands of the examiner to have free access. In cases where great nicety of manipulation is necessary, the abdomen ought not to be covered at all, but the clothes should be turned down, so as not to expose what should be concealed. The bladder ought to be emptied, and the bowels evacuated by an enema or a dose of purgative medicine.

Everything being ready, the examiner applies his hands to the abdomen, and makes gentle but gradually increased pressure, aiming, first of all, to push aside the convolutions of the small intestine, in order that if there be a tumor, it may be more distinctly

felt. In this manner he is carefully to explore specially the iliac and hypogastric regions, to satisfy himself whether or not there is enlargement of the ovaria or of the uterus. Should a tumor be detected, its properties must be attentively examined; the fingers must be passed over its surface and as much as possible around it, to ascertain its size and shape, its fixity or mobility, its smoothness or nodosity, its softness or hardness, and whether equally or unequally hard or soft, the region it occupies, its painfulness or indolence to handling, and, in a word, as accurate a knowledge as the sense of touch can convey, ought to be acquired.

To apply the results of this kind of exploration to the solution of some of the more common problems of practice: We will suppose, in the first place, that a palpable tumor is discovered, occupying the hypogastric, and no inconsiderable portion of the umbilical region; that this tumor is of an oval shape, its large extremity being superior, and that it is indolent on pressure. Most probably, nay, almost certainly, it is the uterus enlarged and risen into the abdominal cavity. The woman is surely pregnant! Not so fast, for other causes besides pregnancy may produce enlargement of the uterus, as, for example, hydrometra and retention of the menstrua in its cavity, from occlusion of its orifice or of some part of the vulvo-uterine canal. To ascertain, as far as this may be done by the abdominal touch, whether there be a foetus in the uterus, we should test the resistance of the tumor to the impulse of the fingers, and learn whether it is yielding and elastic only in certain portions of it, or equally so throughout; if unequally yielding, it favors the inference that a foetus is contained within it; if equally yielding, that fluid, of some kind, distends its cavity.

The inference in favor of pregnancy will be prodigiously strengthened, if the examiner is so fortunate as to feel the active movements of the foetus in utero, which he may be able to do, provided gestation be sufficiently advanced.

To search for these movements, the hands must be firmly applied on the opposite sides of the tumor, and held there for a considerable time, alternately increasing and relaxing the pressure, first of one hand and then of the other. If foetal motions be excited, they may be felt, in the most palpable manner; but the examiner ought to be aware that sudden, spasmodic jerks of the abdominal muscles, in cases of pseudo-pregnancy, may simulate these motions so exactly as to impose on the patient herself, and

even on the most expert practitioner. Dr. Dewees, if my memory serves me, candidly confesses, somewhere in his writings, that he committed a mistake of this kind, and pronounced a lady pregnant who ought not to have been so, and who, indeed, was not.

These pseudo-pregnancies! *simulacra*—feints of the *vis genitalis*, or whatever else they may be called—I have met with quite a number of them. They mostly occur in women somewhat advanced in life, who have been long married without issue, or who, being widows, have married a second time, and having borne children to their first husbands, think it a matter of course they must do likewise to their second. Many of the symptoms of genuine pregnancy make their appearance in due order; the abdomen progressively enlarges, though it may contain no tumor, the distension being tympanitic, the breasts swell, and lacteous serum exudes from the nipples, the menses are suppressed or become sparing and irregular, but above all, reputed foetal motions are felt in a very lively manner. The conviction that she is pregnant is so strongly rooted in the patient's mind that it is ineradicable. If the physician is sceptical, she is offended, and triumphantly places his hands upon her abdomen, at the moment of spasmodic twitchings of the muscles, to dissipate his doubts. The baby's wardrobe is made ready, and the services of an accoucheur engaged; at about the full time, pseudo-pains come on, which subside, in a longer or shorter time, but neither a child, nor wind, nor water is expelled; the insubstantial pageant fades and "leaves not a rack behind."

I spoke of the inference in favor of accumulated menstrea being the cause of uterine enlargement, deduced from the uniform elasticity of the tumor. Cases are, now and then, met with, in which the uterus is so distended, from this cause, as to rise into the umbilical region, and awaken suspicion of pregnancy, not only on account of the altered figure of the woman, but also the supervention of some of the sympathetic derangements, which are supposed to belong exclusively to that condition. Such retention of the menses may occur under the most unlikely circumstances. In April, 1842, Mrs. G——, a widow lady, aged forty-nine years, came to the city from a neighboring county to consult me on account of a tumor, reaching from the pubes to the umbilicus, of the figure of the distended uterus, and of uniform density. I learned from her that she had been the subject of what she supposed was prolapsus uteri, for which she had herself applied a pessary, the pre-

vious summer, under the instruction of a physician. During the fall she was much fatigued with nursing a sick family, and was herself attacked with a fever. The pessary appears to have excited vaginal inflammation, for while delirious she was observed to move her hands frequently towards that region, and eventually she pulled away the pessary, to the surprise of her friends, who were not aware that it had ever been applied. Menstruation, which had been regular up to the time of the febrile attack, did not make its appearance after she recovered. She presently noticed a tumor above the pubes, which regularly increased in size, and became the seat of severe neuralgic pains, which recurred in paroxysms. On examination per vaginam, the opposite walls of the canal were found completely adherent at about the middle of its length. I invited my esteemed friend and colleague, Prof. Gross, to see the case with me, and the adhesion, not being very strong, yielded to the push of the finger in his exploration. A quantity of retained menstrual fluid, of the consistence and color of common thick molasses, and odorless, escaped immediately, and continued to come away, for a few days, after which the tumor disappeared.

But suppose now that the abdominal touch discovers a tumor in one of the iliac regions, which, at the most, only encroaches somewhat upon the hypogastric region, it is almost certainly an enlarged ovarium, and the kind of degeneration it has undergone must be judged of by the feel. If it is irregular in shape, and hard in some parts, but soft in others, it is probably multilocular degeneration; if, on the contrary, it is uniformly soft and yielding, but elastic, it is unilocular.

Finally. The abdomen may be permanently inflated with gas, or distended with water, and one might suppose that these morbid states could never be misapprehended; yet they frequently are, either to the annoyance or mortification of the physician, according to the relation he may chance to bear to the case. Pregnancy may be mistaken for ovarian and abdominal dropsies, or *vice versa*, and a number of instances of such mistakes have come under my observation. The young practitioner is sometimes annoyed, or perhaps unsettled in opinion, by the confident manner in which an old midwife will declare that a patient whom he is going to tap for ascites, is big with child. He may have felt never so much fluctuation, yet nothing can win over the midwife to his way of thinking, and if he thrust his trocar into the abdomen against her remonstrances, it is done with fear and trembling.

It is truly mortifying that a physician should, on the other hand, mistake pregnancy for dropsy: a mistake which I have known to be committed oftener than once. This is most likely to happen, when we are consulted in the cases of young females, of irreproachable character and connections, on account of alleged ill-health, where the parents do not dream of the frailty of our patients. Such an atmosphere is unfavorable to correct vision; every ray of light that comes to us is refracted, so as to form an unfaithful picture upon our mental retina, and we may be as much shocked as the parents, when the spell is dissolved, and we come to see things as they really are. I remember, many years ago, to have been called to a considerable distance, to visit a young lady, in consultation with her physician, who had been treating her for months, for dropsy of the abdomen. He had faithfully plied her with hydragogues and diuretics, but the abdominal tumefaction held pace with him, so that he was, at last, forced to acknowledge that it was too hard for him. I was strongly impressed, at first blush, with the suspicion that the young lady might be *enceinte*, and any remaining doubt was soon dissipated by the kicks with which the child resented the encroachment of my hands upon its mother's abdomen.

2. THE VAGINAL TOUCH.

This consists in the introduction of one or two fingers—usually of one only, and that the index finger—into the vagina, with a view to explore, not only the vulvo-uterine canal, but the uterus itself. From the fact that, until recently, no other sense but the touch was employed in exploring this channel, digital exploration was exclusively denominated “examination per vaginam;” but now, since the sight is employed in this direction nearly as frequently as the touch, the phrase is inaccurate, and would be liable to mislead, without some qualifying epithet, such as tactile, digital, &c.

When the vaginal touch is to be practised, the patient may be placed on the back, across the bed, with the inferior extremities well flexed, and the nates as near as possible to the edge of the bed. A sheet or quilt should be thrown over the knees, and come down to the bed, to screen her from improper exposure. The examiner then passes the right hand under the cover, having previously oiled the index finger, which is moved towards the vulva, with its extremity downwards. When the finger is brought into contact with the perineum, its extremity is directed upwards, to penetrate

the vulva at its posterior commissure, and is at once conducted to the vaginal orifice. It should then slowly traverse the vagina to its superior extremity, and be made to press upon its walls, to test their sensibility, and ascertain whether there is anything abnormal in their condition, or in that of the organs connected with them. It ought to be noted specially whether there is a tumor in the utero-rectal or utero-vesical cul-de-sac, which may be felt through the walls of the vagina. But we must be on our guard against mistaking a collection of hardened fæces in the rectum for a tumor, or for malignant disease in the coats of that bowel. I often meet with cases in which the rectum is the repository of indurated masses of fæces, of diverse shapes and sizes, and so encroaches upon the vagina as to render its exploration unsatisfactory. To the inexperienced touch, this might prove a puzzle, and I have known it to be temporarily mistaken for disease of the rectum. In such cases, the examination ought to be suspended until the bowels are thoroughly cleared out with a dose of purgative medicine or an active enema.

When the finger reaches the upper extremity of the vagina, the os uteri must be carefully explored by it. And here I will give a piece of advice, which might have been offered earlier, viz: that, when the touch is striving in the dark to get knowledge, it is well, indeed it is indispensable, that the mind should be, as Mr. Locke and other philosophers say it was on first coming into the world, like white paper, void of all characters, without any ideas—for it is remarkable how easily, under such circumstances, it is led astray by every will-with-a-wisp that may chance to cross its path, and into what egregious blunders it may betray us.

In the digital exploration of the os uteri, the first thing to be done is to identify it, to make sure that it is the os uteri, and not a polypus, or the fundus of the organ, protruding at the orifice. With this view, the finger should be slowly moved over its surface, and pretty firm pressure be made, to discover the orifice, which must be distinctly felt (though this is not always easy), before we can be certain that it is the os uteri. Having identified it, we next endeavor to ascertain whether it has its normal and healthy characteristics, or whether there is material deviation from these. Deviations may be discovered as to the *position* of the os uteri: it may be too low, or too far forwards or backwards; as to its *size*—instead of being a small projection at the top of the vagina, it may occupy a great part of it; as to its *shape*—instead of being conical, it may

be club-shaped, or of some other figure; as to its *consistence*—instead of pliancy, it may offer stony hardness to the feel; as to its *orifice*, which may be small or large, and bounded by regular or irregular margins. Its smoothness or roughness, its evenness or nodosity, its degree of sensibility, its temperature, in a word, everything that marks a departure from its natural state, should be noted.

The vaginal touch embraces within its scope a still higher range of discovery, and, quitting the *terrestrial*, it aspires to the *celestial*. The finger pushes up the utero-vaginal cul-de-sac, so as to feel the supra-vaginal portion of the neck, and, if possible, the body of the uterus itself. This may be sometimes achieved, if the uterus be not very high, particularly if the fundus be depressed by the other hand, operating upon the hypogastrium. Whenever there is any considerable enlargement of the uterus, whether from pregnancy, or any other cause, it can always be felt and ascertained by the touch employed in this way.

Having explained the manner, and stated the objects of employing the touch per vaginam, I may illustrate its capabilities by alluding to some of its applications in practice. First, we may consider it as a supplement to the abdominal touch. Suppose that, by exploration through its parietes, we are satisfied there is a tumor in the cavity of the abdomen. Were we restricted to this mode of examination, it might not be possible to attain the certainty, in regard to its nature, which is desirable and even necessary to our future course.

In the case of uterine tumor, for example, it may not be very apparent whether the organ is distended by a foetus or something else, especially if no motions be detected, and then the vaginal touch may at once let in all the additional light we need. By it, we may find the os uteri somewhat dilated and circular in shape, and, perchance, feel the membranes of the ovum, thus obtaining demonstrative evidence of the existence of pregnancy; or we may meet with obstruction in the genital passage, and verify, beyond all doubt, the presence of fluid, by causing it to fluctuate between the finger and the other hand, externally applied.

Again, suppose an ovarian tumor, of great magnitude, reaching across the abdomen, and occupying all its regions, and we are not satisfied as perfectly as we desire concerning its nature; we are not even *certain* that it is ovarian, rather than uterine. The vaginal touch can easily determine whether the uterus is implicated, for if it is not, it will be felt in its normal size, pressed down, it

may be, to the inferior part of the pelvic cavity, by the superincumbent ovarian weight.

But the vaginal touch, besides supplementing the abdominal, has duties of its own to perform. It is generally competent to decide whether or not there is displacement of the uterus, of any kind, and for the want of care or skill in its application, these lesions are very frequently overlooked. This is, I would say, one of the most common defaults of diagnosis that has come under my observation. Cases are frequently referred to me, in which the whole round of treatment for uterine maladies has been exhausted to no purpose, without any allusion, in the histories transmitted, to this kind of lesion, in which it, nevertheless, existed in the most marked degree.

The most common forms of displacement are retroversion and retroflexion of the uterus, not excepting even prolapsus, which, in the popular account, too often reiterated by professional gentlemen, is the great malady of the sex—the *fons et origo* of all their sufferings.

These displacements need never be overlooked, provided only the possibility of their existence, in every case we examine for the first time, be kept distinctly in mind, and proper search for them be made. If there be retroversion, a roundish tumor is felt through the vagina in the utero-rectal cul-de sac; if anteversion, a similar tumor is felt in the utero-vesical cul-de-sac; whilst prolapsus is easily discovered, by the descent of the womb and its proximity to the vulva. In retroversion, it may be added, the cervix is projected forwards, under, or behind the symphysis pubis, according to its degree; in anteversion, the cervix is thrown back into the hollow of the sacrum, so that it may be difficult to reach it with the finger. In either anteversion or retroflexion, the os uteri will be found in its normal position.

The vaginal touch can, also, discriminate between polypus or other tumor protruding at the os uteri and any other morbid state. Such a tumor ought not to be mistaken for the os uteri itself, for it has no orifice and differs in shape, being largest at its most dependent part; besides, the uterine orifice may be felt encircling it. Neither ought it to be mistaken for partial inversio uteri, in which the finger can detect the terminus of the tumor just within the orifice.

Lastly, ulceration of the os uteri, and especially carcinomatous ulceration ought to be discovered by the vaginal touch. Simple ulceration, consisting in mere abrasion, the result of inflammatory action, might not be discovered by the touch, for it is indicated only by slight roughness; but malignant ulceration, the last stage of

cancerous degeneration, cannot possibly evade the scrutiny of the least practised touch, I should be inclined to say, if I did not know the contrary. How often have patients been sent me, to be treated for uterine disease, who were in the last stage of carcinoma uteri!

Having now pointed out some of the capacities of the touch per vaginam, it is proper to expose its inadequacy in a very important point. It is now well known that subacute inflammation of the sexual organs, particularly of the vagina and uterus, is the most common of all the diseases to which they are obnoxious, and the insufficiency of the touch alone for its detection may be affirmed, without the fear of successful contradiction. It is true that extraordinary sensibility of the parts, and pain on pressure warrant the presumption that there may be inflammation, but they do not prove it; and we know that such sensibility may be altogether neuralgic. Had we, therefore, no other means of diagnosis (but luckily we have), inflammation of these structures would remain undiscovered, or, at most, our knowledge of its existence would be only conjectural.

3. THE TOUCH PER ANUM—RECTAL TOUCH.

This mode of touching is practised in the same manner as the former, and the cases alleged to come within its purview are, certain displacements, engorgement of the body of the uterus, tumors between the rectum and vagina, and malformations of the genital organs. For none of these purposes, except the latter, have I been much in the practice of resorting to this kind of exploration. To the patient it is more disagreeable than the vaginal examination, and I must confess that I am sceptical as to its range. Writers speak of exploring, in this way, half of the posterior surface of the uterus, and even the ovaries, but I am not sure that my own *digitus* ever reached much higher than the os uteri, in its normal position. Among English authors, Dr. Tilt¹ is the champion of the rectal touch, and he professes to be able to attain to the ovaria, by this route, and even to test their sensibility by pressure. But it must be remembered that *ovaritis* is the great disease of females with this author, and with such a prepossession it is not surprising that he can so readily compass them with his finger. For my own part I do not believe that inflammation of the ovaries is a hundredth part so common as Dr. Tilt would persuade us it is, and I strongly

¹ Diseases of Menstruation and Ovarian Inflammation.

suspect that he may have mistaken retroverted uteri for enlarged ovaries. Be this as it may, however, ovaritis has seldom come under my observation, and I fear that the frequent rectal search for it may debase the sexual organs in our estimation, seeing that he, more than once, calls them "the generative intestine."

The immediate rectal touch, combined with the mediate vesical, is indispensable to a proper examination of one kind of malformation of the genital organs; I allude to congenital absence of the uterus and vagina from arrest of development. I have met with several instances of this capital deficit. One hard case I particularly remember. It was that of a young woman, about twenty years of age, who unfortunately entered into wedlock, wholly ignorant of her impenetrability, which was soon discovered by her husband, who made known to the friends of the bride his intention to have the conjugal noose untied, acquainting them, at the same time, with the cause of his dissatisfaction. I was requested by the lady's friends to visit her, and make diligent inquiry, and report whether or not any obstruction existed which might not be overcome by perseverance in the use of the natural means. On examination, it was found that the vulva was perfect in all its appointments, including even an ostium for the vagina, which, however, was covered with a dense membrane, without any, even the smallest, aperture. A sound was introduced into the bladder and a finger into the rectum, as high as possible, and by pressing the anterior wall of the rectum forwards, the sound could be felt so plainly as to give the idea that nothing intervened between the finger and the sound but the coats of the bladder and rectum. I concluded, therefore, that the unfortunate bride had no vagina, and, as well as I could judge, no uterus. I need hardly add that the husband obtained a divorce.

The history of this patient since she reached the age of puberty deserves a passing notice. Her breasts were finely developed as well as the external organ of generation, and she looked every inch a woman. She had all the symptoms of menstrual molimen, recurring pretty regularly once a month, and was treated for amenorrhœa by several physicians, but, of course, there was no menstrual flux, nor was there, at any time, vicarious discharge. She must, therefore, have had ovaria, or at least one ovary, and ova must have been matured and emitted. Whether she had sexual passion or not, I do not know.

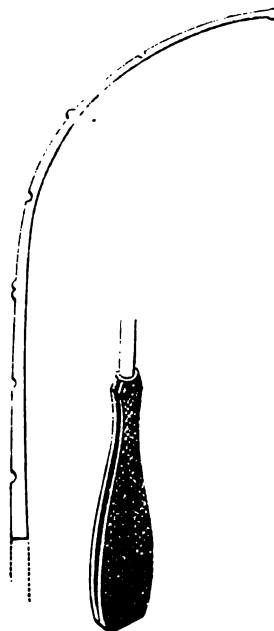
4. THE DOUBLE TOUCH.

A combination of the two previous modes of exploration is highly extolled by Dr. Tilt, under the name of the "double touch," in which the index finger is placed in the rectum and the thumb in the vagina, so as to embrace any intervening morbid growth. It was often resorted to by the celebrated Recamier, and is particularly serviceable in detecting fluctuation in any tumor occupying the utero-rectal space, that may contain fluid of any kind. The cases recited by Dr. Tilt in illustration of its value appear to be satisfactory; but I have no experience which would justify me either in lauding or condemning it.

5. THE UTERINE SOUND.

The uterine sound, for which we are indebted to the inventive genius of Prof. Simpson, of Edinburgh, may be properly regarded as an instrument calculated to extend the touch and bring under its cognizance parts too profoundly situated to be reached by the finger alone. It is an instrument resembling, as Fig. 41 shows, a small silver male catheter, with a handle like that of the common sound. The stem is about nine inches in length, and the handle three, and on its convex surface it is graduated, in order that the length of the uterine cavity may be more accurately measured. The marks used in graduating it are shallow grooves and little knobs; first of all, there is a knob at the distance of two and a half inches from its extremity, the assumed normal length of the cavity, and in either direction from this it is marked at intervals of an inch. There is, of course, but one mark, and that a groove, between the standard knob and the extremity of the sound, whilst there are six towards the handle, the second being a double knob.

Fig. 41.



Simpson's Uterine Sound.

It is not much, if any, more difficult to introduce the uterine sound than the female catheter. In both operations, the instrument is guided by the index finger, placed upon the external orifice of the organ to be penetrated, and the practised touch will be able to find the os uteri at least as easily as the meatus urinarius. The position of the patient may be the same as for touching, and the sound is held with the concavity of its curvature towards the pubes and the handle elevated, as the point is conducted along the finger to the external orifice of the uterus, which it must be made to enter, not by force, but by sleight. If any difficulty is encountered, the direction of the instrument must be varied, and as it is gently pushed forwards it may be slightly rotated from right to left, and *vice versa*, until the channel is found and it glides smoothly onwards. As the sound penetrates the uterus in its normal position, its handle must be depressed, just as the handle is depressed while the male catheter is passing into the bladder. Some resistance is not unfrequently met with at the internal orifice, but this is readily overcome by steady gentle pressure.

But though the uterus may be thus easily sounded, yet prior to experience it could not be known that it would tolerate such intrusion into its recesses, and the apprehension might have been reasonably entertained that acute pain and, perhaps, local mischief would be liable to follow. Prof. Simpson's experience is calculated to allay such apprehension, for he remarks that "the degree of uneasiness felt by the patient during the passage of the instrument is in general very trifling, and not more, if so much, as is felt on passing the catheter along the urethra of the female, and certainly not by any means nearly so great as in using the sound or bougie in the male. In a few cases, I have seen it, like the passing of the sound in the male, produce a feeling of sickness and nausea. In the healthy state, however, of the organ, the lining membrane of the uterus does not in fact appear to be more sensitive than that of the vagina, so that the existence of any true and actual pain in making the examination with the bougie is to be considered so far anomalous, that it is generally, as we shall afterwards see, indicative of the existence of some morbid state or other of the part or parts with which the extremity of the instrument is at the time in contact."

Emboldened by this assurance of the distinguished Edinburgh professor, I have made very free use of the uterine sound for several years, in the course of which I have repeatedly observed, that though

the passage of the instrument into the uterine cavity did not cause much pain at the moment, yet it was shortly followed by severe hypogastric suffering, continuing for twenty-four hours or upwards, and leaving tenderness that did not subside under three or four days. In several instances, moreover, uterine hemorrhage, though not to an alarming extent, has supervened, and lasted for a week or more. The liability to such accidents has taught me caution in the use of the instrument, though my confidence in its diagnostic value is not impaired.

There has recently been much discussion in the Imperial Academy of Medicine at Paris, relative to the *intra-uterine pessary* of Simpson, which M. Valleix has applied in a large number of cases of displacement of the womb—anteversion and retroversion, anteflexion and retroflexion—with, as he reports, the most successful results. The *intra-uterine* differs from all other pessaries in its stem of silver or ivory, which is introduced into the uterus and retained there, for days or weeks, by contrivances which it is not necessary to describe just now. A description of it, illustrated by drawings, will be found in the works of Prof. Simpson, who first recommended it and successfully applied it to the treatment of uterine displacements. The French Academy appointed a commission to inquire into the merits of the new treatment, which elicited an elaborate report from Dr. Depaul, that occupied several sessions in its reading, and was published in the *Gazette des Hôpitaux*, for May 18th, 20th, 23d, 25th, 27th, and 30th. The report condemns the practice, and its sentence was confirmed by the Academy. It is not my purpose to enter into the controversy in this place, for we are not discussing the treatment of uterine displacements; but I have referred to it for the sake of calling attention to one case, in which the simple replacement of the womb by the uterine sound, as a preparation for the *intra-uterine pessary* which it was intended to apply on a subsequent day, was followed by fatal peritonitis. The case was communicated to Dr. Depaul by his friend, Dr. Noël Gueneau de Mussy, and it may not be unprofitable to translate it for these pages.

“A chambermaid was so much afflicted with lumbo-inguinal pains that she was obliged to quit service, and place herself under my care. She could not walk far, or stand long, without greatly aggravating her sufferings. I found, on examination, prolapsus uteri with retroflexion, and granular erosion of the neck. For the erosion, cauterization was resorted to; but, the pains persisting, in-

jections, mineral baths, &c., were directed. I then determined to use Simpson's pessary, but before applying it, I catheterized the uterus with M. Huguier's hysterometre (uterine sound), which easily replaced the uterus, and produced only slight pain. After going round the ward, I returned to the patient, in a few minutes, and found her complaining of lassitude and pain in the abdomen, for which a bath was prescribed. Evening; the pain was more violent.

"The next morning, the pain continued, and was accompanied by a slight acceleration of the pulse. Anodyne enemata were directed; but the pains persisted, and soon assumed the character of those of peritonitis. The inflammation was actively treated by bloodletting and mercury, but the patient died in three or four days.

"The family would not consent to an autopsy, and I could only extract the uterus through the vagina, according to the method of Recamier; a flood of pus and blood escaped from the belly when the peritoneum was penetrated. The uterus was perfectly sound, its mucous membrane being pale, firm, and uninjured. There was a slight effusion of blood in each of the Fallopian tubes."

Dr. Depaul recites several cases of abortion, produced by the introduction of the sound, in the practice of some of the most eminent men in the French metropolis, who had the candor and moral courage to avow the fact. In truth, this is a misfortune which can only be avoided by perpetual vigilance. It occurred once in my own hands. The uterus is very frequently retroverted in early pregnancy: so frequently that some have affirmed it to be its normal state. Now, if to this displacement there be added more than ordinary congestion, it may easily be mistaken for disease. If menstruation be suppressed, pregnancy ought to be presumed, and sounding ought not to be thought of.

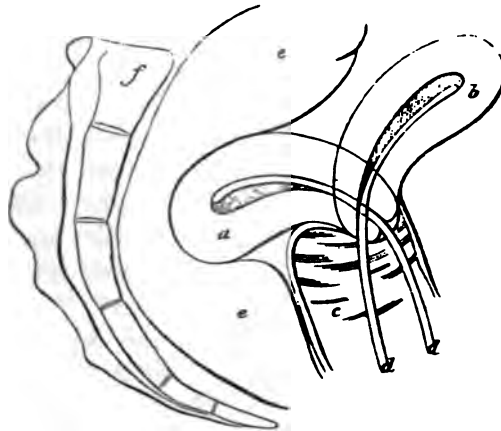
I have alluded to the possibility of serious and even fatal consequences from the use of the sound—not to disparage it, for it could not well be dispensed with, but to inculcate circumspection in its employment. Fatal consequences have never resulted from it within my own knowledge; still, what has happened, even once, may happen again, and it should, therefore, be an invariable rule with us never to resort to uterine sounding as a means of diagnosis, except in cases of necessity, where the information sought by it cannot be otherwise acquired.

In physical diagnosis, the uterine sound is, as already intimated,

resorted to with a view of extending the tactual exploration beyond the reach of the finger. There are cases in which such information as may be thus acquired is desirable and even necessary for our direction in practice. For a specification of these, I refer to Prof. Simpson's admirable papers on the subject, published originally in the British journals, but now accessible to every physician in the United States, in his *Works*, published in this country, and edited by Dr. Horatio R. Storer, of Boston, and Dr. W. O. Priestley, of Edinburgh.

This being premised, I proceed to speak, from my own experience, of the diagnostic uses of the uterine sound. I would observe, in the first place, that I have derived great assistance from it in cases of anteversion and retroversion of the unimpregnated uterus, and greater still in retroflexion and antelexion. Without the sound, indeed, I know not any other means by which positive certainty of diagnosis can be attained in many of these cases. The diagram, Fig. 42, taken from Simpson's *Obstetric Works*,¹ will facili-

Fig. 42.



Retroverted Uterus replaced by the Uterine Sound.

a is the retroverted uterus; uterus replaced to b by the sound d; f is the sacrum; e the rectum; and c the vagina.

tate the comprehension of the relations of the parts in retroversion of the uterus, and the mode of using the sound in its discovery and rectification.

The diseases with which retroversion is most liable to be con-

¹ First Series, page 200.

founded are: ovarian tumor from inflammation or the early stage of multilocular degeneration; fibrous or other tumor in the posterior wall of the uterus; pelvic cellulitis; and stricture, or carcinomatous disease of the rectum; and our only security against mistake, without the sound, consists in tracing, with the finger, a direct continuity of structure between the tumor and the cervix uteri. But this is not always practicable, and even when it is, the differential diagnosis may not be very clearly established. The sound gives us, however, all the certainty of demonstration: for if retroversion exists, it is soon found that it cannot be made to penetrate far into the uterus, unless its concavity is turned backwards, or towards the sacrum, when it easily slips into the cavity, and measures its entire length, the point of the sound being in contact with the fundus. If, now, the handle of the instrument be raised, its point can be felt by the finger, through the posterior wall of the vagina. To render the demonstration complete, we have only to turn the concavity of the sound forwards, and bring the fundus uteri to the centre of the pelvic brim, and, if we please, even into apposition with the abdominal walls, above the pubes, where the point of the sound may be plainly felt. It is now discovered that the tumor, impinging against the posterior wall of the vagina, has disappeared, and that the os uteri is brought back from its forward to its normal position. In such a movement of the sound in utero, its point glances from the inner surface of the posterior wall to the anterior wall, and restores the displaced organ to its perfectly natural situation. The diagnosis may be superabundantly confirmed, if we choose, by again directing the concavity of the sound posteriorly, to reproduce the retroversion, and then turning it forwards to re-correct it.

In the second place, I have used the uterine sound to good purpose, as I think, in a large number of instances, for the detection of chronic congestion and metritis of the body of the uterus.

The persistence of such a pathological state, for any considerable period, is sure to produce hypertrophy of the walls of the organ, with development of its cavity, as in early pregnancy. The depth, as well as the breadth of the cavity is increased: so that the sound readily passes to a greater distance—three, three and a half, or four inches—meets with little or no resistance at the internal orifice, and can be freely moved laterally or antero-posteriorly.

Prof. Simpson enumerates congestion and metritic hypertrophy

among the morbid states of the uterus, in which the sound is capable of affording valuable diagnostic information by disclosing the increased length of the cavity, but it evidently appears that he distrusts the information, in this class of cases. "We would qualify these remarks," he observes, "upon the increased admeasurement of the uterus in congestion or inflammatory hypertrophy, by adding that, judging from our own experience of it, probably this mode of physical diagnosis will, in the morbid condition under consideration, be found of more use practically in showing us with sufficient precision the gradual diminution of the organ, and hence the rate of progress towards recovery, under the treatment that we may be following, than in forming by itself, in the first instance, a perfect diagnostic criterion of the original existence of the disease." The grounds of this distrust are, the liability, from natural conformation, of the uterine cavity to exceed the usual standard by a few lines, and the possibility, though no instance has occurred to him, of a form of metritic enlargement, in which the hypertrophy may be concentric instead of eccentric.

It is with unfeigned diffidence that I venture to dissent from Prof. Simpson's opinion in this particular, but I am constrained to do so by the whole scope of my own observation of uterine maladies. To explain the reasons of my dissent, it is necessary to observe that the usual seat of chronic inflammation of the body of the uterus is the mucous membrane lining its cavity, and that it may, therefore, with more propriety be denominated *endo-uteritis* than *metritis*. The proper tissue may become involved in the inflammatory action, but more frequently it is simply hypertrophied and more or less congested. In such a pathological state of the organ, not only is the longitudinal dimension of its cavity increased but it is expanded in every direction, and the orifice by which it communicates with the neck (cervico-uterine) is so much relaxed that it is virtually abolished. It is, then, not merely the augmented length of the cavity that is to be considered, in estimating the evidences of *endo-uteritis*, but its preternatural capacity in all directions, together with the remarkable, I had almost said *morbid facility* with which the sound is introduced, must be taken into the account, and these collectively, in the absence of any appreciable organic disease, point to the existence of uterine phlegmasia, with almost unerring certainty. But cumulative evidence may be easily obtained, which, in my judgment, ought to dissipate any remaining

doubt, by the conjoint use of the uterine sound and speculum, in the manner which I shall explain by and by, thus confirming by the sight the testimony of the touch. I do not remember that any author has recommended the combined use of the two senses, in this particular investigation and in the mode which I have long practised, but I am convinced of its great advantages. The evidence is of this nature: when the sound is introduced through the speculum, we see the mucous membrane, as far interiorly as it is visible, congested and red; we see sanguinolent mucus issuing from the cavity, and, above all, when the sound is withdrawn, blood is often seen flowing pretty freely from the cavity. Some hemorrhage may follow the introduction of the sound into a healthy uterus, a few hours, or the next day, after the operation, but as far as I have observed there is never an immediate and considerable flow of blood except where the lining membrane is congested or inflamed.

Lastly, the uterine sound may enable us to distinguish, in doubtful cases, between abdominal tumors of ovarian and uterine origin. On this subject I shall say but little, because the field of my observation has been limited. I have, however, occasionally met with cases of abdominal tumors, springing from the pelvis, in which, notwithstanding the use of the abdominal and vaginal touch, it was uncertain whether the tumor was uterine or ovarian. To be positively certain that any given tumor is uterine, we must be able to trace through the vagina its continuity with the cervix; and, on the other hand, we cannot know that the uterus is not involved, unless we can, in the same way, feel the whole of it, its body as well as its neck, and find it of normal size and shape. Now, in the obscure cases referred to, we may not be sure whether there is or is not this continuity, or we may not be able to feel more than the uterine neck. Under such circumstances, the uterine sound may remove all obscurity. If the tumor is uterine, for example, caused, as it most frequently is, by fibrous growths in its walls or cavity, the tissues of the organ are hypertrophied and its cavity is elongated; the sound readily enters it to an unusual length—six or eight or ten inches—and by manipulating the tumor through the abdomen, it is perceived that the instrument is identified with it, buried in its structure, and follows all the movements impressed upon it. If, on the other hand, the tumor is ovarian or other than uterine, the sound penetrates only the usual distance,

and the uterus may be drawn away from the tumor or the tumor from it, so as to show, most clearly, that it is not concerned with the morbid mass.

SECTION II.

THE SIGHT, EMPLOYED EITHER IMMEDIATELY OR MEDIATELY.

The frequency of inflammation of the sexual organs of females, especially of the vagina and uterus, and the insufficiency of the touch to reveal it, having been already declared, it follows as a corollary that, in all cases of chronic disease of these organs of sufficient gravity to justify a tactual examination, ocular inspection ought, also, to be had recourse to, to render the exploration complete, and satisfy the just demands of the present state of obstetric science and practice. This proposition may startle some, and will, no doubt, be viewed by many as preposterous, if not monstrous; yet I have not announced it without due deliberation and the most thorough conviction of its tenableness, as well as its transcendent importance.

In further support of it I would observe that, not only is metritis a very common disease, existing independently of any other malady, but it very often accompanies the several kinds of displacement to which the uterus is liable; and in such cases, although it be true that the touch can discover the displacement, yet it is equally certain that it cannot discover the accompanying inflammation. In many instances of retroversion and prolapsus, my attention has been strongly drawn to the intense inflammation, not unfrequently attended with abrasion about the os uteri, and extending into the uterine cavity, even to the fundus. In other instances, inflammation exists in a mitigated degree, but it is seldom entirely absent. Never, therefore, was there, in my opinion, a greater or more important practical mistake than that committed by Dr. Robert Lee, in a paper read before the Royal Medical and Chirurgical Society, in 1850, and published in the *London Lancet*, in which he renounces the speculum uteri as of no utility either in the diagnosis or treatment of uterine displacements. We are not now considering the treatment of these lesions of situation, but simply their diagnosis; and it cannot be possible that any judicious practitioner,

who had been accustomed for years to rely upon the touch alone, could look through the speculum once only, and see the uterus as I have seen it again and again, and not suspect that he had habitually ignored an important pathological element in these cases. For, whether we believe with some, that the phlegmasia is the primary affection, or with others, that it is only consecutive to the displacement, we cannot persuade ourselves that it is immaterial, and may be safely left out of the diagnosis, which is to constitute the basis of treatment.

These remarks, on the indispensable necessity of the sight, being premised, I proceed to describe the method of conducting the examination, and to indicate the prominent points to be noted in the investigation. The best position of the patient is the same as for the vaginal touch, and the great desideratum is a good light—day, and not candle light, as the manner of some is—to obtain which, the couch should be drawn near to the window which admits the most light. She should lie with her hips as near the edge of the bed as she conveniently can, with the inferior extremities flexed, and the feet resting on the bed; not on stools or chairs, as some will have it. A counterpane or sheet, thrown over the lap and reaching down to the bed, completes all the preliminary arrangements.

The practitioner first makes a tactual examination, which, if it be for the first time, ought to be thorough; otherwise it may be slight, and is chiefly intended to learn the position of the *os uteri*. The visual examination follows, and ought to be both immediate and mediate; immediate for the vulva, and mediate for the vagina and uterus. For mediate vision, the *speculum uteri* is employed—an instrument that has been variously modified and made of divers materials; but those which I am accustomed to use are, the four-bladed speculum, made of German silver, which can be converted into a bivalve by detaching two of its blades, and, silver tubes of different sizes. A slight peculiarity in my tubular specula will be presently explained.

The tactual examination being completed, the forefinger of the right hand is withdrawn, and that of the left hand inserted a short distance in the vagina. This may be pressed pretty firmly upon the right side of the vagina, and slowly retracted to the vaginal orifice, where it is to be firmly held against the inner face of the right labium; the point of the second finger is then made to press

against the inner face of the left labium, to part it from its fellow. The vulva is thus opened, and its several parts can be rapidly inspected, previous to the introduction of the speculum. To gain this access to the vulva, the left forearm pushes the sheet or counterpane between the knees of the patient, so that its dependent border is just above the vulva, whilst the inner surfaces of the thighs are covered by it. In this way, there is no exposure, except of the part that must needs be exposed, else no ocular examination can be made. Whilst the labia are thus held apart, the speculum, previously oiled, is to be inserted into the vaginal orifice and passed up at once to the os uteri, the locality of which has just been ascertained by the digital examination. If the bivalve speculum be used, the vaginal surface can be examined between the blades, and by revolving it, the whole surface may be brought successively and longitudinally under the view; if, on the contrary, the tube be used, by slowly retracting it, we get a view of it circularly, as portion after portion of it recedes from the speculum. I hardly know whether the bladed or the tube speculum is best; or whether, indeed, either ought to be dogmatically preferred to the other. I use them both indifferently, and could, perhaps, if questioned, give no better reason why I am now found mostly using the one, but because I am tired of the other. Still, there are cases in which one answers better than the other, but it is difficult to designate them otherwise than by saying that in some the vagina crowds in between the blades of the bivalve or even of the quadri-valve, so as to intercept the view of the os uteri, and then the tube answers best; in others, the os uteri is so high up and so far backwards that it cannot be reached by the tube, but may be brought forwards by the bladed speculum.

Many writers, and among them Prof. Simpson, are particular to direct that the speculum should be introduced under cover, and with the aid of the touch alone, and some of them think that it is more decent and less offensive to female modesty, if the patient be placed upon her left side rather than the back. I used to be of this way of thinking, but my thoughts have changed, for after all, the genital organs, including the vulva, must be seen; and if they are not seen *sursum* they must be seen *deorsum*, so that it is only a sham to take these delicate precautions. Genuine modesty consists in scrupulously protecting our patients against unnecessary exposure; all beyond this is counterfeit.

So much for the mode of conducting the specular examination. As to its objects, it may be remarked that the vulva is not unfrequently the seat of inflammation, indicated by vivid redness, and that the inflammation is hardly ever general, but restricted to certain of its parts. Thus, the inner surfaces of the nymphæ may be its special seat, or it may affect the vestibule, the immediate vicinity of the meatus urinarius, or it may be found at the orifice of the vagina, lurking among the myrtiform or hymenal caruncles. When there is much complaint of painful or difficult micturition, the orifice of the urethra ought to be particularly inspected, for it will often be found that the mucous membrane of the urethra is phlogosed, and more or less protruding at the morbidly patent meatus.

The vagina is much oftener found in a state of inflammation than the vulva. The entire canal is not usually implicated (though I have met with a few such instances), but only a portion of it, the superior oftener than the inferior; and the anterior oftener than the posterior wall. But the elect seat of inflammation, among these organs, is the os uteri. The disease may invade its external or internal surface, or involve both at the same time, and it may affect one or both labia. The most frequent form, perhaps, in which it is exhibited, is that of an inflammatory circle, of variable breadth, surrounding the orifice, and dipping more or less deeply into the cervical canal. When it is strictly external, the surface, especially if abraded, is seen to be covered with muco-purulent secretion; when, on the contrary, it dips into the cavity, the mucous follicles are excited to increased secretion, and their peculiar viscid mucus, rendered opaque by the morbid action, hangs out of the orifice like a tough string, which it is difficult to get away by either mop or forceps.

Again, the inflammatory process may be confined to the mucous membrane, or it may extend to the subjacent tissue; in the one case, there is little or no enlargement of the os uteri; in the other, it is hypertrophied, or, being more profoundly involved, it may be at once greatly enlarged and indurated. In either case, there may or may not be ulceration around the orifice, or on one lip only.

Here it is necessary to define what is meant by ulceration of these parts, and to settle its import. For want of precision on this point, there has been much fruitless discussion: mere logomachy, disreputable to the combatants, in my judgment, and obstructive to the march of truth.

What is ulceration? "A solution of continuity in the soft parts, of longer or shorter standing, accompanied by a purulent discharge, and kept up by some local disease, or constitutional cause." Such is the definition given in *Dunghison's Dictionary*, in which all must acquiesce. Now, on certain points of the genital mucous membrane, where evidently inflammation runs highest, there is a destruction of the epithelium; plainly the result of inflammatory action, and the surface, thus denuded, secretes pus abundantly, and will continue to secrete it until the phlogosis subsides, and the raw surface is again provided with an epithelial covering. The loss of substance seldom extends deeper than the epithelium, and the solution of continuity is, therefore, quite superficial, but it is not the less real; and surely the definition of ulceration is as completely fulfilled by a line as by an inch or a foot. Hence, the unreasonableness of those who insist on calling such ulcerations "abrasions," or "excoriations," on account of their superficialness. If, in so doing, they desire to sink the pathological importance of these ulcerations, nothing is gained, for they cannot regard them as more insignificant than do the more intelligent of those who have written most concerning them, who all consider them the products—the sequelæ of inflammation, and not the primary or essential disease.

It was, as I have shown in another work,¹ by setting up this man of straw, *ulceration of the os uteri*, and demolishing it with a great flourish, that Dr. Charles West attempted, in his *Croonian Lectures*, to decry the speculum; all in vain, however, for even could the ghost be killed off, the substratum, inflammation, remains, and is not so easily vanquished.

It has been already declared that inflammation not unfrequently effects a lodgment in the body of the uterus, and its diagnostic marks have also been pointed out, namely, the dilatation of its cavity, and the patency of its apertures, together with the blood and vitiated secretions issuing from it, as felt by the uterine sound, and seen through the speculum, used conjointly.

The speculum and sound, which I use in the deepest exploration of these organs, are delineated in Fig. 43.

The speculum differs from the common tube, in having its extremities beveled in opposite directions, so as to shorten one of its sides, which is turned towards the pubes in its introduction—a form of tube speculum, I may remark, superior to that in common use, in all

¹ Lectures in reply to Dr. West.

Fig. 43.

Miller's Speculum and Uterine
Sound.

cases, because it admits more light, and gives easier access to the os uteri. The shortness of its pubic side permits the ready introduction of the sound through it, which is then passed into the uterine cavity by the aid of sight. The sound itself differs somewhat from Prof. Simpson's, being rather shorter, and having a handle like a catheter, to render it more portable. Instead of being graduated, it has only a double knob at the distance of three inches from its point, that serves as a landmark, from which we may estimate, near enough for all practical uses, the depth of its penetration.

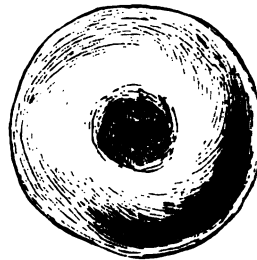
Valuable as are the services of the speculum, however, in revealing the existence of inflammation of the sexual organs, otherwise undiscoverable, this is not its only contribution to accurate diagnosis. In the hands of Mr. Whitehead, it has brought to light a *new visible sign of pregnancy*, so much the more to be prized, as it is available in early pregnancy, when, as practical men too well know, all the other evidences are dubious and liable to mislead us. This sign consists in certain striking changes which the os uteri undergoes, and which are not observed in any of the morbid conditions of the part.

I cannot better describe them than in his own language, nor better illustrate them than with his diagrams, which, though rough, answer admirably well. After stating that the characteristic feature of a healthy unimpregnated uterus, as distinct from that which indicates the existence of pregnancy, is the *linear form of the orifice*, which is preserved even during menstruation, the only difference being that it is elongated and its boundaries are somewhat relaxed, he goes on to say: "At the time of conception, the parts are thrown into a precisely similar condition; but no escape of fluid occurs to relieve the turgescence, which consequently continues to increase. In from ten to twenty days afterwards, the whole organ is found considerably enlarged, and the

circulation through it augmented both in force and volume; the labia are thickened and apparently elongated, the commissures less distinct, and the os appears to be sunk in, or dimpled, owing to the distension and consequent projection of the labia below the level of the orifice. In the fourth week, the *labia*, at the centre of their margins, are permanently separated to the extent of one or two lines; and the *os tinæ*, which was before a mere chink with parallel boundaries, is now seen to be an elliptical, or sometimes rounded aperture, which is occupied by a deposition of transparent, gelatinous mucus. At six or eight weeks it becomes decidedly oval, or irregularly circular, with a puckered or indented boundary, having a relaxed and lobulated character. This appearance is shown in the accompanying sketch (Fig. 44), representing the uterus of a woman, twenty-three years of age, who was seven weeks advanced in her second pregnancy.

“These changes of form of the lower uterine orifice are evidently owing to distension of the surrounding textures, caused by the increased flow of blood into their structure. The whole circumference of the cervix is enlarged in all its dimensions; the labia become less and less distinct by the simultaneous expansion of the commissures, so that at the stage above mentioned the existence of the latter is altogether obliterated. After this period, the parts present a great variety of appearances, depending principally upon the state of the circulation through the uterine veins. The characteristic trait, however, is always maintained: namely, the patulent state of the orifice, occupied by a transparent gelatinous plug of mucus, and its relaxed, irregular boundary. The annexed figure (Fig. 45) represents the uterus of a woman, twenty-five years of age, at the period of quickening of her second pregnancy.

Fig. 44.



Appearance of the Os Uteri at the seventh week of pregnancy.

Fig. 45.



Appearance of the Os Uteri at quickening.

"She was a person of full habit of body, suffering from piles and varicosis of the legs. There was also a similarly congested state of the lower uterine veins, some branches of which were seen ramifying upon the posterior labium and contiguous part of the cervix."¹

The opportunity of making such observations but seldom occurs in such a practice as I have had; I have, nevertheless, been permitted by two patients, whom I had treated for inflammation of the os uteri and who both conceived shortly afterwards, to examine with the speculum in the sixth or eighth week of pregnancy, and in both, the appearances corresponded as exactly as possible to the description and illustrations of Mr. Whitehead. This is the whole of my experience as to this particular sign of pregnancy, but being confirmatory, as far as it goes, of Mr. Whitehead's, I am the more disposed to accept all he affirms in regard to it.

SECTION III.

THE HEARING IN THIS KIND OF EXPLORATION.

It is only in cases of abdominal tumors, the nature of which is uncertain and cannot be ascertained by other methods, that auscultation may be applied to determine whether it is produced by pregnancy. And, supposing pregnancy to exist, the most conclusive of all testimony may be obtained by this mode of investigation, for as, if we apply our ear to the præcordial region of a man and hear the pulsations of his heart, we cannot doubt that he is alive, so neither, if we hear the foetal heart beating in the mother's abdomen, can we doubt that she is with child. She may be dropsical, she may have an enlarged ovary; but whatever else may contribute to swell her abdomen, she is assuredly pregnant. Here is certainty. What a precious boon, then, did M. Kergaradec bestow upon the obstetric art, when he published the fruits of his numerous and perfect observations on a solitary woman within two weeks of her delivery,² to which subsequent observers have added but little, although they have written volumes on obstetric auscultation.

When the ear is applied, either nakedly or with the stethoscope,

¹ On Abortion and Sterility, p. 168, 2d Amer. edit.

² Mémoire sur l'Auscultation appliquée à l'Etude de la Grossesse. Paris, 1822.

to the abdomen of a woman in advanced pregnancy, we shall hear, provided the child be alive, *two kinds of pulsatory sounds*, the one *double* and referable to the action of the foetal heart, the other *single* and emanating from the maternal circulation in the parietes of the uterus. Neither of these sounds can be heard all over the gravid uterus, but both are restricted to comparatively a small portion of it, and if one is heard on one side of the mother's abdomen, the other will most probably be heard on the opposite side. In searching for them, the patient should be placed in a recumbent position, upon the back, with the head and shoulders raised, and the inferior extremities gently flexed, in order that the abdominal muscles may be relaxed as much as possible. The abdomen ought to be divested of all covering except the chemise or some simple robe that will make no rustling noise, and the examiner may apply his naked ear or use a stethoscope, according to his wont, but for myself I prefer the former. It requires some patience and perseverance, especially in first essays at obstetric auscultation, to catch and isolate the sounds we are in quest of, for the ear may be saluted with a bedlam concert, composed of these and the gurglings in the intestinal tube, the pulsations of the aorta, and the drumming of the foetus. By practice, however, the ear becomes wonderfully attuned to the specific sounds in question, and is enabled to distinguish them readily, notwithstanding the medley.

Let us consider these sounds separately; and first, *those of the foetal heart*. To give an idea of their nature, they were compared by Kergaradec to the ticking of a watch, and this comparison has been reiterated by all subsequent writers. But one who has never heard them, and yet is familiar with the sounds of the adult heart, will be more likely to recognize them by their similarity to these, for they are, in fact, alike, only the sounds of the foetal heart are fainter and much more frequent, numbering 130 to 140 in the minute.

The pulsations of the foetal heart cannot be discovered by auscultation earlier than the fourth month of pregnancy, and they are so much the more audible in proportion as pregnancy has advanced beyond this period. Prior to the seventh month, it is wholly uncertain in what part of the abdomen they may be heard, on account of the instability of the foetus, which is frequently changing its position in the uterus. But from the seventh month to the close of gestation, the foetus is more steadfast, and inasmuch as its head and shoulders, in by far the largest number of cases, oc

inferior part of the uterus, it is most likely that we shall hear its heart beating in the hypogastric or one of the iliac regions. In either case, however, the whole extent of the tumor should be carefully ausculted, as we cannot know what may be the foetal position in any given case.

The pulsations of the foetal heart are always heard most loudly in a circumscribed space of the abdominal parietes, and as the ear recedes from this, they become less and less audible until they die away in the distance. The point of greatest intensity of sound should be noted, because it is, as will be more fully explained in a future chapter, an index to the position of the foetus in utero. I shall only observe here that on account of the smallness of the chest and the comparatively large size of the heart, together with the condensed state of the lungs, the sounds of the foetal heart are freely transmitted through every part of the thoracic walls; but owing to its peculiar attitude, only the sounds which are transmitted through the posterior part of the chest reach the ear of the examiner. From this it follows that the point of greatest intensity of sound corresponds to the shoulders of the child, and not to its præcordia.

The other pulsatory sound, discovered by auscultation of the gravid uterus, is single, and resembles the blowing of a bellows (*battemens avec soufflé* of Kergaradec). It is the *bruit de soufflé* of the French, or simply the *soufflé*, a term in such common use among us, that it may be said to be anglicized, and as it is convenient, we may be pardoned for adopting it. Several varieties of this *bruit* were described by Laennec in different morbid states, which are also recognizable in ausculting the gravid uterus; but the most common is, as Dr. Kennedy observes, a combination of the bellows, or sawing, with the hissing sound, commencing with one of the former and terminating with the latter; and this is in general so protracted, that the last *soufflé* is audible when the subsequent one commences.

M. Kergaradec first discovered it in connection with pregnancy, in the uterus of the woman where first he heard the foetal heart's action, and as the result of repeated auscultation, in her case, he came to the conclusion that it is emitted exclusively from that portion of the organ to which the placenta is attached, and is produced by the circulation of the maternal blood through the cells and tubes of the placenta. M. De Lens, who entered upon the investigation of the newly discovered phenomenon of pregnancy, so

soon as Kergaradec opened the way, adopting the opinion of the latter as to its cause, proposed, in an appendix to his memoir, calling it the *placental souffle*. Both of these observers were perfectly convinced that it is connected with the maternal and not the foetal circulation of blood, because they constantly found that it is synchronous with the pulse of the mother, a finding which has been verified by every subsequent auscultator, how much soever they may differ as to the precise seat of the sound. On this point, there is great dissimilarity of opinion. Dr. Evory Kennedy,¹ for example, maintains that it is the congeries of specially enlarged and tortuous arteries in that portion of the uterine walls to which the placenta is attached, that *principally* gives forth the *souffle*; he says principally, because he admits that it is occasionally caused by the passage of blood through the vessels at the lateral part of the uterus. "This placental or extremely vascular structure," he observes, "is confined to a circumscribed portion, changing, not gradually, but abruptly, into the ordinary uterine texture," and, according to his explanation, the *bruit* is produced in the same way as by pressing the stethoscope upon a large artery, the blood passing suddenly through a strictured to a more widely dilated portion of the vessels.

Others, (I need not particularize, for I am not writing a treatise on auscultation), who agree that the seat of the sound is the uterine parietes, contend that it is not confined to the placental region, but is the product of innumerable rills of blood flowing through the augmented vascular system of the uterus, any *one* of which, though emitting sound, cannot be heard, but their combined gurglings are audible, and these propose to denominate the sound, the "*uterine murmur or souffle*."

Others, again, following M. Bouillaud, maintain that it is altogether extraneous to the uterus, being caused by the pressure of the organ, enlarged by gravidity, upon the aorta and its iliac branches, and prefer, hence, to call it the "*abdominal souffle*."

On this subject there is certainly sufficient diversity of opinion and discord in observation. For my own part, however, I remain convinced that the sound in question is emitted by the circulation of the blood through the placental portion of the uterus, and I am not sure that the explanation of the original observers is not, after all, the correct one; or at least, it must be admitted that the

¹ Observations on Obstetric Auscultation.

utero-placental vessels may swell the chorus. I shall, therefore, adhere to the nomenclature of De Lens, and call this murmur the *placental souffle*. The grounds of this decision are that I have always heard the murmur only in a circumscribed space, to which it is confined, not changing or shifting from place to place, and when opportunities have offered, as they have on several occasions, to ascertain the seat of the placenta, this was found to correspond to the region of the uterus where the *bruit* was heard. So well am I satisfied of the correctness of this observation that, in any case of retained placenta requiring manual extraction, I do not hesitate to pass the hand into the region of the uterus where the *souffle* was heard previous to the delivery of the child, and I have not, thus far, been disappointed in following its direction.

The nature of the evidence acquired by auscultation having been explained, we may now endeavor to estimate its availableness. In regard to the *double pulsatory sounds*—the music of the foetal heart—they bear, when distinctly recognizable, irresistible testimony to the existence of pregnancy, and distinguish the tumor in which they are heard from all other tumors. So convincing, indeed, is this kind of evidence, that it were bootless to seek for any other, and all further investigation is precluded. But the auscultator needs to be reminded of a fallacy to which he is exposed, if he be not on his guard. I allude to the possibility of mistaking, under certain circumstances, the sounds of the maternal for those of a foetal heart. A young girl, whose catamenia are suppressed, may have her abdomen to swell and become as greatly distended as in advanced pregnancy; and if she be anæmic withal, with a hurried circulation of the blood, the quick pulsations of her heart may be heard in the lower part of the abdomen, and be mistaken for those of the foetal heart. I have somewhere seen it stated that Prof. Dubois, of the Paris school, once made such a mistake, but he soon rectified it by finding on comparison that the ausculted pulsations corresponded precisely with those at the wrist of the patient, and were increasingly loud as the stethoscope approached the epigastrium.

Then, again, although the patient may be pregnant, the foetus may have lost its vitality, and of course there is an extinction of the cardiac sounds, or even if the foetus be alive, the beating of its heart cannot always be heard, owing to the peculiar position it may chance to occupy. But though in the latter case it cannot be

heard at one examination, it may be at another, and therefore a definitive opinion ought not to be formed until auscultation has been repeated after the lapse of a few days.

The *placental souffle* is not so reliable a diagnostic of pregnancy as the *bruit du cœur*, for unfortunately it may be closely imitated by the pressure of morbid tumors, ovarian or uterine, upon the large bloodvessels on the posterior plane of the abdomen. I knew an instance myself, in which an unmarried lady, the subject of ovarian tumor, was pronounced pregnant by an eminent practitioner, not unskilled in auscultation, who was misled by this sign. Nevertheless, the *placental souffle* ought not to be discarded on this account, especially as it may be distinguished from the imitative souffle by raising the tumor with the hand, or altering the position of the patient, when the latter may cease to be heard. Besides, the souffle from morbid states is heard only in the vicinity of the larger arteries, whilst the *placental souffle* may be heard in any part of the gravid uterus, and at a distance from any great bloodvessel. Still, it must be regarded as subordinate to the cardiac pulsations, for we should hardly venture on its evidence alone, to give an affirmative opinion in a case of doubtful pregnancy. Probability is the most that can be reached by it, which, however, might be so strong as to amount to a presumption that ought to guide our course, and is much better than no evidence at all.

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CHAPTER IV.

PREGNANCY.

THE organic changes which take place in the uterus, specially in its mucous membrane at the menstrual periods, calculated to detain the ovum for a time, have been explained in the second chapter. And the fate of the ovum, provided it be not fructified by sexual congress, has also been declared. But supposing that the fertilizing element of the male semen has access to it, either in the uterus or Fallopian tube, it speedily begins the series of developments that ultimately issue in the production of a new being resembling its parents.

This is generation, and the starting-point of it is fecundation, with the intimate nature of which we are wholly ignorant; it is shrouded in mystery, which we cannot pretend to penetrate, and all speculation concerning it is idle as it is unprofitable.

If the development of the fœtus takes place within the organs of the parent, as it does in all the mammals, she may properly be said to conceive at the moment of fecundation; conception, fecundation, and impregnation are for her convertible terms, and signify that a change has been wrought within her by sexual intercourse, which will, unless prevented by disease or casualty, eventuate in the production of offspring.

Profrs. Velpeau and Meigs, however, attach a different meaning to conception, and treat of it and fecundation separately.

According to the former of these high authorities, conception is not a single act, but comprehends whatever occurs between the vivification of the germ and its attachment to some point of the generative passages; or, in the case of oviparous animals, its extrusion to undergo incubation externally. In this sense, as he observes, the ophidians and birds have a conception, though they have no gestation. Prof. Meigs is more restricted in his use of the term, and, instead of making it include the first series of changes,

which the fecundated ovum undergoes, prior to its attachment to the maternal tissues (and according to the microscopic observation of Dr. Barry, these are manifold), he emphatically declares that "conception is the fixation of a fecundated ovum upon the living surface of the mother; it is the formation of an attachment to or union with the womb, the tube, &c., of the mother. This is conception, viz: the fixation of a fecundated ovum. If a conception takes place in the womb, it is pregnancy; if out of the womb, it is extra-uterine pregnancy," &c.¹ According to Prof. Velpeau, then, the fixation of the ovum is only the complement of conception, but according to Prof. Meigs, it is the very thing itself, and no matter what evolutions may occur in the fecundated germ, whilst it is a floating spherule, conception has not yet taken place: for conception is fixation, and whatever has preceded has nothing to do with it except as preparatory.

It is, in my judgment, far better to employ such common terms as "fecundation," "conception," "impregnation," "pregnancy," in their generally accepted sense, and the innovations, to which I have adverted, are well calculated to perplex rather than to enlighten the student, and are, moreover, fruitful in paradoxes, if not flat contradictions. Thus, conception, according to our dictionaries, signifies the first formation of the embryo or fœtus, and is constantly referred to as an *act*, quickly performed, even during sexual congress or immediately subsequent to it. If there were but one congress, and that fruitful, we always say that conception took place *then*, and make our calculations accordingly. At that time, also, fecundation or impregnation occurred, and pregnancy is immediately supervenient. A woman is as truly pregnant the moment after conception as she is when her time to be delivered is drawing nigh. This is pregnancy—to be with child—and such is virtually the state of a woman, who has "conceived seed" that will grow to a child, no matter whether a long or a short time be required to effect its attachment to the uterus. I understand Prof. Meigs to acquiesce in this definition, when he says "pregnancy

¹ *Obstetrics: the Science and the Art*, Phil., 1849.

I have here, as well as elsewhere, quoted from the first edition of this deservedly popular work, although it has since passed through two other editions, the latest being that of 1856. I have done so, because it is the only copy in my possession. I have, however, looked over the parallel passages, in the latest edition, without finding any material difference. The phraseology may be somewhat altered, but the substance is the same.

ordinarily begins soon after the disappearance of a periodical effusion of the menstrua." Now, inasmuch as a considerable time elapses before the ovum begins to make its attachment, which is at last only gradually consummated, the scientific definition of conception involves us in the paradox that *a woman may be pregnant before she conceives!* which is plainly an inversion of the natural order of generation. And again: *abortion may take place before a woman has conceived*—for the learned author himself declares that the fecundated ovulum may be lost, washed away in a torrent of blood, without the woman's having conceived; but miscarriage at any time after fructification, and before the fruit is viable is abortion, without any reference to scientific conception.

To proceed: the fecundated ovum is installed as the occupant of the uterus, until it acquires the maturity of development and growth necessary to fit the fœtus for external and more individual life. Meanwhile, great and important changes take place in this organ to furnish it for the maintenance of its inhabitant, and eventually to eject it when its lease expires. The fœtus itself, also, puts forth certain structures to establish a connection with its parent, which it casts off as *exuvix*, never to be replaced, when the time for it to assume its individual life has arrived. Such, in general terms, are the phenomena, to which the study of pregnancy introduces us, and they naturally fall under the twofold division of *maternal* and *fœtal*.

SECTION I.

MATERNAL PHENOMENA OF PREGNANCY.

If the advent of the *unfecundated* ovum produces in the uterus periodical orgasm, with hypertrophy of its tissues, what might be expected as the effects of its presence, when, being *fecundated*, it is animated with the *nisus formativus*? Itself the seat of the most active vitality—the theatre of displays of little less than creative power—the hitherto dormant energies of the uterus are now aroused in the highest possible degree. All its tissues are permeated by an unusual tide of blood, and are instinct with a higher rate of innervation, under the influence of which they are expanded in every direction. A genuine hypertrophy is induced, which keeps pace with the growing ovum; the bloodvessels, lymphatics, and nerves are enlarged and elongated; the muscular fibres are thickened and

extended, whilst many of them assume a definite and useful arrangement; the mucous membrane becomes tumid and pulpy, and its glandules pour out, in unwonted abundance, their albuminous secretion, becoming changed in its aspect, at the same time, until it is metamorphosed into the outermost of the foetal envelops, and receives the new name of *membrana decidua*, so called from its being cast off at the time of parturition.

These striking changes in the condition of the uterus deserve a more particular examination.

1. ALTERATION OF THE UTERINE MUCOUS MEMBRANE CONSEQUENT TO IMPREGNATION.

In examining the uterus, at a very early period of pregnancy, its internal surface is found to be lined by a membrane, called the *decidua*, which, until quite recently, was supposed to be of new formation. Coagulable lymph, it was believed, is thrown out on this surface, into which bloodvessels are soon extended, converting it into an organized product, subservient to the ovum. This is the account given of it by Dr. Wm. Hunter, in his Anatomical Description of the Human Gravid Uterus, who also bestowed upon it the name by which it has since been generally designated. The researches of later inquirers, assisted by improved methods of investigation, have demonstrated, however, apparently in the most conclusive manner, that the decidua is nothing more than the mucous membrane, modified by pregnancy to fulfil perhaps the chief offices for which it is destined. According to the observations of Prof. E. H. Weber, communicated in manuscript to Müller:¹ "The decidua is composed in greater part of the tubular follicles, which lie very closely arranged at the inner surface of the uterus, and of numerous bloodvessels ramifying upon and between them. In animals, the long tubular follicles, here and there bifurcated, lie in the substance of the uterus itself, and open upon its inner surface by numerous orifices. In the human subject they form the decidua. When the inner surface of the decidua is examined, numerous filaments can be seen in its substance, tolerably regularly disposed, and directed towards the surface. These filaments resemble closely set villi, except that they do not lie free, the interspaces between them being filled with the substance of the decidua. If the cut surface of a divided uterus is examined in the bright sunlight,

¹ Elements of Physiology, Phila., 1843, p. 844.

with a lens, these supposed villi are seen to be long and thin cylindrical tubuli, which become somewhat narrowed where they reach the free surface of the decidua, while at the attached or uterine surface of that membrane they become wider, are much convoluted, and appear to commence by closed extremities. If the substance of a pregnant uterus is compressed, a thick whitish fluid exudes upon the surface of the decidua, similar to the secretion which may be expressed from the uterine glands of animals. The decidua presents at its inner surface numerous orifices, which have been long known, and which appear to be the mouths by which two or more of the tubuli open. Besides these, however, there must be many orifices of single tubuli which are not visible. The tubuli are almost a quarter of an inch in length, and here and there bifurcate, the branches being as wide as the trunk of the follicle. This character completely distinguishes them from the bloodvessels which run in contact with them; for the bloodvessels form a network or loops, or at all events ramify, diminishing in diameter at each division."

The researches of Profrs. Sharpey, Goodsir, Coste, and Robin, coincide with those of Weber, and leave scarcely a doubt as to the identity of the decidua and uterine mucous membrane. From these authors a few other particulars may be gathered, which it may be proper to adduce, to complete the description, which I wish to offer at present, of the early condition of the decidua, leaving its later transformations to be noticed hereafter.

The membrana decidua is limited to the cavity of the body of the uterus, the cervix not being lined by it. At a very early period, it has openings corresponding to the orifices of the Fallopian tubes and the cervico-uterine orifice, which are afterwards frequently closed by the growth of the membrane across these apertures. But from the first, it is virtually a shut sac, the inferior, larger opening, towards the cervix, being plugged by the tough mucus secreted by that portion of the organ, whilst the Fallopian orifices are very minute. It is thus that the cavity of the decidua soon becomes filled with a fluid, poured out by its glandular tubuli, and containing a large number of nucleated cells, from which the embryo at first derives the materials for its growth.

There is nearly uniform concurrence among observers, from Hunter to the most recent, as to the limitation of the decidua to the body of the uterus, and the non-participation of the neck in the peculiar organic changes that are there going on—an anatomical

fact worthy of special notice, on account of its bearings on several points which will come before us hereafter.

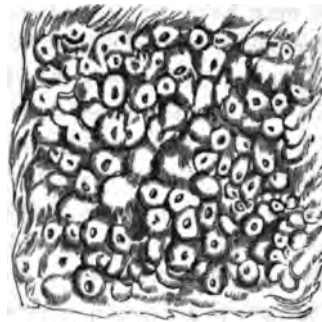
That the decidua is the uterine mucous membrane in disguise, may be concluded from the observations made upon it in aborted ova, by Dr. Montgomery: observations which are the more valuable because they were made before the new view was promulgated, and whilst the distinguished author regarded the decidua as a separate and newly organized structure. In his work on the *Signs and Symptoms of Pregnancy*, published in 1837, Dr. Montgomery gives a description, illustrated by a drawing, of the deciduæ of ejected ova, which is equally applicable to the normal structure of the uterine mucous membrane, somewhat

exaggerated by gravidity. Fig. 46 is a copy of his drawing, and he describes a great number of cup-like elevations upon the external surface of the decidua, "having the appearance of little bags, the bottoms of which are attached to, or imbedded in its substance; they then expand, or belly out a little, and again grow smaller towards their outer or uterine end, which, in by far the greater number of them, is an open mouth,

when separated from the uterus: how it may be while they are adherent, I cannot at present say. Some of them, which I have found more deeply imbedded in the decidua, were completely closed sacs. They are best seen at about the second or third month, and are not to be found at the advanced periods of gestation." Dr. Montgomery calls these peculiar structures "*decidual cotyledons*:" "for to that name their form, as well as their situation, appears strictly to entitle them; but, from having, on more than one occasion, observed within their cavity a milky or chylous fluid, I am disposed to consider them reservoirs for nutrient fluids, separated from the maternal blood, to be thence absorbed for the support and development of the ovum." These decidual sacs, containing milky fluid, are wonderfully like the tubular glandulæ of the uterine mucous membrane, and if the decidua be of new formation, it is a *fac simile* of that tissue.

There is, furthermore, an observation of M. Robin, who studied the microscopic characters of the uterine mucous membrane and

Fig. 46.



the decidua, which is to the point, viz: every anatomical element which can be found in one may also be found in the other, which shows, if I may so say, their natural as well as their structural identity. This, if I mistake not, cannot be affirmed of adventitious membranes in any part of the body.

Whilst the mucous membrane of the body of the uterus is being transformed into decidua, that of the neck undergoes no organic change, but its follicles are simply excited to increased secretion of perhaps unusually viscid mucus, that fills not merely the external orifice, but also the canal of the cervix. This is the *mucous plug* of obstetric authors, concerning which much has been written, yet there is not perfect agreement either as to its nature or semeiotic value in the diagnosis of pregnancy. Dr. Burns, for example, says it may be extracted entire by maceration, when a mould of the lacunæ may be obtained by floating it in spirits saturated with fine sugar, which conveys the idea of solidity, and such nice adaptation that the cervical canal is as effectually stopped by it as the neck of a bottle by a cork. A good degree of solidity and permanence is ascribed to it also by Dr. Tyler Smith, who says that when once formed it continues up to the commencement of labor, except that its inferior part is, to a slight degree, constantly wearing away and discharged in the form of *débris* into the vagina, the secretion of the cervix going on slowly, to supply the loss. But Mr. Whitehead affirms that the gelatinous plug, as he calls it, is always in active process of being replaced by a new secretion, which is constantly going on, the old deposition being at the same time pushed downwards and dissolved, as it descends, in the vaginal mucus, but in so small a quantity as to escape the notice of the woman, under ordinary circumstances. This last description is most in accordance with my own observations.

As to the evidence of pregnancy in its early stage, which the mucous plug can afford, I am not so confident of its value as Dr. Tyler Smith appears to be. In this condition, he states that its lower part is perfectly white and opaque, owing to its coagulation by the action of the acid vaginal secretions upon it, by which it is, also, rendered more solid, and he thinks that it rarely presents this appearance except in connection with pregnancy. It has never occurred to me to see this purely white and opaque mucous plug, but I do not, therefore, doubt that he has, or that, when present, it may be entitled to consideration, especially when there is no appearance of a morbid condition of the parts. But, at the same time, I can

testify to the fidelity of Mr. Whitehead, when he remarks that if the secretion be suddenly increased and its quality changed, the cervical plug may be thrown off in a mass, leaving the cavity which contained it unoccupied and collapsed, to be filled anew in a short time by fresh secretion. It is, therefore, manifest that if we rely too much on the plug as a sign of pregnancy, and chance to make a specular examination when it has been thrown off, we may pronounce a woman to be not pregnant, though it may afterwards appear that she was three or four months gone, an error into which I was once betrayed by too implicit reliance on this sign.

2. ALTERATIONS IN THE STATE OF THE VASCULAR SYSTEM OF THE UTERUS INDUCED BY PREGNANCY.

None of the changes that take place in the gravid uterus is more remarkable than that which occurs in its vascular system. In the non-gravid state, its tissues are firm and compact, and except at the catamenial periods, when a kind of mock gravidity exists, its arteries and veins are of moderate size and circulate but little blood. But during pregnancy, its *arteries*, without losing their tortuousness, are greatly enlarged and lengthened, and the *veins* are so numerous and so much dilated that the name of sinuses is appropriately bestowed upon them. In short, the uterine vascular system is prodigiously augmented, and an incalculably larger amount of blood flows in broad and rapid currents through it to supply the foetus with the materials of nutrition and respiration.

The *veins* of the pregnant uterus are deserving of special consideration, not only on account of their great size but also a very important anatomical peculiarity which they exhibit. When a section is made of the uterine walls, they are seen to be arranged in several planes, superficial and more deep seated, the veins belonging to each plane having frequent and free anastomoses with each other, whilst the veins of one plane inosculate also with those of another, so that a great venous network is formed. The uterine veins are flattened like sinuses rather than cylindrical like the superficial veins of the surface of the body, and consist only of the usual lining membrane of the venous system surrounded by the muscular fibres of the uterine parenchyma, which invests them as a second coat.

But the anatomical peculiarity, to which allusion was made, con-

sists in the opening of many of these veins upon the internal surface of the uterus by smooth and well defined orifices. They transfix this surface very obliquely, so as to provide themselves with valves at their orifices, which are especially numerous and large upon that portion of the uterus to which the placenta is attached. Here, in advanced gestation, they are large enough to receive a good sized goose-quill, or even the tip of the little finger. I do not know that such a disposition of the veins is found in any other organ or even in the uterus of the inferior animals. This disposition exists, of course, independently of pregnancy, but under ordinary circumstances the veins are small and these orifices may escape notice. When, however, they are exaggerated by a pathological state of the uterus, they may become quite conspicuous and attract the particular attention of the observer. Thus, in one of Mr. Whitehead's cases of fatal termination of chronic menorrhagia, in a virgin, aged seventeen years and five months, no organic lesion was discovered in any part of the body, which was everywhere drained of blood: "The *labia* and *cervix uteri* were perfectly healthy. The inner surface of the uterus presented numerous openings scattered over every part of it, obvious to the naked eye, some being sufficiently large to admit a good-sized bristle, or the end of a lachrymal probe. The largest and most numerous were at each side of the fundus near the horns (superior angles) of the uterus and at the contracted part of its body near the commencement of the *cervix*. The openings had a valvular arrangement, a great number passing downwards towards the *cervix*, while those at the upper part of the organ appeared to pass towards the Fallopian orifices."¹

The only valves belonging to the uterine veins are those at the orifices and those which are found at the points of inosculation between the veins of the different planes, already referred to. The latter employed the particular attention of Prof. Owen, in his dissections of gravid uteri, who describes them by saying that the central portion of the parietes of the superficial vein invariably projected in a semilunar form into the deeper seated one, and where two or even three of these wide venous channels communicated with a deeper sinus at the same point, the semilunar edges decussated each other so as to allow only a very small part of the deep seated vein to be seen.² Probably Prof. Simpson's description of

¹ Abortion and Sterility.

² Complete works of John Hunter, edited by Jas. F. Palmer, vol. iv. p. 100.

this kind of venous inosculation may be rather more lucid than Prof. Owens', when he says that the foramen by which a venous tube communicates with another lying immediately beneath it, is not in the *sides* but the *floor* of the superficial vein, and looking down in it from above we see the canal of the vein below partially covered by a semilunar or falciform projection, formed by the lining membrane of the two venous tubes, as they meet together at a very acute angle, the lower tube always opening very obliquely into the upper.¹ That these valvular arrangements, by obstructing the retrograde movement of the venous blood, operate efficaciously in preventing uterine hemorrhage, in the various exigencies of pregnancy and parturition, can hardly be questioned. The investment of the veins with a muscular coat is also well adapted to accomplish the same object, by diminishing the entire calibre of the vessels, which is always secured in a more or less perfect degree under uterine contraction, so that it has passed into an obstetric proverb, that "a contracted uterus can't bleed."

3. DISPOSITION OF THE MUSCULAR FIBRES OF THE GRAVID UTERUS.

In the description which has been given of the unimpregnated uterus (Chap. II.), it was stated that the fibres constituting its parenchyma are not arranged in any definite order, and even their nature is not so unequivocal as to leave no room for dispute. As muscular fibres, they exist, in fact, in a rudimentary condition. But touched by the wand of pregnancy as by that of a magician, they take on hypertrophic development and exhibit their genuine muscular nature, whilst many of them assume a regular arrangement like that which exists in other hollow organs. Some of the descriptions which have been given of the arrangement of their fibres, are evidently derived from the analogy of other organs, the alimentary canal, for instance, rather than from actual dissection. Such analogy suggests that the uterus ought to possess a layer of longitudinal fibres externally, and a layer of circular ones internally, and accordingly this is the representation made of them by Dr. Dewees, who makes it the basis of his speculations concerning the normal and abnormal action of the womb at the time of parturition. But no such arrangement, nor even an approach to it, can be demon-

¹ Works, first series, p. 660.

strated in the subject. It appears to me, so far as my own inquiries have enabled me to judge, that the descriptions of Sir Charles Bell, and Dugès and Boivin, which substantially agree with each other, represent this anatomical point in its true light. From their researches¹ it appears—

First. When the peritoneal covering of the uterus is removed, an *external muscular layer* (Fig. 47), is discovered upon the superior part of the body of the uterus, consisting of fibres that part from each

Fig. 47.



View of the Anterior Face of the Uterus of a woman recently delivered, the peritoneal coat being dissected off and turned down: 1, 1, 1, the median plane of the uterus; 2, the right ovary; 3, the right Fallopian tube; 4, the right round ligament; 5, 5, fibrous planes, common to the round ligament and Fallopian tube of the right side; 6, 6, fibrous planes common to the round ligament and Fallopian tube of the left side; 9, 9, 9, fragments of the muscular coat and peritoneum that covered the anterior face of the body of the uterus.

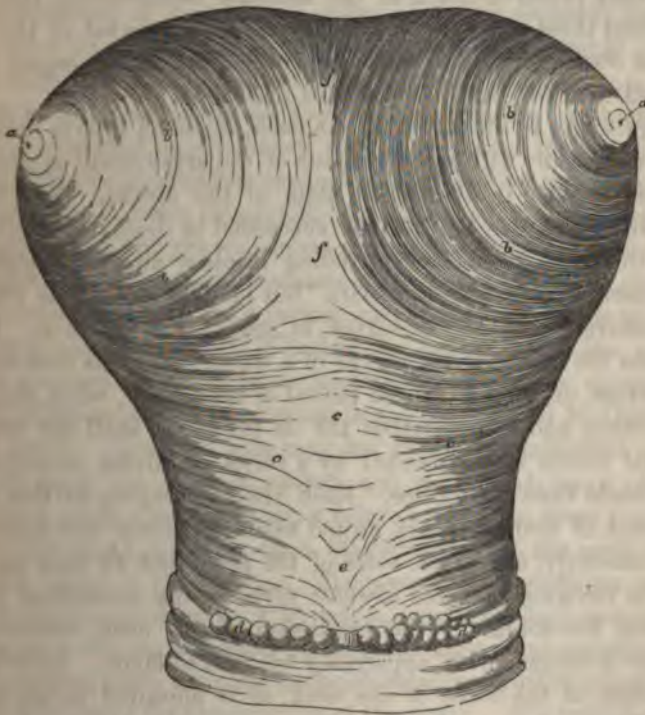
other on the mesial line of its anterior and posterior surfaces, and run obliquely downwards and outwards, to the borders of the uterus. The fibres from the fundus are continued upon the Fallopian tubes and ligaments of the ovaries, while the rest, from both surfaces of the uterus, converge towards, and are continued upon the round ligaments which they, in fact, constitute. Madame Boivin, tracing these fibres from the mesial line, very aptly com-

¹ Paper on "The Muscularity of the Uterus."—*Med.-Chirurg. Transact.*, vol. iv. p. 338.

Traité Pratique des Maladies de l'Uterus, par Mme. Boivin et A. Dugès, Paris, 1833; tom. ii. et Atlas.

pare their appearance to that of the long hair of the human head, parted the whole length of the mesial line of the cranium, smoothly combed on both sides of the forehead, and tied a little anterior to each ear. Sir Charles Bell, on the contrary, describes them as arising from the round ligaments, and spreading in a diverging manner over the fundus until they unite and form the outermost stratum of the muscular substance of the womb; the round ligaments he regards as their tendons. His view of them is, I think, the most correct; but we may call them, with Madame Boivin, the *oblique fibres* of the uterus. When it is remembered how largely the fundus of the uterus is developed during pregnancy, and that the whole of its expanded surface, even down to the insertions of the round ligaments, is invested with these fibres, we may form some idea of their extent.

Fig. 48.



View of the Internal Face of the Uterus, shortly after delivery at term: *a, a*, internal orifices of the Fallopian tubes; *b, b*, concentric fibres of the internal lateral regions, or expulsive muscles of Ruysch; *f, f*, internal median line—disposition of its fibres; *c, c*, internal orifice of the uterus; *d, d*, external orifice, forming a slight corded prominence upon the surface of the vaginal canal; *e*, median line of the posterior wall of the neck giving origin to the numerous plicæ seen there.

Secondly. Upon inverting the uterus and brushing off any portions of decidua that may be adhering, an *internal layer of fibres* (Fig. 48), will be easily seen, consisting of *concentric circles* around the orifices of the Fallopian tubes. These circles are, of course, small next to the orifices of the tubes, but enlarge as they recede, until the outermost ones meet and mingle upon the mesial line of the anterior and posterior surfaces of the uterus. These concentric fibres are described in the same manner by Sir Charles Bell and Madame Boivin, and any one may easily satisfy himself, as I have several times, of their trustiness, by simply opening and looking into a recently gravid uterus.

With regard to the fibres belonging to the inferior part of the body of the uterus, viz: the part below the insertions of the round ligaments (which is comparatively small, owing to the predominant development of the superior part), nothing very definite can be said; they preserve much of the intricate interweaving that characterized them anterior to pregnancy, and somewhat of the same may be observed still in the superior portion of the organ, intermingled with the regular order just described.

Thirdly. As to the fibres of the neck, Madame Boivin describes them as *circular*, with some remains of the arborescent appearance peculiar to them in the vacant state of the uterus. Sir Charles Bell informs us that he "has *not* succeeded in discovering circular fibres in the os tinæ, corresponding in place and office with the sphincters of other hollow viscera," but he does not tell us what he *has* discoverèd. I will endeavor to supply the omission. If we lay open the cavity of the uterus of a woman who has died during parturition, or at an advanced period of pregnancy, when the neck is unfolded, and look towards the os tinæ, we shall see that its external orifice is surrounded by a series of circles, enlarging as they recede from the orifice. Each circle belonging to this set is composed of four segments, united upon the mesial line anteriorly and posteriorly, and at the sides of the neck, and we have no difficulty in recognizing these *circular fibres* as the penniform fibres, rendered horizontal by the expansion of the neck, which their peculiar arrangement is apparently adapted to favor. Such is the disposition of the fibres of the neck, as it appeared to me in the examination of several gravid uteri, even without the aid of dissection, and as one preparation in my collection will serve to show.

4. ALTERATIONS IN THE VITAL CONDITION OF THE GRAVID UTERUS.

The *vital properties* which the uterus possesses in its vacant state are very much enhanced by pregnancy. It is endowed, for instance, with *organic contractility*, a property that resides in its muscular tissue, and is excited into action even in the non-gravid state, by the presence in its cavity of any foreign body, a clot of blood, for example. This organic contractility is exalted to the highest pitch during pregnancy, and yet it is kept in abeyance until the time arrives for the expulsion of the foetus. The uterus possesses, also, in common with all organic reservoirs, *contractility of tissue*, in virtue of which it is retracted, and its cavity gradually diminished to its former size, when the cause that distended it has been removed. The dormancy of these properties is essential to the continuance of pregnancy; when they are aroused, by any cause, prior to its natural term, abortion is the inevitable result, unless they can be appeased. The *sensibility* of the uterus is, also, exalted, and the scope of its sympathetic reaction upon distant organs is extended by pregnancy, which is no more than we should expect from the prodigious expansion acquired by its nerves, according to Dr. R. Lee's researches. Dr. Lee's accuracy, I know, has been impeached, but yet we cannot suppose that while all the other anatomical constituents of the uterus are in active process of growth, the nerves alone retain their former size and are *insensible* to what is going on around them. Whether the sensibility of the uterus is most marked in its body or neck, authors are not agreed, M. Dubois affirming that it is greatest in the former, and M. Cazeaux, in the latter. However this may be, there is established, as M. Cazeaux says, but I would rather say, manifested, more plainly than under other circumstances, a relation between these two portions of the organ, which is such that irritation of the neck reacts upon the fibres of the fundus. The premature expulsion of the foetus is often caused by such irritation, produced, for example, by too frequent coition, and even by frequent digital examinations, as we are assured often happens in the Parisian amphitheatres, among women who serve for the practice of the touch. We have here an important principle revealed, which has numerous applications that will be pointed out in their proper places.

5. CHANGES OF THE GRAVID UTERUS IN RESPECT TO SIZE, FIGURE, AND RELATIONS.

Under the hypertrophic impulsion of fecundation, the uterus begins to grow, slowly at first, but more rapidly afterwards, and, increasing both in volume and weight, it quits its humble abode in the pelvis, and soars eventually in the supernal regions of the abdomen. Some of the writers among the French, who love to probe everything *à fond*, have taken pains to measure the vertical, transverse, and antero-posterior diameters of the uterus at the principal epochs of gestation; but, esteeming such knowledge more curious than useful, I shall be content to note its growth by the elevation of the fundus, as felt through the abdominal walls, at different periods after impregnation.

The gravid uterus continues in the pelvic cavity during the first three months, not, perhaps, that its size is not sufficient to project the fundus somewhat above the pubes, but because its increased weight sinks it lower in the pelvis. Prolapsus uteri may, consequently, be regarded as an usual, if not necessary, consequence of early pregnancy. It deserves to be remarked, however, that some degree of retroversion not unfrequently exists along with the prolapsus, as I have often had occasion to verify. This displacement of the womb has, doubtless, a good deal to do with producing the dysuria, which is so common, and sometimes so troublesome a symptom of early pregnancy. When such a condition exists, in connection with suppression of the menses, in a married woman, previously regular and healthy, it is most probably *prolapsus uteri gravidi*. At the fourth month, the fundus uteri may be felt in the hypogastrium; at the fifth, it has entered the umbilical region; at the sixth, it is on a level with the umbilicus; at the seventh, it is in the superior portion of the umbilical region; at the eighth, it reaches the epigastrium; nor does it ascend any higher during the ninth month, but rather descends somewhat, on account of the further development of the uterus taking place in the inferior part of the body of the organ, the fundus having attained its maximum. The fœtus can, consequently, descend lower, and the fundus pursues it, by virtue of its contractility of tissue.

The principal *development of the uterus*, during the first six months of pregnancy, takes place in its fundus, which becomes

highly arched, and strikingly contrasts with its nearly plane border in the virgin uterus.

Much of the space required by the growing ovum is furnished by the expanded fundus. Is the remainder supplied by the development of the inferior portion of the body alone, or does the cervix also contribute its quota?

Baudelocque taught that both contribute, in a certain established order, that is, that during the first six months of pregnancy, the body only of the uterus enlarges, on account of its fibres being more supple than those of the neck; that at the sixth month the neck begins to be developed, to furnish its quota towards augmenting the cavity occupied by the foetus; that henceforth the fibres of every part of the uterus are equally developed until near the close of gestation, when those of the body, having been developed first, offer the greatest resistance to further distension, and then there is no longer an equilibrium between them and those of the neck; that, the equilibrium being broken, the fibres of the body begin to make efforts to expel the foetus, discoverable by the alternate relaxation and tension of the membranes, felt by the finger at the uterine orifice; and that, henceforward, the fibres of the neck, receiving the whole of the distending force of the uterine contents, as well as the reaction of the body, are much more rapidly developed, and all further increase of the uterine cavity is obtained by their distension, which is so great that, at the commencement of labor, the parietes of the neck are not thicker than two or three sheets of ordinary paper.¹ It will be perceived that this account of the development of the gravid uterus is based upon Levret's doctrine of the antagonism of the body and neck. The antagonists, in the hands of Baudelocque, are made to operate in such a way as to explain the phenomena, as they were believed by him to exist. First the neck predominates; then there is an equilibrium between it and the body, and ultimately the body becomes predominant, and continues so until the induction of labor. Divested of speculation, the account is simply this: During the first six months, the distension is confined to the body, but from this period the neck gradually shortens, its upper part being imperceptibly added to the cavity of the body until the end of gestation, when it forms, together with the body, one common cavity, and nothing remains of it but the cushiony circle of the external or vaginal orifice.

¹ *L'Art des Accouchements*, septième edit., Paris, 1833, tom. i. p. 110.

Baudelocque extended this principle of development, so as to make it explain also the induction of labor at the completion of gestation.

The explanation is briefly as follows: The determinative cause of labor at the end of gestation, resides in the uterus itself; this cause acts constantly during pregnancy, although its effects are not usually sensible until the end of nine months; that, ever and anon, the developed uterine fibres are urged to expel the foetus which affects them disagreeably; that, if they do not expel it at an earlier period, it is owing to their not being all equally urged because, as all are not developed at the same time, the action of some is strongly counterbalanced by the natural resistance of others. The structure of the organ is such that the fibres of the neck resist during the first six or seven months of pregnancy, while those of the body obey, the agents that distend and develop them; but toward the end of pregnancy, the fibres of the neck, becoming more supple alone supply the necessary expansion, so that in less than two months, this part is entirely obliterated, and is so enfeebled that it can no longer resist the expulsive efforts of the body. It is then that the latter exerts a *sensible action* upon the product of conception and pushes it forwards: if this action is not painful to the woman, its effects are discoverable by the finger, introduced to the uterine orifice and applied to the membranes. This is the first degree of labor, although the commencement of strong pains is usually reckoned as such. The time for these pains is not far distant; more powerful contractions of the uterus soon succeed this species of prelude.¹

Prof. Meigs is a staunch advocate of the Baudelocquian theory, as it appears from the following forcible statement of it in his *Obstetrics: the Science and the Art*, published contemporaneously with the first edition of this work: "The womb yields to the antagonistic force of the expanding ovum. It undergoes a compulsory development. The womb always resists this expanding power; it makes daily and perhaps hourly efforts to cast forth the burden from its cavity.

"But, the ovum commences its career of development in the cavity of the womb, which is composed of the wall of the fundus and corpus uteri.

¹ L'Art des Accouchements, par. 584-5-6-7.

"The long cylindrical cervix is not, at first, interested in the struggle or contest between the expanding ovum and the resisting cavity. It stands as the guardian of the fruit of the conception. The cervix uteri is the seat of what the ancients called the *facultas retentrix*, and it continues superior in force to the *facultas expultrix*, until the close of pregnancy, when, being abolished, the *facultas expultrix* acquires sole dominion, and labor commences."¹

From these expositions, it is manifest that the theory rests on the assumption that the uterus is naturally disposed to resist, *unguibus et rostro*, all intrusions upon its premises, an assumption so contrary to analogy that it ought not to be admitted without the clearest proof. But let us examine its pretensions in its twofold application, and *first* as affording an explanation of uterine development. Here it seeks to expound a phenomenon which is itself gratuitously assumed, namely, such a development of the cervix as enlarges the capacity of the cavity of the gravid uterus.

According to the observations of M. Cazeaux,² the neck, especially in women who have borne children, preserves the whole of its length until the last fifteen days of pregnancy, or at least until the commencement of the ninth month. He avers that he has repeatedly verified this fact, which had already been noted by Professor Stolz, of Strasburg, and publicly taught by Professor Dubois since 1839. "At this time" (November, 1839), says M. Cazeaux, "I have in my course a woman advanced to the last fifteen days of her pregnancy, in whom the internal orifice is not yet opened, though the neck below it is sufficiently dilated to admit the whole of the first, and half of the second, phalanx of the finger." It thus appears that, in women, who have borne children before, the expansion of the neck commences below, and extends upwards, reaching its middle by the seventh month, and nearly to the internal orifice towards the end of the ninth, when the cavity of the neck resembles an inverted funnel. At this time, the internal orifice is puckered and closed like a purse; but it finally dilates, and permits the finger to reach the membranes, after passing through a cylindrical canal, an inch to an inch and a half long. The membranes can sometimes be touched as early as the seventh month, by passing the finger through this cervical canal.

¹ Page 162.

² *Traité Théorique et Pratique de l'Art des Accouchements*. Paris, 1841, p. 59.

In primiparæ, the cervix uteri offers some peculiarities, which, as far as our present subject is concerned, consist in its shortening somewhat, instead of preserving its usual length, throughout the greater part of pregnancy, as in multiparæ, and in its internal orifice becoming dilated before the external. Professor Stolz¹ explains this shortening in the following manner: At the sixth month, the vaginal portion of the neck begins to shorten, while *it widens at its superior part*. The external orifice, continuing closed, approaches the internal, and consequently the cavity of the neck becomes larger in the middle, *until the two orifices are brought near each other; the internal orifice then opens first*, which happens during the last fifteen days of pregnancy; the rest of the body disappears much more rapidly than it had done before, and a projection can no longer be felt; the external orifice remains closed.

M. Cazeaux, while he will not reject the explanation of M. Stolz, acknowledges that he cannot reconcile these two phrases, which he underlines—*the superior part of the neck expands, then the internal orifice opens first*. If the superior part of the neck widens at the sixth month, he inquires, how can the internal orifice still exist at the end of pregnancy? This would truly offer an insurmountable difficulty; but Professor Stolz, as quoted by M. Cazeaux himself, does not say that the superior part of the *neck*, but of its *vaginal portion*, widens at the sixth month; and in saying that, some time after this occurs, the internal orifice opens, there is nothing that needs to be reconciled.

The observations of Professor Stolz are substantially confirmed by M. Chailly; and the entire account, which he gives of the changes that the neck undergoes during pregnancy, contradicts the hitherto received opinions of writers on the subject.

There is one well-known fact, to which we may allude, that goes far to establish the accuracy of these researches of MM. Stolz, Dubois, Cazeaux, and Chailly, if it be not of itself sufficient to refute the opinion formerly entertained. It is this: When the neck of the uterus is so much developed as to allow the finger to be passed to its upper orifice, which it is by the seventh month in multiparæ, the membranes can be felt and are organically united to the uterus around the margin of the orifice. When, again, the neck is entirely obliterated, as it is at term, the membranes can be

¹ Quoted by M. Cazeaux, *op. cit.*

felt and are still attached around the os uteri. Now, as it is admitted that during the first five or six months, the ovum is confined to the cavity of the body, and that the neck is not lined with decidua, were the obliteration of the neck owing to the expansion of its upper part, either the membranes would be too high to be reached by the finger; or if they were sufficiently extensible to be pushed down into the expanding neck by the growing ovum, they would not be found adhering to its surface. The latter declaration is authorized by the fact that, in the progress of gestation, the membranes become less vascular, and their adhesion to the internal surface of the uterus is gradually weakened. But in either case, at the seventh or ninth month, the membranes are found to have vascular connection around the uterine orifice, for when separated by the finger, or by the uterine contractions, as in the latter case they are, so soon as labor commences, there is a slight effusion of blood. We conclude, therefore, that the neck contributes nothing to the cavity of the gravid uterus, which is made up entirely of the dilated cavity of the body.

From these later researches (and my own observation, as far as it goes, confirms their accuracy) it would appear that the neck has no participation with the body, as far as making room for the fœtus is concerned, and that when the work of gestation is accomplished it simply and quietly unfolds and opens a way of egress for the fœtus by a pre-established harmony of action, which is as admirable as it is beneficent. Indeed, the preservation of its cylindrical shape, until near the close of gestation, is, as we shall see when we come to study parturition, the only safeguard of the product of conception.

The *secondary application* of the theory to explain the induction of labor is best met by demanding the proof that the uterus displays, during gestation, such intolerance of its burden as is attributed to it. Writers, speaking figuratively, do indeed indulge in such expressions as "the burden of the child," "the uterus burdened with the product of conception," &c., but does reason or analogy authorize us to believe that the fruit of the womb is really any greater burden than is imposed on the stomach by a temperate meal?

There is absolutely no evidence of such contractile efforts of the uterus as this theory assumes, except the occasional tension of the membranes, sometimes observed towards the completion of gesta-

tion, the os uteri being then sufficiently open to admit the finger. Slight contractions of the fundus may produce this tension, but these are not such as constitute labor, for they are unaccompanied by pain, and take place without the consciousness of the individual herself. Allowing, however, that they are labor-pains in disguise, their presence at so advanced a period of pregnancy is no proof of their existence during the earlier periods; and in the complete absence of such proof, we are loth to admit the assumption that they do exist, because it makes the uterus the strangest anomaly in the body, if not in nature. It is destined first to contain and nourish the foetus, and then to expel it, when its maturity is acquired. But, according to this assumption, the first is an irksome task imposed upon it which it continually endeavors to quit by expelling its contents. Such a constitution of the gestative organ could hardly exist, and abortion be not perpetually threatened, without, as far as we can perceive, any compensating benefit; for we cannot imagine that its development could be promoted by it. There is, in fact, no conceivable way in which contraction of the uterine fibres during pregnancy could favor their development, except that imagined by Baudelocque, viz., one class of fibres stretching another by the superior force of their contractions, by which he attempts to account for the development of the cervix uteri. How, then, are the fibres of the body of the uterus developed during the first six or seven months of gestation, the neck being quiescent all the while? If these need no such force to aid their development, neither do those of the neck; both are developed after their own peculiar fashion, without the interference of one with the other. The neck, as we have seen, is developed in women who have borne children, in a manner inconsistent with the idea that any sort of force is exerted upon it by the body, that is, from below upwards. If, therefore, there is no evidence of the existence of these insensible contractions of the uterus, and, from the nature of the case, none can be acquired, until the os uteri is somewhat open, may they not be excited at this time in some way unknown to Baudelocque? This exciting cause I shall attempt to develop in the chapter on Labor.

From what has now been declared, it may be inferred that I reject the notion of Levret, indorsed by Baudelocque, and more recently by Meigs, that the neck is the antagonist of the body of the uterus, *during pregnancy*, simply for the reason that there is not

a tittle of evidence that there is anything to be antagonized. The body quietly suffers itself to be distended by the product of conception, or rather its growth keeps pace with that of the ovum. whilst the neck is not at all concerned either in making room for the fetus or barring its escape. But though the neck be not called on to exert a retentive faculty, it holds, nevertheless, the key, if I may so say, which unlocks the uterine cavity, by virtue of the relation, of which mention has been made, established between it and the body by pregnancy, in consequence of which impressions made upon it, specially upon its internal surface, are reflected upon the body and excite its muscular fibres to expulsive action. Hence the necessity of keeping the neck closed to so late a period of pregnancy, while the body is growing and expanding in every direction. That labor is naturally excited in this way I shall endeavor to prove hereafter. The neck is not the active but the passive custodian of pregnancy; it simply withholds the key, until the time to unlock the uterus has arrived.

With its progressive acquisitions of volume the gravid uterus changes its figure and its relations to other organs. Rising out of the pelvis it gently insinuates itself among the abdominal viscera, pushing the small intestine and omentum aside and backwards, and getting in contact with the parietes of the abdomen. When its ascension is completed it comes in contact with the stomach and liver, whose functions may be impeded by its proximity, and even the thoracic organs may be encroached on by the limits imposed upon the descent of the diaphragm. Hence, doubtless, many of the symptoms of advanced pregnancy, viz., gastric and hepatic derangements, dyspnoea, palpitation of the heart, &c. The relation of its axis to that of the superior strait is altered, either by the lateral or anterior obliquity of the uterus, for the fundus always inclines to one side or the other, most usually to the right side, and, if the patient has borne many children, it also dips forwards more or less, according to the degree of relaxation of the muscles and integuments of the abdomen. The relation of the uterus to its internal annexes is likewise changed by pregnancy; the broad ligaments are unfolded and the ovaries and tubes are drawn into close approximation with its sides. For the time being, it is everything and they are nothing.

The figure of the gravid uterus, when it is completely developed, is that of an oval flattened upon its anterior and posterior surfaces,

and its capacity may be estimated at from 10 to 12 inches in its vertical diameter, from 7 to 9 in its transverse, and from 4 to 5 in its antero-posterior diameter. Its weight is from one and a half to two pounds.

SECTION II.

FETAL PHENOMENA OF PREGNANCY.

The fetal phenomena of pregnancy comprise the changes that take place in the ovum from the earliest to the latest stages of its development. A complete account of these would make a treatise on Embryology, a department of physiology which has probably been more enriched than any other by the recent researches of numerous observers. At the same time the subject is a difficult one, and on many points obscurity still rests, as must be the case in all our inquiries pushed so very near to the origin of being. There is much in such investigations, which, however curious and interesting to the inquisitive mind, can be turned to no practical account, and of which a man may be totally ignorant and yet be a successful and skilful accoucheur. There is, therefore, a solid basis for the division, made by the learned Velpeau, of the objects of obstetric study into tokology and embryology, the former being concerned with the matters appertaining to childbirth, the latter with, if I may so say, the fabrication of the foetus out of the raw materials furnished by the mother. Now, it is very manifest that one may ignore much that belongs to the fabrication, and still know very well what disposition to make of the fabric when it is thrown upon his hands. Of what advantage, for example, would it be to a practitioner in the management of abortion, at a very early period of pregnancy, to know that the embryo has divers curious little contrivances, transient in their continuance, such as the *vesicula umbilicalis* with its *omphalo-mesenteric* bloodvessels, or that it is in a yet more rudimentary state, and is just beginning to be sketched in the *germinal membrane*, split into the *serous*, *vascular*, and *mucous* layers? Far be it from me, however, to depreciate embryology, much less to assert its uselessness in tokology, for a certain amount of embryological knowledge is indispensable to the obstetrician. This amount, and no more, it will be my aim to introduce in this work.

We have seen what changes take place in the lining membrane of the uterus consequent to conception, how it becomes increasingly more vascular, thickened, and softened. The minute fecundated ovum imbeds itself in this membrane thus prepared for it, which shortly grows up around it so as to shut it in, and then the ovum is inclosed between two layers of membrane, the outermost of which is the *decidua vera*, and the innermost the *decidua reflexa* of Dr. Wm. Hunter. To the internal layer first described by him, Dr. Hunter gave the name of reflected decidua, in consequence of the hypothetical view he entertained of the manner in which it is formed, which may be thus briefly stated: When the ovum, fecundated in the ovary or tube, is transported to the uterus, it encounters the decidua vera stretched across the orifice of the Fallopian tube, which it pushes before it as it enters the uterine cavity, forming at first only a small protrusion in the cavity of the decidua vera, which increases with the growth of the ovum until eventually it comes in contact with the uterine walls at all points, which are then lined by two layers of decidua. By others, the Hunterian hypothesis has been somewhat modified, who suppose that there are originally two layers of decidua, the external being perforated at the tubal orifices and also at the cervico-uterine orifice, whilst the internal is a closed sac; in their view, it is the internal layer which is impinged upon by the ovum and reflected before it, and, consequently, the ovum must, at a certain stage of development, be invested with three layers of decidua. The fact appears to be, that, at an early period of gestation, there are two layers of decidua, and the ovum is included between them. This is all that is positively known, and Dr. Hunter's description of the mode of their production can scarcely be deemed anything but an ingenious hypothesis invented to explain the fact, which is, I think, much better explained by, I will not say, the hypothesis of M. Coste, but his discovery of the true nature of the decidua. M. Coste has a beautiful drawing in the *Atlas*, accompanying his great work on the *Development of Organized Bodies*, representing the appearance of the internal surface of the uterus on the 20th or 21st day after impregnation, in which the ovulum, shut in by the mucous membrane, makes only a slight prominence, which, upon being cut into, discloses the little lodge in which the ovum was imbedded. The annexed drawings, Figs. 49 and 50, will serve to convey a clear idea of the manner in which the ovum becomes surrounded by the so-called decidua.

Fig. 49.



First stage of the formation of the Decidua reflexa around the ovum.

Fig. 50.



More advanced stage of the same.

Thus ensconced, the ovum is in a position eminently favorable to its development, and it is soon recognized to consist of a double membranous envelop including the embryo floating in an aqueous fluid. While, for the reasons above assigned, I shall not attempt to give a full description of the ovum, it is practically important that we study two marked phases of its development, which may be denominated its *membranous* and *placental* states. The former condition exists during the first two months of pregnancy, and is not, indeed, completely superseded by the latter until a later period.

Fig. 51.



Membranes, and Villi of the Chorion, of the Embryo.

First or Membranous Phase of Development.—The involucre of the embryo consist as yet only of two membranes, exclusive of the decidua, the outermost of which is the *chorion*, which it possessed before leaving the ovary, and the internal is the *amnion*, which is produced at a very early period of development. As these structures abide until the completion of gestation, expanding with the growth of the foetus, to which they are subservient, they deserve to be particularly studied. The cut, Fig. 51, will aid the

student in gaining a satisfactory idea of these and the other membranes, in which 1 points to the decidua vera and 2 to the decidua reflexa, in an ovum somewhat advanced in its development. I may here say that it would be better to designate these membranes *uterine* and *foetal* decidua, because these names merely express their relation and involve no hypothesis as to the mode of their formation. In this same figure, 4 is the chorion, the external of the envelopes proper of the ovum, but the third in the series, reckoning from without inwardly and including the two deciduæ.

In its organization and general appearance the *chorion* resembles fibrous membranes, being like them, dense and resisting, although transparent or diaphanous. It is destitute of both nerves and blood-vessels, at least neither of these, which are so abundant in most membranes, have been demonstrated in the chorion. Its external surface, even in ova of only a few days' development, is not smooth but tomentous, and is soon thickly set with filaments both single and branching, which are bulbous at their extremities. These are what are called its *villi*, which become specially luxuriant about the second month, on that portion of the chorion where the placenta is to be formed, as indicated by 7, Fig. 51. When greatly elongated and branched in an arborescent manner, they are what some physiologists have called the dendritic processes of the chorion, from a Greek word signifying a tree. Henceforward, the villi begin to diminish elsewhere on the surface of the chorion and become more sparse as the membrane expands, until finally they disappear entirely, or only a filament is here and there seen.

The villi of the chorion serve to attach the ovum to the decidua, forming so many slender cords, which, as Jacquemier finely expresses it, is the most delicate mode of suspension and best calculated to prevent injurious consequences from concussions, blows, &c., at a period when protection is most needed. They are, also, spongioles for absorbing nutriment from the surrounding fluids of the mother, besides being, as we shall see, essential elements in the construction of the placenta.

The internal surface of the chorion is smooth, and is not, at first, in contact with the amnion, but leaves a considerable space, 5, Fig. 51, occupied by fluid.

The *amnion*, Fig. 51, 6, is a delicate, transparent membrane, filled with an aqueous fluid called *liquor amnii*, in which the foetus floats. Separated, at first, by a considerable interval from the chorion, the

two membranes are brought into apposition towards the conclusion of the membranous phase, but they are never adherent; they are only agglutinated. The amnion resembles serous membranes, and, like the chorion, is destitute of bloodvessels and nerves.

The liquor amnii, called also, in obstetric phrase, the *waters*, is usually a clear, transparent, somewhat viscid fluid, resembling the serum of the blood both in its sensible properties and chemical composition. It is difficult to explain its production, though there can be little doubt that its source is maternal. It exudes from the internal surface of the amnion, though no vessels of the mother, nor, indeed, foetal vessels are distributed to this membrane. The foetus was formerly supposed to be nourished by the imbibition or ingurgitation of the liquor amnii; but this notion is now exploded, and no other use is attributed to it but to protect the foetus from external injuries and to provide space and a suitable medium for its muscular movements. The use of the liquor amnii at the time of parturition will be explained in a subsequent chapter.

From this description it appears that during the first phase of its development the foetus is invested with four layers of membrane, viz., reckoning from without inwardly, the uterine decidua, the foetal decidua, the chorion, and the amnion. As the growth of the ovum proceeds, the interspaces which separate these layers diminish until they are brought into apposition with each other. The vascularity of the decidua uterina continues to increase, especially upon its internal surface, where, as we have seen, there is a conspicuous network of capillary vessels, even at the catamenial periods. Many of these vessels become dilated into sinuses and circulate a large quantity of blood to supply pabulum for the development of the foetus, and, probably, also, by a mechanism not well understood at this early period, to deplete its blood. When this highly vascular condition of the decidua is considered, it ought not to be a matter of surprise that its delicate and greatly distended vessels should be liable to rupture, from a thousand causes, and give rise to the profuse hemorrhages that not unfrequently accompany abortion. It is a peculiarity of such effusions of blood that they may take place from any point of the ovum and likewise from distant points, differing in this respect, as we shall see, from the hemorrhages of more advanced pregnancy which issue from the placental region alone. As to the surface of the uterine decidua which yields the discharge, it may, I apprehend, be either the external or internal; probably

the blood flows more frequently than has been supposed from the *internal surface* into the space between it and the foetal decidua, and escapes thence as from a reservoir. At all events, in examining aborted ova it is not unusual to find quite large clots of blood between the two layers of the decidua, and there can be no doubt that blood effused in what may be called decidual apoplexy, sometimes destroys the vitality of the ovum, and operates as a cause of abortion. I do not remember that any author has alluded to the possibility of hemorrhage from the internal surface of the decidua; the vessels passing from the internal surface of the uterus to the decidua have been supposed to furnish it; but my own conviction is, that its most usual, if not exclusive, source is the internal surface of the uterine, and the external surface of the foetal decidua.

The Second or Placental Phase of Development.—Early in the third month of pregnancy the placenta begins to make its appearance upon that portion of the chorion which is towards and in contact with the uterine decidua, but its development is not so great as to supersede the membranous state until the close of the month, and is not, indeed, completed until the sixth month of pregnancy or a little later.

The first indication that the formation of the placenta is beginning to take place, is, the visible vascularity of the villi of the chorion, which had been hitherto destitute of bloodvessels; and, upon inspection, it is found that there is a small artery and vein coursing along the stem of each villus, which ramify upon its branches that serve as a kind of framework for the divisions and subdivisions of the bloodvessels. At the extremities of the branches the vessels terminate in one or more capillary loops which communicate with an artery on one side and a vein on the other. Imagine these villi converted into dendritic processes of the chorion, growing thickly together and their branches interlocking, with bloodvessels clustering upon them like a wide-spreading vine upon an arbor, and you will have some idea of the exuberant vascularity of the placenta. This vascular vine, with its clusters of capillaries, is an offset from the bloodvessels of the foetus, which will be particularly described presently. Meanwhile, let it be observed that the placenta is mainly an outgrowth of the foetus, an extraneous extension of its vascular system, seeking a connection with its parent. But, in order that we may understand the kind of connection that is established, our attention must be turned to what is going on in the uterine decidua,

with which the vascularized villi of the chorion are in apposition. The conversion of many of its distended capillaries into sinuses has been already observed before the expiration of the membranous period of development; the amplification of these vessels proceeds during the placental period until they acquire enormous magnitude and constitute a network of colossal capillaries, with frequent and free anastomoses, in which condition they are not inaptly compared by M. Coste to a pool of blood, with here and there partitions dividing its expanse. The character of these vessels must be remembered, namely, that they are capillaries, and consequently their walls consist only of a single and exceedingly delicate membrane. Now it is against this sanguineous pool, filled, of course, with maternal blood, that the villi of the chorion impinge and into it they dive, so to speak, as they push their growth outwardly; and, in such a process, they necessarily become invested with a covering of the inverted membrane forming the walls of the decidual capillaries. We are not to suppose that these capillaries are passive at this time; their growth impels them in the opposite direction and thrusts them into all the interstices between the branching villi of the chorion, so that these interstices may be said to be lined by their thin and delicate walls.

It is thus that the maternal system becomes interested in the placental fabric and may justly lay claim to a portion of it, notwithstanding that the bulk of the organ is undoubtedly of foetal growth. It is evident from such a process of growth that the foetal and maternal portions of the placenta must be so intricately and inextricably interwoven as to defy all attempts to dissever them by the scalpel of the most skilful anatomist. To help the student to apprehend the manner in which the maternal and foetal constituents are blended in the placenta, we may borrow an illustration from Dr. Chowne, a writer in the *London Lancet*.

In one of his interesting articles, "on the source of hemorrhage in partial separation of the placenta," he uses a glove to represent the structure in question, which, as he says, is a very humble illustration, but, as a compensation for its humbleness, has the advantage of its being by no means difficult for any one to carry it into effect. "If, for instance," Dr. Chowne observes, "he takes his glove, and places it on the table with the palm downwards, and the tips of the fingers towards himself, and then puts the points of his own fingers against the tips of those of the glove, and pushes them (the

tips of the fingers of the glove) inwards, inverting them within themselves, until his fingers have pushed them up into what might be called the body or hand part of the glove, and each finger is enveloped in the inverted finger of the glove which it has pushed up before it, he produces a representation of the manner in which the foetal vessels and the maternal vessels come together, while the current in each remains distinct."¹

The maternal portion of the placenta being nothing more than a rete of huge capillaries of the deciduous (mucous) membrane, is, of course, in communication with the uterine arteries and veins, and the communicating vessels are denominated the utero-placental arteries and veins. These consist of numerous, slender, delicate, and tortuous vessels, passing obliquely from the inner surface of the uterus to the decidua, and terminating abruptly upon its inner surface instead of being prolonged into the substance of the placenta, and dividing and subdividing like arteries and veins in other parts. Nor need this excite surprise or appear at all singular; when they reach the network of capillaries that compose the maternal portion of the placenta, their destination is attained, and their termination differs from that of corresponding arteries and veins, in other structures, only in the enormous magnitude which their capillaries have acquired.

The existence of these utero-placental vessels has been called in question by many physiologists, and is yet denied by many writers. They were first demonstrated by John Hunter, who claimed to have discovered the true structure and functions of the placenta in a uterus procured from the body of a pregnant woman, who died undelivered at the full term, the veins being filled with yellow, and the arteries with red wax, by Dr. MacKenzie, at the time assistant to Dr. Smellie.

Upon making an incision through the walls of the uterus, what seemed to be an irregular mass of injected matter was brought to view, and upon raising a part of the uterus from this mass regular pieces of wax were observed passing obliquely between it and the uterus, which broke off, leaving parts attached to the mass; "and on attentively examining the portions towards the uterus, they plainly appeared to be a continuation of the veins passing from it to this substance, which proved to be placenta." Other vessels,

¹ Republication of the London Lancet, New American Series, March, 1848.

about the size of a crow-quill, were observed passing in the same manner, though not so obliquely, which also broke, leaving small portions on the surface of the placenta, which were discovered to be continuations of the arteries of the uterus. Upon tracing these into the placenta they soon lost the regularity of vessels, and terminated at once upon its surface in a very fine spongy substance, the interstices of which were filled with the injected matter, the arteries having made a twist or close spiral turn upon themselves at their termination. The placenta being cut into, yellow injection was discovered in many places and red in others, and in many others these two colors mixed. The red injection of the arteries (which had been first thrown in) had passed out of the substance of the placenta into some of the veins leading from the placenta to the uterus, mixing itself with the yellow wax, and the decidua was seen to be very vascular, "its vessels going to and from the uterus being filled with the different colored injections." The substance of the placenta had a regularity in its form, which showed it to be naturally of a cellular structure, fitted to be a reservoir of blood.

From these appearances (which have been given as much as possible in his own words), Mr. Hunter concluded that "the blood, detached from the common circulation of the mother, moves through the placenta of the foetus; and is then returned back into the course of the circulation of the mother, to pass on to the heart."¹ It should, moreover, be observed that Mr. Hunter regarded the placenta as entirely a foetal product, principally composed of the ramifications of the vessels of the embryo, which have the same anatomical arrangement as arteries and veins in other parts of the body, and the motion of the blood through them is the same, viz., arteries, conveying blood from the foetus, terminate in veins, which return it; and between the peculiar extra-vascular circulation of the mother in the placenta, and the ordinary circulation of the foetus in the same, there is no communication.

Mr. Hunter's method of investigating the structure of the placenta is certainly faulty and liable to mislead the inquirer, for the wax used in injecting it and the uterus may lacerate the delicate vessels concerned, and, becoming extravasated, derange the parts so as to give them an appearance not at all natural to them. Such was the result of the only attempt which I myself ever made to repeat it; upon making a section of the uterine wall the wax was found to be

¹ Complete Works, vol. iv. p. 99.

extravasated in large quantity, between the uterus and placenta, destroying all traces of intermediate vessels, and filling the placental substance in a manner that indicated mechanical violence done to its tissue. The derangement and distortion of the parts liable to be produced by injection have been justly, I think, urged as an objection to Mr. Hunter's observation, and it must be deemed a remarkable proof of his anatomical skill and physiological acumen, that from a single examination of this kind he was able to unfold the true structure of the placenta and expound the nature of the connection established by it between the foetus and mother. The substantial accuracy of the account which he gave of the matter has been since confirmed by others, who employed unexceptionable methods of investigation.

Prof. Owen, in a note appended to Mr. Hunter's essay on the *Structure of the Placenta*, gives a description of the appearances observed by him in dissecting two gravid uteri, in their natural state, which he fixed under water in an apparatus used for dissecting mollusca, commencing the dissection from the outside and tracing the vessels, both arteries and veins, in their course to the deciduous membrane. He satisfied himself of *the passage of the tortuous uterine arteries into the decidua*, and of the existence of what he calls *oblique decidual canals in continuity with the mouths of the uterine sinuses*, by which the blood conveyed to the placenta by the curling arteries is returned again to the uterus. He describes the utero-placental arteries as passing through the placental decidua and apparently opening or being lost on the spongy surface of the placenta. Having carefully compared the Hunterian preparations with the results of his own examinations of the gravid uterus at the full period, Prof. Owen believes that they all fully bear out Mr. Hunter's general view.

Prof. J. Reid has published a very interesting article on the *Anatomical Relations of the Bloodvessels of the Mother to those of the Foetus in the Human Species*,¹ which, it may be affirmed, corroborates, while it supplies a deficiency in the Hunterian view, divesting it of the anomalous features which give to it an air of improbability. Instead of the blood being poured by the curling arteries into the cells of the placenta, and thus becoming extravasated, Prof. Reid maintains that the inner coat of these arteries is prolonged upon

¹ Edinburgh Med. and Surg. Journal, vol. lv.

some of the tufts of the foetal placental vessels which project into their orifices, and that there is likewise a similar prolongation of the inner coat of the utero-placental veins, so that all the trunks and branches of the foetal placental vessels are ensheathed in prolongations of the inner coat of the vascular system of the mother, *or, at least*, as he says, *in a membrane continuous with it*. "If we adopt this view of the structure of the placenta," Prof. Reid goes on to say, "the inner coat of the vascular system of the mother is prolonged over each individual tuft, so that when the blood of the mother flows into the placenta through the curling arteries of the uterus it passes into a large sac formed by the inner coat of the vascular system of the mother, which is intersected in many thousands of different directions by the placental tufts projecting into it like fringes, and pushing its thin wall before them in the form of sheaths, which closely envelop both the trunk and each individual branch composing these tufts. From this sac the maternal blood is returned by the utero-placental veins without having been extravasated, or without having left her own system of vessels." Prof. Reid, like Prof. Owen, dissected these structures under water and called the microscope, also, to his aid in submitting them to a minute and apparently accurate examination. His account agrees with Mr. Hunter's and Prof. Owen's, in assigning a vascular interest in the placenta to the mother, distinct from that of the foetus. He gives the same description of the vessels concerned, except that he claims for them continuity instead of a cellular structure intervening between the arteries and veins, which belongs to the foetal system. For my own part I cannot help thinking that his method of supplying such continuity is fully as improbable as the cellular intermedium, and that Weber's view, which I have adopted, is far more rational, viz., that a congeries of colossal capillaries intervene into which the utero-placental arteries open, and from which the utero-placental veins arise.

While the placenta is being formed in the manner I have thus endeavored to describe, remarkable changes are at the same time taking place in the foetal membranes. In the first place, the growth of the ovum brings them nearer each other until they finally come into apposition, and then, of course, the spaces between them are abolished. But their organic condition is also affected. Shortly after the foetal decidua is brought into contact with the uterine, it begins to become atrophied, and soon entirely disappears; its tem-

porary function being fulfilled, it is no longer useful, and even the uterine decidua becomes gradually attenuated, and its connection with the subjacent coat of the uterus is loosened, so that by the close of gestation its integrity as a membrane is destroyed, nothing but patches of it remaining here and there upon the outer surface of the chorion, and a very thin lamina of it covering the uterine surface of the placenta. Meanwhile, so early as the fourth month of pregnancy, according to M. Robin, the formation of a new mucous membrane is begun, to replace the one converted into decidua, but it is not perfected by the time of delivery, when it appears as a soft, homogeneous layer, scarcely half a line thick, covering the muscular fibres of the uterus. Every pregnancy then, it would appear, involves the appropriation of the mucous membrane of the body of the uterus to its uses, and eventually the exfoliation of this membrane at the time of parturition. The chorion also undergoes changes. The development of certain of its villi, with the foetal vessels that are trained upon them, into the foetal portion of the placenta, is the final evolution for the supply of the wants of the foetus, and this being completed, or even before it is entirely completed, villi are no longer needful upon the segment of chorion covered by the foetal decidua, and these obey the law that condemns all useless parts to annihilation. They are absorbed, and, towards the conclusion of gestation, the external surface of the chorion, except the portion occupied by the placenta, is smooth, or only the débris of the villi are here and there seen.

When these various changes have taken place, the appendages of the foetus, which are to serve it until its great change shall come—namely, its transition from uterine to extra-uterine life—consist of: 1. The *funis umbilicalis*, *umbilical cord* or *navel string*; 2. The *placenta* or *after-birth*; 3. The *membranes*, reduced to only two complete layers—viz., the chorion and amnion—these with the placenta being called the *secundines*. The membranes furnish a complete lining of the cavity of the gravid uterus, the innermost of them, the amnion, being continued over the foetal surface of the placenta, and making a shut sac in which the foetus is contained, immersed in the fluid which surrounds it.

Let us now examine these appendages, or, as I think they might more properly be called, appurtenances of the foetus.

1. *The Umbilical Cord*.—The umbilical cord is a vascular rope, of varying length and thickness, stretching from the umbilicus or

navel of the foetus to the placenta. It consists of bloodvessels, surrounded by more or less gelatinous substance, and enveloped by two membranes, which are reflected upon it from the internal surface of the placenta, being nothing more than continuations of the two foetal membranes proper, viz., the chorion and amnion. No nerves belong to it, and hence it is devoid of sensibility, either in regard to the child or mother.

The vessels of the cord, belonging exclusively to the foetus, consist of two large arteries and one vein yet larger, which, taking their name from the aperture of the foetal abdomen through which they pass to and fro, are denominated umbilical. The umbilical arteries, arising from the internal iliacs of the foetus, or being rather the main trunks of these vessels, ascend into the cavity of the abdomen, conducted by the sides of the urinary bladder (which is, in the foetus, an abdominal organ), and pass out at the umbilical opening. When they make their exit, they begin to wind around the umbilical vein, and run in a spiral manner to the placental termination of the cord, where they divide into several large branches, conspicuous upon the internal surface of the placenta. These branches penetrate the placenta, and, dividing into smaller and yet smaller branches, end in the system of capillary vessels, belonging to the dendritic processes of the chorion.

The umbilical vein, taking its origin from the capillaries of its associate arteries, traverses the cord in the opposite direction, as a single large trunk, enters the abdomen of the foetus at the umbilical aperture, ascends along the linea alba to the under surface of the liver, where it assumes a horizontal direction in the antero-posterior fissure, to reach the inferior vena cava, sending in its course two large branches to the liver. The main trunk, which pursues its course to join the ascending vena cava, is called the *ductus venosus*.

Of the two membranous coverings of the cord, the outermost is the amnion, and in tracing them towards the foetus they are found to terminate abruptly within half an inch or so of its abdomen—the line where they end, and the skin or common integument of the foetus begins, being indicated by a marked difference of color. There is no reason, I judge, to believe that one of these tissues is transformed into the other, as some have imagined, and it is always at the line of demarcation between them that the cord separates and becomes detached in a few days after the birth of the child.

The umbilical cord exhibits, even to a superficial observer, several

nodosities, which appear like varicose dilatations of its veins; but these will be found, on dissection, to be owing to that vessel doubling upon itself; that is, at such points, the vein turns back a short distance and then proceeds forwards—a contrivance which may possibly be a substitute for valves, of which it is entirely destitute. But besides these nodes, the cord sometimes presents a veritable knot, single or double, and occasionally even triple, an instance of which last occurred to the celebrated Baudelocque, and was deemed by him so curious that he gives a figure of it in a plate (No. VII.) devoted to this knotty subject. In that instance the cord was unusually lengthy, the triple knot was about a foot from the umbilicus, being as tightly drawn as is possible in such a case, and the cord, thirty-six or thirty-seven inches in length, was besides coiled twice about the neck. The circumstance last mentioned, viz., the cord encircling the neck—an exceedingly common thing whenever it is longer than usual—affords the key to an explanation of these knots, at least when they are single. They are tied by the foetus slipping through the circle about its neck; but I must confess, with Baudelocque, that it is difficult to account for such a triple knot as he has figured, not being able to perceive clearly how the foetus could have tied it with its neck.

It was at one time a topic of disputation, whether these knots could be so tightly drawn as to destroy the foetus. It is difficult to believe in the possibility of such a catastrophe, seeing that the knot can only be tightened by such tension of the cord as would probably tear off the placenta from the uterus. Dr. Smellie assigns this, nevertheless, as one cause of the death of the foetus in utero, and in one of his Collections (XIX. No. 2, Case I.) relates a case occurring in his own practice in which, when he was first called, the membranes had ruptured, brownish and offensive waters were escaping; and the child, when expelled, was of a livid hue, its abdomen tumid, the epidermis easily peeling off, and the cord, about ten hands' breadth long, was swollen and livid, having a *tightly drawn knot* in its middle. The knot and death may, however, have been only coincidences.

2. *The Placenta*.—This is a thick, spongy, and exceedingly vascular structure, of a circular or slightly elliptical figure, measuring six or seven inches at its greatest diameter, and being thinner towards its circumference. It has two surfaces—an external or uterine surface and an internal or foetal one. The external surface,

a view of which is given in Fig. 52, is convex while it is adherent to the uterus, and when detached it offers many smooth lobes, called by some, improperly as I think, *cotyledons*; between these there are numerous fissures, sinuses they have been called, in which

Fig. 52.

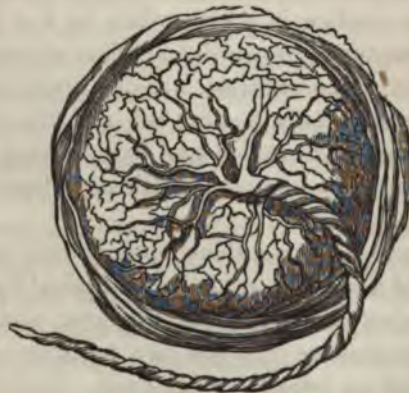


The Placenta : external surface.

may be seen, here and there, large, smooth openings, communicating with the spongy substance of the placenta, through which blood may be made to exude by compression. It is covered over by a delicate layer of the deciduous membrane, in which may often be seen some of the curling arteries broken off from the uterus by the separation of the placenta.

The internal surface, represented in Fig. 53, is more even; it is

Fig. 53.



The Placenta : internal surface.

covered by the chorion and amnion, the former being inseparably united to it, and exhibits, very conspicuously, the large branches of the umbilical bloodvessels, which diverge from its centre like the rays of a parasol. The cord is not, however, always attached to the centre of this surface, but may be attached, as I have seen, much nearer to one edge. While the placenta is connected to the uterus, the foetal surface is concave.

The utero-placental vessels are the bonds of union between the placenta and uterus, and these are so frail as to be lacerated by comparatively slight force. In examining gravid uteri, it is always found, unless there be morbid adhesion, that the placenta may be separated very readily—as easily, it is truly said, as the rind from the pulp of ripe fruits. There can, nevertheless, be no doubt that such separation is a genuine avulsion, and necessarily involves the rupture of the connecting vessels and the effusion of more or less blood. The bleeding may not amount to hemorrhage in the grave import of the term, and it may, also, escape notice; but I have never failed to discover a coagulum of blood upon the uterine surface of the placenta, after its removal, by turning aside the membranes—which are always inverted so as to cover this surface—whether the placenta be expelled naturally or extracted artificially.

The position which the after-birth occupies in the womb at the end of gestation, has recently engaged the attention of several obstetric inquirers, and, as the subject is not without practical interest, it deserves our notice.

Mr. Hugh Carmichael has made extensive observations at the Coombe Lying-in Hospital, Dublin, with a view to elucidate this question, and the conclusion to which he came is, that the fundus is very seldom the situation of the placenta, but that, on the contrary, it is somewhere near the os uteri, and most usually on the posterior surface of the womb. The method of inquiry pursued by Mr. Carmichael was to examine the membranes after their extrusion and notice particularly the distance of the placenta from the rent or perforation in them through which the child passed; and, inasmuch as the rent occurs where the membranes stretch across the dilated os uteri, the distance of the placenta from the os is indicated by it. In this manner, he found that the placenta is, in ninety-six times out of the hundred, in the vicinity of the aperture made in the membranes by the head previous to its birth. To understand the proof he adduces of the posterior position of the

placenta, it is necessary to observe that, according to his view, the anterior part of the uterus supplies much more of the increasing superficies during pregnancy than either the posterior part or fundus, and the longest part of the membranes gives evidence, he alleges, of having lined the most distended or concave part of the womb; the shortest, one comparatively of a straight superficies.

To account for this most frequent posterior situation of the placenta, he assumes that it is originally formed near the uterine orifice of one of the Fallopian tubes, and consequently upon the fundus; but, as the fundus and posterior part of the uterus do not keep pace with the development of its anterior portion, they, together with the attached placenta, must apparently sink posteriorly, the fundus proper of the gravid uterus not being really the most elevated part of the organ but the expanded anterior wall.¹

The *theory* of Mr. Carmichael is obnoxious to several weighty objections. In the first place, it is purely an assumption, that the placenta is first formed in the immediate vicinity of the tubal orifice. Certainly no sufficient proof has been adduced in support of such a position, but it is rather confidently asserted because it is conceived that it must be so, as indeed it must upon the Hunterian hypothesis concerning the decidua, which is adopted by Mr. Carmichael. But this hypothesis may now be regarded as exploded by the more recent researches which have discovered the true nature of the decidua, namely, that it is the mucous coat itself of the uterus, and, consequently, that it does not stretch across the tubal orifices to regulate the intromission of the ovum. There is, therefore, nothing to hinder the ovum from being transported to a distance from these orifices previous to its fixation upon some point of the uterine cavity.

But, in the second place, Mr. Carmichael's statement, that the development of the anterior wall of the uterus preponderates so greatly over that of the posterior wall and fundus, needs corroboration. It is not supported by any other authority, and is in direct contravention to the findings of some who have directed special attention to this point. Dr. Montgomery, for instance, whose testimony is not easily outweighed, affirms positively that the development of the posterior exceeds that of the anterior wall of the gravid uterus, as ascertained by passing a line around it, at

¹ Medical Gazette, Aug. 7, 1840, *et seq.*, quoted in Braithwaite's Retrospect, No. II.

the full time, where the tubes penetrate its substance, when it will be found that three-fifths are situated posteriorly to them and two-fifths anteriorly.

As to the *facts* brought forward by Mr. Carmichael, they can only be received, in my opinion, with considerable qualification. That the placenta is seldom attached to the fundus of the uterus all will now agree, notwithstanding the opinion which formerly prevailed that this is its usual situation. Though not particularly engaged in investigating this point, I have often been struck with the frequent proximity of the membranous perforation to the placenta, in the many secundines which I have examined in the course of my practice. This observation indisputably proves that the placenta is not often connected to the fundus. But I very much question the possibility of discovering, merely by inspecting the secundines, whether their long side had been attached to the anterior or posterior surface, or to one side or the other of the uterine cavity, and I am, therefore, obliged to doubt Mr. Carmichael's accuracy when he affirms so confidently that he found the placenta situated on the posterior wall 96 or 97 times in 100. This is, moreover, in conflict with the observations of others. Prof. Nägelle, for example, gives a table of 600 cases, examined by the stethoscope in reference to the situation of the placenta, in 379 of which it was found at the sides of the womb, which he denominates the ordinary situation of the placenta, and, as far as I can judge by my own auscultatory inquiries, and by the instances in which I have had to resort to manual delivery in cases of retention of the placenta, I should say that the placenta is much the most frequently attached to the sides of the womb and extending partially over its posterior wall; and if it be attached strictly to one wall or the other it is more often the posterior than the anterior wall which is its seat.

Having unfolded the structure of the placenta, we are prepared to understand its uses in reference to the foetus.

First: It is its organ of respiration. The umbilical vessels, already described as terminating in capillaries upon the dendritic processes of the chorion, belong exclusively to the vascular system of the foetus. They consist, as we have seen, of three trunks, two arteries, and one large vein—a branch of the inferior vena cava—and have no communication whatever by anastomosis with the bloodvessels of the mother. The arteries convey no inconsiderable portion

of the blood of the fœtus to the placenta, which, after circulating freely and minutely through it, is returned to the fœtus, not a drop passing into the vessels of the mother. While circulating in the placenta, this blood is brought in contact with the blood of the mother, flowing through the canals of the maternal portion of the placenta, or at least nothing intervenes but the thin walls of these canals, and the delicate coats of the fœtal capillaries. The fœtal blood is thus enabled to abstract oxygen from, and impart its superfluous carbon to, the blood of the mother; and although it may be supposed that this vital operation is not as freely performed as in animals that inhale atmospheric air, it is at least as advantageous an arrangement as the branchial respiration of such as inhabit the waters, to which it is, in fact, analogous—fishes getting their oxygen from water, and the fœtus from maternal blood.

It deserves to be remarked (and this did not escape the sagacity of Mr. Hunter), that the whole constitution of the maternal portion of the placenta is calculated to produce a slow movement of the blood flowing through it; for the utero-placental arteries are coiled where they open into it, which diminishes the force of the circulation, and then when the blood gets into the placenta, its impetus is abated by its being diffused through channels, incomparably wider than the small arteries through which it is received. The motion of the blood is so much diminished by this mechanism as, in the opinion of Mr. Hunter, *almost to approach to stagnation*. The blood of the mother being detained for a longer time in the placenta, permits the fœtal capillaries to extract its oxygen, and to freight its sluggish tide with carbon, more perfectly than they could do, were its motion as rapid here as in other parts of the mother's system.

In animals with cotyledons instead of a placenta,¹ the arterializa-

¹ The animals referred to are the *ruminants*, in which the connection between the fœtus and mother is formed by the implantation of tufts or tassels of the chorion in the cotyledons of the uterus. These cotyledons are cup-like elevations upon the internal surface of the uterus; they are very numerous, being found not only in the body of the organ, but also in both horns, even to their termination. They appear to be the natural structure of the internal coat of the uterus (I have seen them in the calf of six weeks), and are only greatly developed by pregnancy. The vascular tufts of the chorion do not adhere to the cotyledons so firmly but that they may be eradicated without laceration, and I infer (for I confess I have not happened to witness all the phenomena of parturition in these animals) that they are thus detached by the action of the uterus, leaving the cotyledons, which could not, indeed, be cast off without bringing an entire coat of the uterus along with them.

tion of the foetal blood is accomplished by the juxtaposition of the foetal with the maternal capillaries in the cotyledons—a disposition not nearly so favorable to this vital function as the placental, both because there is less maternal blood in the same area, and its motion is more rapid. Hence, as I judge, the necessity of a larger extent of uterine surface, and a great number of cotyledons, to obtain which, horns are appended to the uterus. In the human female, such a structure of the uterus would not have been compatible with the symmetry and beauty of her form. The womb must occupy as little space and be as little conspicuous as possible. In such a contracted cavity, the object being to economize room, without committing the interests of the offspring, we can think of no device better than that of a placenta.

But notwithstanding the placenta offers a structure apparently adapted to aerate the blood of the foetus, and no other reason can be assigned why so considerable a portion of its blood is sent thither, except that it may undergo this indispensable renovation, it may be asked, is there any positive proof that such a function is performed by the placenta? Such a question is the more likely to be put, since so eminent a teacher as Dr. Blundell expresses doubt upon the subject.¹ He has, as he informs us, been at some pains to get blood from the umbilical arteries and vein at the same time, and has not observed any difference between them, in point of color, or, if any, only a mere shade. But Dr. Blundell did not make proper allowance for the peculiar economy of the foetus, if he expected to observe as marked a difference of color between the arterial and venous blood of the cord, as between that of the pulmonary artery and veins. For it should be remembered that the blood of the mother is not, and cannot be safely, as highly charged with oxygen as atmospheric air; and could it be, there is reason to believe, that it would prove destructive to the tender organization of the foetus, its delicate tissues not being able to bear the infusion of highly oxidized and proportionably stimulating blood. There is yet another circumstance which, if duly considered, would not have allowed Dr. Blundell to look for a *scarlet* current in the vein and *purple* currents in the arteries of the cord; namely, the blood that flows to the placenta through the umbilical arteries is not, strictly speaking, *venous* in its qualities, but it is just such blood as is distributed to every part of the foetal system, for its nourishment

¹ Lectures on Principles and Practice of Midwifery.

and growth. It is a mixture of arterial and venous blood, detached from the circulatory torrent, and sent forth to the placenta for a *small* additional dose of oxygen, and to part with a little carbon. The blood in the two sets of vessels ought not, therefore, to be expected to differ more than a *shade* in color.

The observations of Dr. Blundell, if they were carefully made, go far to corroborate the old English doctrine in relation to a cardinal point in the physiology of the foetal circulation, which, nevertheless, I consider firmly established by other facts and reasoning. The cardinal point referred to is, the necessary admixture of arterial blood from the placenta, and venous blood from the head and superior extremities, in the cavities of the heart of the foetus, and the *equal* distribution from thence to all parts of its body of this mixed blood. In opposition to this, it is well known, the French school of anatomy and physiology maintains that the arterial and venous currents, in their transit through the cardiac cavities, are kept, in a great measure, separate; arterial blood being distributed to the head and upper extremities, and venous blood to the nether parts of its body, as being good enough for them.

A full discussion of this controverted point would be irrelevant to our present subject; but I may be permitted to remark, that if the doctrine of the French school were true, the blood of the umbilical arteries would be found to differ more than a shade from that of the umbilical vein, although, for a reason already given, there would not be the striking contrast that is observed between the blood of the pulmonary artery and that of the pulmonary veins in a breathing animal.

If, however, not even a shade of difference in color could be detected in the blood of the umbilical vessels, the fact might be explained by the imperfection of the placental functions which must exist whenever it is possible to make observations of this kind. The child is expelled, and the womb is, of course, very considerably reduced in volume; the placenta may be actually detached, though still in the uterine cavity. If the placenta be detached, although the umbilical vessels may continue, for a time, to carry on their accustomed circulation, there can be no aeration of the foetal blood in the placenta, nor is it needed, the lungs having come into play. If the placenta be adherent, the diminished caliber of the uterine arteries and veins, resulting from the reduced size of the womb, must render placental respiration less perfect than before the birth of the child.

We have abundant proof that the foetal blood is aerated in the placenta, in the consequences that arise from compression of the cord to such a degree as to arrest the circulation of the blood in its vessels. Such compression is liable to happen, during labor, when the cord prolapses before the head of the child, in vertex presentations, and also while the head is passing through the pelvis, in nates presentations; and whenever it does, death is the consequence, while both the celerity and manner of death show clearly that it is caused by suffocation. The cord ceases to pulsate, and the foetus, after a short convulsive struggle, evinces no further indications of life.

Secondly: The placenta is the organ through which the foetus derives its nourishment from the mother. Of this, it must be confessed, there is no *positive* evidence; but, at the same time, it may be safely affirmed that, in relation to this point, *negative* evidence is altogether satisfactory. There is absolutely no other medium through which the foetus can obtain its supplies of alimentary matters. The only other possible source is the liquor amnii, the fluid which surrounds the foetus; and the doctrine that this is appropriated, either by absorption or deglutition, has long since been exploded, by facts and arguments that cannot be answered, which need not be rehearsed in this place. How or in what form nutriment is received through the placenta, is not known; most probably there is a set of vessels, in connection with the umbilical capillaries, which open into the maternal portion of the placenta, and, abstracting from thence the needful supplies, convey them at once into these capillaries, to be incorporated with the foetal blood. Whether these hypothetical vessels take up blood, or only certain of its elements, we do not know; nor, as far as I can see, is it a matter of the least practical moment that we should know. Nature here, as elsewhere, is chary of her revelations that might gratify the curiosity, without adding to the resources of her votaries.

3. *The Membranes.*—Any further description of the foetal membranes would be tautological, inasmuch as they have been already described, as they appear at an early period of pregnancy, and the successive changes they undergo have also been pointed out. It only need be observed here that, towards the close of utero-gestation, when the placenta is completely developed, the membranes are reduced to only two layers, viz., the chorion and the amnion, the foetal decidua having been entirely removed, and the uterine decidua having become so much atrophied, that it is not possible

to dissect it off the chorion as an entire membrane. The sac in which the foetus is contained, at the time of parturition (called *amniotic*, from its being lined by the amnion), is, therefore, composed of these two membranes, the placenta being—as we have seen—only a vascular efflorescence upon a portion of the outer surface of the chorion, which gives to that membrane the appearance of being attached to the circumference of the placenta. The chorion and the amnion, although in close apposition, are, at this time, easily separable by the fingers, on the foetal surface of the placenta, as well as throughout their whole extent. In fact, the amnion may not only be stripped from the chorion on the foetal surface of the placenta, but also on the umbilical cord to some distance from its insertion into the placenta.

SECTION III.

THE OBSTETRIC APTITUDES OF THE FŒTUS.

Under the title of obstetric aptitudes of the foetus, we may consider its peculiar attitude in the cavity of the uterus, the structure and dimensions of the more important parts of its body, considered in reference to parturition, and the manner in which it is situated, relatively to the cavity in which it is included, and from which it is to be expelled.

1. ITS ATTITUDE.

At the completion of utero-gestation, the foetus is, on an average, eighteen or twenty inches in length, measured from the summit of the head to the heels; while the cavity of the uterus, when completely expanded, does not exceed twelve inches in length, by nine in its greatest transverse diameter, and six in its antero-posterior. It is, then, obvious that the foetus cannot be lodged in this cavity in a state of extension, and accordingly it is folded up by the flexion of its thighs upon the abdomen, the legs upon the thighs, and the head upon the breast, and the arms are closely applied to the sides, with the forearms crossed upon the chest. In this compact form, its size is not disproportioned to the capacity of the uterine cavity, to which it is further adapted by its ovoidal figure corresponding to the shape of this cavity.

This apparent packing of the foetus, in order that it may occupy the least possible space, is not produced by the want of room in the uterus; for, it is observable at all stages of gestation—in the early periods, when its size, compared with the cavity, is small, as well as at a more advanced period, when its *comparative* as well as absolute size is great. At no period is it crowded, and constrained to assume its peculiar attitude. The foetal attitude must, therefore, be regarded as a curious instance of adaptation of the several parts of a complicated process to each other.

2. ITS DIMENSIONS AND STRUCTURE.

In considering the foetus, thus folded up, in reference to its *dimensions* and *structure*, we may, with M. Moreau, divide it ideally into three distinct parts, viz: (1.) *The cephalic extremity*, formed by the head alone. (2.) *The pelvic extremity*, including both the pelvis proper and lower extremities. (3.) *An intermediate part*, formed by the trunk, exclusive of the pelvis.

(1.) *The cephalic extremity*, or *head*, must be regarded as the most solid and voluminous part of the foetus; and on this account, as well as the greater frequency of its presentation in labor, deserves the particular study of the accoucheur. An accurate knowledge of its structure, form, and size, is, indeed, indispensable to a correct understanding of the mechanism by which the foetus comes into the world.

The head includes the cranium and face, and each of these divisions deserves the notice of the obstetrical student, on account of some peculiarities of structure in the foetus.

The *cranium* may be subdivided into two parts—one superior, convex, bulging at its sides, and measuring more antero-posteriorly than transversely—which is its *vault*. The other, inferior, flat, narrower, and shorter, which sustains the first, and is, therefore, its *base*. Six distinct *bones* enter into the construction of the cranial vault, viz., the *two parietal*, the superior portion of the *occipital*, the squamous portions of the *two temporal*, and the *frontal* bone. The *os frontis* is, however, usually divided into right and left halves, and seven bony pieces might, therefore, be enumerated as belonging to the vault of the cranium. A greater number of *osseous* pieces compose the base of the cranium; but these need not be mentioned, for they possess no obstetric interest, being deeply covered by soft parts, and never forming the presenting part of the child.

The imperfect ossification of its several constituents is the most remarkable, and, in a practical point of view, the most interesting, feature of the superior portion of the cranium. In consequence of this, considerable intervals are left between the bones, in the direction of the future sutures of this part of the head. These membranous interspaces have usually been denominated, in advance, sutures, not, however, with strict propriety of speech; I prefer designating them, as M. Moreau has proposed, by the term "*commissures*." The parietal bones are, in the foetal skull, separated from the os frontis by the *coronal* commissure, and from the occiput by the *lambdoidal*, while they are themselves parted by the *sagittal* commissure, which derives its name as Dr. F. Ramsbotham vouchsafes to inform us, from its being fancifully supposed to be situated between the lambdoidal and coronal, as an arrow is placed in a strung bow.¹ The comparison is not, after all, so fanciful as to the foetal skull, for, the sagittal commissure extends to the root of the nose, dividing the two pieces of the frontal bone, and thus, like an arrow, projects beyond its bow. It is better, with most authors, to regard this as an extension of the sagittal commissure, than to call it, as Dr. Ramsbotham does, the *frontal*.

But there are other and larger *soft places* in this part of the foetal cranium, called *fontanel*s, produced by default of ossification at the angles of the bones. Two of these only are worthy of any special notice. One is found at the intersection of the sagittal and coronal commissures, and the other at the posterior extremity of the sagittal, where it meets the lambdoidal. The former is the *anterior* or *bregmatic fontanel*, which is distinguished by its quadrangular shape, and the openings at its angles caused by the entrance of the coronal and sagittal commissures. It is, besides, the largest of the fontanel. The latter is the *posterior* or *occipital fontanel*, which is of a triangular figure, and has, likewise, openings at its angles caused by the sagittal and lambdoidal commissures. It is of the utmost importance that the obstetrical practitioner should be able to recognize these fontanel by the sense of touch alone, and this he will be enabled to do by a little care and attention.

The construction of the cranial vault (the most voluminous part of the head), by separate bony pieces, with such large interspaces, is evidently calculated to facilitate its passage through the pelvis in childbirth. There are, perhaps, few labors in which these bones

¹ Process of Parturition ; New Phila. ed., 1845, p. 31.

are not made to approach each other more closely, and, in some instances of disproportion, their edges overlap, so as materially to alter the form of the head. We are not, however, to suppose that the absolute size of the head can be sensibly diminished. If it be reduced in one direction, it is elongated in another to make room for its contents, which are nearly incompressible. It deserves to be remarked, in connection with this, that the pulpy and semi-organized condition of the brain of the fœtus enables it to suffer such compression as alters its form, with comparative impunity. At the same time, it is not improbable that, as has been conjectured, this compression produces such a degree of stupefaction as renders the fœtus insensible, and prevents it from injuring the maternal structures by the violence of its struggles.

In reference to its structure, the *face* of the fœtus is not entitled to any very special notice. Composed of the same bones as in the adult, it is only remarkable for its comparative diminutiveness, so that it detracts from the regular figure of the head but little more than any other of its regions.

The *shape of the fetal head* has been variously described by obstetrical writers. M. Dugès, following Levret in this particular, represents it as a *conoid*—of which the face is the base, and the occiput the summit. But it is more correctly represented by M. Capuron as an *ovoid*, and having, therefore, *two extremities*—one large, obtuse, and round, formed by the superior portion of the *os occipitis*; the other smaller, and more acute, formed by the chin.

Most of the French authors describe five distinct *regions* as belonging to the head; and M. Moreau fixes their metes and bounds with scrupulous precision. But, in a practical point of view, it is scarcely worth while to preserve more than two of these regions, viz., the *vertex* and *face*, because these alone offer themselves at the superior strait in head presentations, or if one of the temples is found there, it is but a rare perversion of a vertex presentation, and can easily be detected by feeling the ear, which is its only distinguishing mark. English writers, using the term "vertex" according to its strict import, apply it to that part of the head where the hair grows in a whirl, which is nearly over the posterior fontanel; hence, Dr. F. Ramsbotham affirms "it is not *perfectly* correct to say that the vertex is the presenting part;" while he allows that "for all practical purposes it is enough to describe the vertex as the point of presentation." There can surely be no objection, how-

ever, against enlarging the signification of the term, and making it equivalent to the summit or top of the head, as M. Dugès and others have done. In this sense it will be constantly used in this work; and it will, therefore, be understood to include the anterior and posterior fontanels, and the parietal bones, from their protuberances to the sagittal commissure.

The *dimensions* of the foetal head are measured by certain imaginary lines, called its *diameters*, which have been as variously enumerated as denominated by authors. The following may be considered essential to a correct explanation of the mechanism of labor in vertex and face presentations. In vertex presentations: 1. The *occipito-frontal* diameter, extending from the occipital to the frontal protuberance, measuring four and one-half to four and three-fourths inches; this I shall call, also, the *great diameter* of the head. 2. The *cervico-bregmatic*, from the junction of the cervix, or hinder part of the neck, with the occiput, to the anterior fontanel or bregma. 3. The *bi-parietal*, from one parietal protuberance to the other; the latter two are nearly equal, and, measuring three and a half to three and three-fourths inches, may be called *small diameters* of the head. In face presentations: 1. The *fronto-mental*, from the top of the forehead to the chin (*mentum*), four inches, rather less than the great diameter, but exceeding the small. 2. The *gutturo-bregmatic*, from the throat (*guttur*), just above the larynx, to the anterior fontanel—three and a half to three and three-fourths inches, and consequently a *small diameter*. 3. The *bi-malar*, from one malar bone to the other—three inches, and of course the *least diameter*. Besides these, all authors, without exception, mention another diameter, with which they usually, indeed, head the catalogue—viz., the *occipito-mental*, from the posterior fontanel to the chin, and measuring five and a half inches, which they call the *longest diameter* of the head. But I prefer considering this as the *axis of the head*, under which name it will be referred to, though I may occasionally call it likewise the *occipito-mental diameter*.

To each of these diameters a *circumference* may be given by describing a circle from their middle with a radius of half the diameter. But there is no practical utility in thus multiplying the circumferences of the foetal head: two only can be advantageously referred to in considering the passage of the head through the pelvis, in vertex cases. These are: 1. The *occipito-frontal circumference*, which passes horizontally, a little below the extremities

of the bi-parietal diameter, and divides the vault from the base of the cranium, measuring thirteen and a half to fourteen and a quarter inches, which I shall call, also, the *greater* circumference. 2. The *cervico-bregmatic circumference*, passing over the extremities of the biparietal, as well as the cervico-bregmatic diameter, belonging equally to both. This I shall call, also, the *lesser* circumference of the foetal head, its measure not exceeding eleven inches. The *fronto-mental* and *gutturo-bregmatic* circumferences will be easily comprehended, should there be occasion to refer to them in describing the mechanism of face presentations.

The *movements* which the head of the foetus can be made to execute safely, by virtue of its connection with the spinal column, are deserving the attention of the obstetrical student. These are *flexion, extension, rotation, and lateral inclination*. The first two are performed by the articulation of the occiput with the atlas, and the laxity of the ligaments in the foetus permits them to be carried to a greater extent than in the adult; there being, in fact, no limit even to extension, except the check received by the occiput from the posterior part of the thorax. Hence, face presentations, which imply extreme extension, are not such constrained positions for the foetus, as we might imagine from the awkwardness, or rather impossibility, of such a movement in ourselves. Rotation is executed by the articulation of the atlas with the dentatus, which limits its extent to a quarter of a circle, beyond which it cannot be forced without risk of fatal laceration. Hence, in the operation of turning, or in the management of nates presentations, the practitioner should take care not to rotate the child's body beyond this limit, lest the head, yet contained in the uterus, might not participate in the rotation, and the child be destroyed by the injury inflicted on it. There is no special articulation for lateral inclination; it is performed by the yielding of the ligaments and fibro-cartilages of all the cervical vertebræ, and can be carried so far as to place the side of the head upon either shoulder.

(2.) *The pelvic extremity* of the foetus offers much less to interest us than the cephalic. Its form is spheroidal, and between its two hemispherical surfaces there is a cleft in which the anus and genital organs are found. It is to be observed that the pelvis proper of the foetus is very small, being, in fact, almost in a rudimentary state; but its magnitude, obstetrically considered, is increased by the articulation of the inferior extremities with it, and the peculiar

manner in which these are folded upon it. Two *diameters* only are ascribed to it, viz: 1, the *transverse*, and 2, the *antero-posterior*. The transverse extends from one ilium to the other, and measures about four inches. The measure of the antero-posterior diameter is not constant, being more or less according as the inferior extremities make a part of it by maintaining their usual position, or depart from it, by the legs being extended upon the abdomen. In the first case, the antero-posterior diameter is greater, in the second case less, than the transverse.

Composed of a considerable number of pieces, which are but imperfectly ossified, some of which are even in a cartilaginous state, the pelvis of the fœtus may be somewhat reduced in volume, by the pressure it experiences in its passage into the world. The softness and flexibility of the parts in connection with it, allow this extremity of the fœtus to be moulded to the shape and dimensions of the maternal pelvis, without much injury to their structures.

(3.) *The trunk of the fœtus*, though quite bulky, is composed of a great number of pieces, some of which, viz., the ribs and sternum, are in a cartilaginous and imperfectly ossified condition. It presents a uniform curvature forwards, produced by the flexion of the spine, which differs from that of the adult in offering but a single curvature, instead of three, in opposite directions. The posterior surface of the trunk is rendered much more prominent and regularly convex by this anterior flexion of the spine. To the superior or thoracic portion of it are reckoned two diameters: 1. The *transverse* or *bis-acromial*, which extends across from one shoulder to the other, and measures four and a half inches. 2. The *antero-posterior* or *dorso-sternal*, from the spinous apophysis of the last dorsal vertebra to the ensiform cartilage of the sternum, measuring three and a half inches. The mobility of the shoulders and ribs, together with their compressibility, easily allows, as M. Moreau observes, the bis-acromial diameter to be reduced to three and a half inches, while the flexibility of the spine enables the entire trunk to accommodate itself to the curvature of the pelvic canal during labor.

3. ITS SITUATION.

It remains to inquire into the *situation* of the fœtus in utero. It has already been stated that the size and figure of the fœtus are adapted, by reason of its peculiar attitude, to the capacity and

shape of the cavity in which it is contained. Let us examine this adaptation a little more particularly. The cavity of the gravid uterus is of an ovoidal figure, the large extremity of the ovoid being at the fundus and the small at the cervix. The figure of the folded foetus is likewise ovoidal, its nates being the large, the head the small, extremity of the ovoid. It is obvious, then, that the foetus would be most commodiously *situated* with its head towards the cervix, and its nates towards the fundus, uteri.

Again. The transverse dimension of the uterine cavity is greater than its antero-posterior, while, on the other hand, the antero-posterior dimension of the foetus, viz., from its back to its abdomen, is greater than its transverse, viz., from side to side. The foetus would, therefore, find more room in its lodging, with its back towards one side of the uterus, and its abdomen and flexed members towards the other. But the remarkable convexity of its back needs a corresponding concavity of the uterus to accommodate it, and this is offered by the anterior wall of the uterus, which is more concave than the posterior. If, therefore, its back were directed forwards, it would be accommodated in this respect.

Now, the most usual situation of the foetus in utero is such as to put it in possession of all these comforts. Its head is towards the cervix, its nates towards the fundus, while its back is turned, neither laterally nor anteriorly, but towards the left anterior or right anterior portion of the cavity of the uterus. This accounts for the more frequent presentation of the head at the time of parturition; but, it may be inquired, what causes the foetus to assume, and generally to maintain, this position in the womb, during the period of gestation? This question has excited the curiosity, and exercised the ingenuity, of medical philosophers in ancient and modern times, and still it can hardly be considered as satisfactorily answered. It was formerly believed that the foetus sits in the uterus, with its fore parts directed towards the mother's abdomen, until the seventh or eighth month of pregnancy, when, from the development of the head, and its preponderance over the rest of the body, it turns topsy-turvy, the head falling forwards and downwards, while the nates rise to the fundus uteri.

This opinion was completely refuted by the observations of Delamotte, Smellie, and Baudelocque, and is now universally abandoned. But it is still commonly taught that the weight of the head, compared with the rest of the body, at all stages of foetal development, is the cause of the great frequency of its presentation.

This purely physical theory has been combated, and, in my opinion, satisfactorily refuted, by M. Paul Dubois.¹ Whether the explanation which he has offered in lieu of it, is to be regarded as equally satisfactory, may admit of doubt; but surely his researches are entitled to more notice than they have received, on account of the valuable facts which have been disclosed by them. I shall, therefore, offer no apology for presenting my readers with an abstract of his interesting memoir.

In opposition to the theory in question, M. Dubois alleges:—

First. If we take a dead foetus, from the fourth to the ninth month of gestation, and put it, by means of bandages, in the attitude natural to it in the uterus, it may be plunged into tepid water without the head sinking more rapidly than the rest of the body. This is the ordinary result, when vessels are used for the experiment as nearly as possible the size of the uterus, at the different periods of gestation to which the foetus belongs. But the experiment is rendered more convincing, if the foetus be plunged into a larger quantity of water—into a bathing vessel, for example—when, falling more slowly and through a larger space, time is allowed for the head to descend foremost, if it be really heaviest; but it is found, in fact, that every part of the foetus descends with equal rapidity, the trunk preserving the horizontal position it had when first plunged into the water, and the back or a shoulder first reaching the bottom of the vessel.

This experiment, frequently repeated, constantly yielded the same result, which is no more than reasoning ought to have led us to expect—for, if the foetal ovoid be divided into two equal parts, one consisting of the head and superior extremities, the other of the abdomen and inferior extremities, their weight is about the same. If the head contains the brain, greatly developed, the abdomen contains the liver, equally large, besides the meconium, sometimes accumulated in large quantity in the intestines, and a certain quantity of urine in the bladder.

Secondly. According to the hypothesis that the laws of gravity preside over the position of the foetus in utero, the head ought to be more irresistibly carried towards the os uteri in the earlier periods of gestation, when it is relatively more developed, when

¹ "Mémoire sur la cause des présentations de la tête pendant l'accouchement et sur les déterminations instinctives ou volontaires du foetus humain." (*Mémoires de l'Académie Royale de Médecine*, tome deuxième, p. 266.)

also the cavity of the uterus is proportionably larger, and the quantity of liquor amnii comparatively greater. But the reverse is true: *presentations of the cephalic extremity are proportionably less frequent in the earlier than in the latter months of gestation.* In confirmation of this, M. Dubois appeals to observations made in the Paris Maternity during four consecutive years, from which it appears that, in the year 1829, *thirty* children were born before the seventh month, of which twenty-two presented the vertex, seven the pelvic extremity, and one the right shoulder. In 1830, *thirty-five* children were born before the seventh month, of which sixteen were vertex presentations, eighteen pelvic, and one shoulder. In 1831, of *twenty-three* children born at the same period of pregnancy, thirteen were vertex, nine nates, and one left-shoulder presentations. In 1832, of *thirty-four* children, not arrived at the seventh month, fourteen were vertex, seventeen nates, two shoulder, and one expelled enveloped in the membranes, its position not ascertained. Total number of premature births, one hundred and twenty-one, of which sixty-five were vertex, fifty-one nates, and five shoulder presentations. The proportion of nates to vertex was, therefore, as four to five, instead of as one to thirty-six, which obtains at full term, according to Baudelocque's statistics.

Thirdly. In quadrupeds, the head of the foetus presents with as much constancy as in the human species; and yet, on account of the direction of the trunk, the ovum or ova, contained in their unilocular or multilocular uteri, have nearly a horizontal position in the early period of gestation, and, in the latter period, an inclination opposite that of the foetus of the human female, seeing that the fundus uteri comes, by the yielding of the abdominal parietes, to be the most dependent part of the organ. The head ought, therefore, to be furthest removed from the os uteri, on the principles of the physical theory.

If the laws that govern *dead* matter do not regulate the situation of the foetus in utero, M. Dubois concludes that those of *life* do, and that some connection exists between the vitality of the foetus and head presentation. This conclusion is corroborated by the results of his inquiries as to the comparative frequency of head presentations, where the foetus dies, in the latter months of gestation, some time before its expulsion. During the four years occupied in his researches, *ninety-six* children were born at the Maternity, that had died during the last two months of gestation; of these, seventy-two presented the head, twenty-two the nates, and two the shoulder,

making the proportion of nates to vertex presentations as one to three and a quarter, which is a great increase of the proportion that obtains where living children are born at the same period. These facts show the influence of foetal vitality in a strong light, for it would not have been surprising if the relative proportion of vertex and nates presentations had not been affected by the death of the foetus at such an advanced period of gestation. The force of this remark will be acknowledged when it is recollected that in the latter months of pregnancy, the foetus is too large, relatively to the cavity of the uterus, easily to allow any essential change to take place in its situation; and it might, therefore, be supposed that whatever position it happened to occupy at the time of its death, would be preserved in spite of the disturbing influence of extraneous causes. Such causes—violent exercise, jolting, stooping, lifting, etc., for example—would be more powerfully operative upon the dead foetus, were there more room in the cavity containing it; and accordingly it appears, from observations collected in the same ample field by M. Dubois, that if the foetus die *during the seventh month*, it will be born as often with the nates as with the head presenting. Thus, in the years 1829, 1830, 1831, and 1834, *forty-six* children, dying in the seventh month of pregnancy, were born at the Maternity; of these, twenty-one were head presentations, twenty-one nates, and four shoulder—a remarkable result, compared with that of living children born at the same period of pregnancy; for, during the same years, *seventy-three living* seven months' children were born, sixty-one of whom presented the vertex, ten the nates, and two the shoulder.

These facts leave no doubt of the influence of the life of the child over its situation in the uterus; but if it be inquired how is this vital influence exerted, it would perhaps be presumptuous to speak with equal positiveness. After establishing, by a great number of observations, the fact that the foetus possesses sensibility and performs muscular motions, in consequence of the various impressions it receives, M. Dubois contends that its voluntary or instinctive movements, in obedience to an internal sensation, cause it to occupy the position it does. In answer to the question, What is the nature of this internal sensation? he asks whether the abnormal situation of the foetus, in which its nates correspond to the small extremity of the ovum, is inconvenient or painful and gives rise to spontaneous movements to change this position for one of ease, or whether, as both extremities of its trunk are best accommodated to the form

of the ovum, with the nates above and the head downwards, it is the comfort (*bien-être*) of this situation that determines the foetus to seek and retain it? He does not pretend to decide the question, but observes further, that the foetus executes its greatest movements with the inferior extremities, and that these are easier, more extensive, and less trammelled when its pelvic extremity corresponds to the large extremity of the ovum, and that possibly this circumstance has something to do with the choice of its relations to the uterus.

Whatever may be the cause of the peculiar situation of the foetus in the womb, there can be no doubt but it is to be reckoned among the most felicitous of its obstetric aptitudes.

Since the publication of the first edition of this work I have read several articles from the pen of Prof. Simpson, entitled "On the Attitude and Positions, natural and preternatural, of the Foetus in Utero," which first appeared in the *Edinburgh Monthly Journal of Medical Science*, but are now embodied in his Works, second series. He treats the subject with his usual ability, and has rendered it much more attractive by extending the range of its practical bearings. His dissertations will richly repay the most careful and thoughtful perusal, and for full satisfaction I must refer the student to his Works. In one of these articles the attitude of the foetus in utero

Fig. 54.



Foetal attitude and usual position in utero.

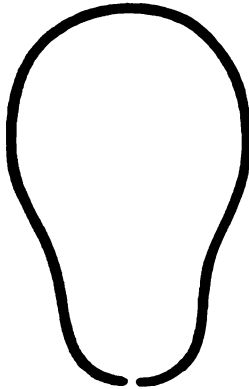
and the better adaptation of the ovoid which it makes to the ovoidal shape of the uterine cavity, when it is placed with its head downwards, are illustrated by sketches, some of which I have had copied to help the student to a more vivid comprehension of the matter. Figure 54 is a representation of the foetal attitude and its most usual position in the uterus, taken from the uterus of a woman who died of cholera near the full time of utero-gestation, in the possession of Prof. Goodsir. "The placenta is seen situated on the right side of the uterus opposite the right foot of the infant. In injecting the vessels some wax escaped in the interspace between the two feet, and, probably, slightly altered their position." In models and obstetric plates, the flexed legs are commonly represented parallel, with the heels resting upon the nates, or, with the legs crossed, and the internal margins of the feet applied to the nates. But there is no reason to believe that such a disposition is rigidly maintained, and it is no doubt often disturbed by the free movements performed by the inferior extremities.

The whole length of the cavity of the uterus, in Prof. Goodsir's preparation, is twelve inches and a half. "The broadest part of it is four and a half inches from the fundus, where it measures eight inches across. From this point the organ gradually diminishes in breadth, and tapers downwards towards the cervix. Across the cervix, about three inches above the os, it is about four inches in breadth." In the above description, quoted from Prof. Simpson, it will be perceived that the cervix is conceived to form at least three inches of the cavity of the gravid uterus; and this is in accordance with the generally received opinion, though repugnant to what has been taught in this chapter. I am, notwithstanding, satisfied that it is erroneous, and would amend the description by simply saying "across the organ," about three inches above the os, &c. But this by the by. The measurements of the foetus, in the same preparation, were as follows: "The broadest part of the larger or pelvic end measured nearly eight inches, and ran across in a line from the lumbar region of the child nearly to the point where the sole of the foot was applied to the placental surface. The breadth of the smaller or cephalic end of the ovoid (formed by the occipito-frontal diameter of the head) measured about four inches. In other words, the lower end was nearly a half narrower than the upper and broader end of the foetal ovoid."

Figs. 55 and 56 represent in outline the ovoid form of the uterus and the ovoid form of the foetus, at the full term of pregnancy,

and show very clearly the adaptation of the one to the other when the child's head is dependent.

Fig. 55.



Ovoid form of the uterus at full term.

Fig. 56.



Ovoid form of the fetus at full term.

Prof. Simpson agrees with Prof. Dubois in entirely discarding the purely physical explanation which has been given of what might be called the natural position of the foetus in utero. He also agrees with him in attributing it to the muscular movements of the child as its procuring cause; but these movements, he contends, are not volitional, but entirely of a reflex or excito-motory character. His arguments in support of this opinion are very cogent, perhaps conclusive; at all events, it scarcely seems reasonable to impute psychical actions to a being so circumstanced as the foetus, when the phenomena are explicable upon physiological principles acknowledged to govern kindred phenomena. Thus, if the sole or palm of the new-born infant be irritated, even during sleep, muscular movements are excited in the limbs. These are admitted to be excito-motory movements, and why may not the movements caused by similar irritations to the limbs or surface of the foetus, through the abdominal and uterine walls, be of the same character? But we ought not to dogmatize on such a subject, and it must be confessed that either theory affords an explanation far more satisfactory than that of gravitation or the law that rules dead, insentient, and inorganic matter. Whether, with M. Dubois, we regard the foetus as the subject of sensation and voluntary motion, or, with Prof. Simpson, consider it as insensate, but capable of as lively excito-motory phenomena as a decapitated frog, we may account,

upon either theory, for its taking up its usual position in the womb during the latter months of pregnancy, and recovering it when lost by the operation of any disturbing cause. In any other position, there is a want of adaptedness to its lodging, and the pressure made upon its surface by the opposing uterine parietes, whether it acts as an excitor stimulus awakening reflex motion, or produces disagreeable sensations leading to sensorio-volitional movements, is followed by a series of movements which do not cease until the fœtus has recovered its adaptive position, in which it is freed from such stimulus or disagreeable sensation. It is not so in the early months of gestation, when, as we have seen, there is ample scope for the fœtus in the relatively larger cavity of the womb, and it may assume any position it pleases (if it can be pleased); hence the greater proportionable number of malpresentations in cases of premature labor, the fœtus being caught in its gambols.

Upon the same principle, Prof. Simpson explains the greater frequency of preternatural presentations under a variety of other circumstances of labor, which it would be instructive to notice particularly, did the space that may properly be devoted to the subject, in a work like this, permit. One of these circumstances I will, however, briefly refer to: it is the perverting influence of intra-uterine hydrocephalus over the presentation of the fœtus; in which disease, the head being by far the largest part of the fœtus, is turned towards the fundus, or largest part of the uterus, more frequently than where the fœtus is healthy, and its conformation natural. Thus, as Prof. Simpson observes, 'Among sixty-nine cases of intra-uterine hydrocephalus, previously referred to as collated by Dr. Thomas Keith, in fifty-nine the cephalic, and in ten the pelvic extremity of the infant, presented. One of the sixty-nine cases was a transverse presentation.

Table of Proportions of different Presentations of the Fœtus in 69 cases of Intra-Uterine Hydrocephalus, and in 84,000 cases of Common Labor.

Conditions.	No. of Head Presentations.	No. of Pelvic Presentations.	No. of Transverse Presentations.
Hydrocephalus cases	59 in 69	1 in 7	1 in 69
Common cases . .	96 in 100	1 in 31	1 in 224

¹ Works, Second Series, p. 131.

CHAPTER V.

ON ABORTION.

ABORTION is one of the most common maladies to which pregnant females are obnoxious. It is, indeed, the great disease of pregnancy, inasmuch as it destroys the fruit of the womb and blasts the hopes that were excited by its blossom.

Various derangements of other organs, sympathizing with the gravid uterus, are usually reckoned among the diseases of pregnancy; these may, however, be produced by other causes, and are not, strictly speaking, diseases of pregnancy. But abortion is the disruption of the process of utero-gestation itself, and may, therefore, be justly considered as entitled to a large share of the study of the obstetric practitioner.

By abortion is understood the expulsion of the ovum before the fœtus has acquired sufficient development to maintain a separate existence. Such development is not often attained earlier than the seventh month, and the expulsion of the ovum, prior to this period, may, therefore, be regarded as an abortion, whilst its subsequent expulsion, should it occur before the term of pregnancy, is premature labor. This distinction does not imply, however, any essential difference so far as the process of expulsion is concerned; in this view it is, in either case, *labor*, and not unfrequently abortion is even much more tedious, and involves much more suffering and hazard than ordinary parturition.

Although the period allotted to abortion embraces more than two-thirds of that of pregnancy, yet it must be observed that it happens, in by far the greatest number of cases, at about the third month. In other words, it is most liable to occur during what I have called the membranous phase of the development of the ovum, or, at least, prior to the complete formation of the placenta, and whilst the most external of the membranes—the decidua—is ex-

ceedingly vascular and gorged with blood. This must be borne in mind in order to have any right notions concerning one of the most important of the symptoms of abortion, namely, uterine hemorrhage.

SECTION I.

THE SYMPTOMS AND SIGNS OF ABORTION.

Abortion is, as already intimated, labor in miniature, and hence it is accompanied or rather accomplished by pains, having all the characteristics of those of parturition, viz., pains recurring paroxysmally and alternated with intervals of ease; affecting the back and extending around the hips to the pubes; increasing gradually in frequency and severity until they are attended with bearing-down, caused by the involuntary contraction of the abdominal muscles to aid the uterus in expelling its contents. These pains are the indexes of contraction of the muscular fibres of the uterus, and the measures, in some degree, of its intensity: viz., if they be slight, the uterus is contracting but feebly; if severe, it is contracting more powerfully. These uterine contractions are always accompanied by more or less hemorrhage from the organ—a symptom seldom present in labor at the full time, except in connection with the detachment and expulsion of the secundines.

This observation, if I rightly interpret it, points to the wholly different sources of the hemorrhage which accompanies abortion and that which attends or immediately follows the extrusion of the secundines in natural parturition. In abortion, the blood flows chiefly from the decidual vessels, probably from both layers of the decidua, and may issue from any point of the ovum or internal surface of the uterus; in parturition, it flows exclusively from that portion of the uterus to which the placenta was attached, and proceeds from the ruptured utero-placental vessels. A different doctrine is, however, enunciated by Prof. Meigs (not in opposition to the view I have taken, for he speaks as though no other explanation but his own could be given), and is again and again inculcated with undoubting confidence in its verity. The doctrine alluded to is, that the hemorrhage of abortion comes from the placental superficies of the womb and always implies detachment, to a greater or less extent, of the placenta from the internal surface of the uterus.

Not to insist on the difficulty of accounting, on this hypothesis, for the sometimes profuse hemorrhages of very early abortions, ere the first rudiments of a placenta can be discerned (though this of itself is an insurmountable objection), the doctrine is obnoxious to the formal objection that if, as the learned professor contends, uterine contraction invariably breaks up the attachment of the placenta, in abortion, it ought, *à fortiori*, to produce the same effect in natural parturition, and consequently all labors would be hemorrhagic; never a child could be born without being baptized in blood. The ground of this conclusion is the admitted fact that the placenta adheres less intimately at term than in the early months of pregnancy. Will it be replied that the adhesion of the placenta is destroyed by violence, such as falls, blows, &c., in some cases of abortion, and by disease of the ovum in others? Be it so; but, then, in a large number of cases—I think we may safely say, in by far the majority—no such suggestion is admissible, for the cause of abortion resides in the uterus itself, as I shall presently attempt to show, and acts simply by provoking the organ to expulsive contraction. Prof. Meigs admits as much in the following citation, from the pathology of which, however, as will shortly appear, I entirely dissent:—

“There are some individuals in whom there seems to be so great an irritability of the muscular fibres of the womb, that the presence of the fruit of a conception never fails to bring on the contractions before the completion of the term of pregnancy; and I apprehend that this excessive irritability is among the common causes that produce abortions. This view seems to be maintained by a reference to what happens in those who have already miscarried, since such females are found to be greatly disposed to miscarry again, at about the same period as that at which they had sustained the first misfortune; which appears to me to indicate, that the repeated accidents of this kind are attributable, rather to an excessive or abnormal irritability of the womb, than to any of the other circumstances that are enumerated as causative of abortions; for it is far more reasonable to suppose that the *same* uterus is endowed with too great a degree of muscular irritability, than to suppose that several successive germs should be so constituted as to perish always at about the *same* period.”¹

If, then, mere uterine contraction is competent to break up the

¹ Meigs's *Obstetrics: the Science and the Art*, ed. 1849, p. 212.

attachment of the placenta, whilst the entire ovum is contained in the uterine cavity, in all those individuals with irritable uteri (for they all bleed), much more ought the same cause be capable of detaching the placenta in all women at the full time, in the very outset of labor, because its adhesion is then naturally loosened, preparatory to its exfoliation.

From the foregoing considerations we may confidently conclude that detachment of the placenta is not the usual source of the hemorrhage of abortion. We must, therefore, seek for it in the decidua or in the vessels connecting it with the subjacent tissue of the womb. There may be rupture of these vessels (and this is the opinion of Burns and others who ascribe not the hemorrhage to placental separation), but this cannot be deemed essentially necessary. The hemorrhage may be, and, I doubt not, often is, pathological rather than traumatic in its nature, the result of decidual hyperæmia—an exudation of blood from its distended and overloaded vessels. This may be inferred from the fact that a sense of fullness and weight is not unfrequently complained of previous to the eruption of blood, and also the further fact that the hemorrhage may precede the uterine contractions, and is always coeval with them, even in their incipiency, when they are too few and feeble to disturb the relations of the ovum to the internal surface of the uterus.

To continue our historical sketch of abortion: Both the hemorrhage and pain may intermit, simply from quietude in a recumbent posture—the hemorrhagic molimen being appeased by the flow of blood, and the uterus not possessing the disposition to persist in expulsive contractions as perseveringly as in natural labor—to return after a longer or shorter time, and then be followed by another intermission, and so on until the expulsive nisus is subdued or the ovum is expelled. But in other instances, when these symptoms have once appeared, there is no abatement until the uterus has delivered up the treasure intrusted to its keeping.

The expulsion is not always effected in the same manner. Sometimes the membranes rupture, followed by the flow of liquor amnii and the escape of the little foetus, the secundines being retained; in other cases, the ovum is expelled entire. I have seen the cast off ovum preserve its integrity so late as the fifth or sixth month of pregnancy, when the foetus was sufficiently developed to manifest vitality by its movements, seen through the membranous sac

in which it was included, and this mode of expulsion is most natural, at least it is most desirable, for, if the membranes break and the embryo be expelled first, the secundines are much more apt to be retained for a prolonged period than after the birth of the child at maturity. The retention of the secundines thus ensuing is one of the most embarrassing accidents which can occur, for they serve to keep up irritation of the genital organs for a lengthened period, marked by frequent repetitions of the uterine hemorrhage and contractions, holding the patient in suspense and her medical adviser in anxious attendance.

What is the explanation of these prolonged retentions of the secundines, so common in abortion, compared with natural parturition? It is to be found, I apprehend, in two considerations. *First*, in the marked difference in the condition of the cervix uteri in early and in advanced pregnancy. During the abortive period, it retains its natural density, or at least it is but little softened, and is quite indisposed to yield to the pressure of the ovum, urged against it by the contractions of the fundus; and when at length it does open and permit the liquor amnii and foetus to pass, it promptly contracts again, because it is not distended by the empty membranes. But, *secondly*, there is yet another cause of pertinacious retention of the secundines, in these cases, which is operative in proportion to the earliness of pregnancy, but which has, so far as I remember, been entirely overlooked by authors; I allude to the firm adhesion of the decidua to the inner surface of the uterus; for, the decidua being, as we have seen, nothing less than the mucous coat of the uterus in process of preparation for ejection at the term of pregnancy, its connection with the subjacent coat is too strong to admit of easy dissolution, and may be so intimate as to require long continued efforts for its severance. Whilst, moreover, the decidua is in vital union with the uterus, there is no reason to believe that any very strenuous efforts for its expulsion will be made; it must first be partially detached or exfoliated, so as to become, in some sort, an extraneous body, before its presence will excite the organic contractility of the uterus to action. If not upon this view, I know not upon what other, we shall be enabled to explain so singular a phenomenon as the almost indefinite retention of the secundines in some cases of abortion; where they are more promptly expelled, it may be presumed that they are prepared for it by the disruption of their

uterine connection by extravasated blood or other causes which it may be difficult to assign.

When the abortive process is tediously protracted, whether from retention of the secundines or from the slow detachment and expulsion of the entire ovum, it is liable to be mistaken for other diseases. I have myself known it to be mistaken for polypus uteri, in the case of a young married woman, who had uterine hemorrhage recurring every few days for several weeks. The physician who had charge of the case, finding at length that something was protruding at the os uteri, which was firmly held in its grasp, concluded that it must be a polypus, and expressed this opinion to the patient's friends. I was requested to see the case in consultation, and to bring with me instruments for the removal of the supposed polypus. Armed with Gooch's double canula, I obeyed the summons, and found the physician and the friends of the patient awaiting my arrival, expecting the operation as a matter of course. The history of the case and a careful examination satisfied me that the patient was in an early stage of pregnancy, and that the supposed tumor was an aborted ovum held in the grip of the cervix. What was I to do? What ought I to have done? A moment's reflection upon the medical ethics of the question decided my course. Introducing the canula, I embraced the ovum in the loop of its ligature, and then remarked to the doctor, loudly enough to be heard by all who were in the room, that I thought the *tumor* might be removed at once by drawing the ligature very tightly. The ligature was accordingly tightened to get a secure hold of the ovum, and then the instrument was withdrawn, bringing the ovum along with it. The patient had no further hemorrhage, and gradually recovered from the anæmia consequent to the hemorrhagic losses of blood which she had suffered.

I have related this case, not for self-glorification, but because it may serve to guard others against committing a similar mistake. If all the errors of diagnosis, which the wisest among us have committed, were duly chronicled, I opine that a large hiatus in our libraries would be compactly filled with choice reading. For my own part, I own that if I have not fallen into this precise error, I have fallen into others quite as egregious; and I imagine that no one ever practised medicine long without having his self-esteem abated by his manifold blunders.

To proceed: Imminent danger need not, generally speaking, be

apprehended from abortion, for, though the patient may suffer much and be greatly debilitated by hemorrhagic depletion, a fatal termination seldom occurs as its direct consequence. But it not unfrequently lays the foundation for future ill health, and specially for chronic disease of the uterus, affecting mostly the os and cervix. From my own experience, now somewhat extended, I am convinced that quite a large proportion of the cases of chronic inflammation and ulceration of this portion of the organ may be traced to abortion as their cause, as their history clearly reveals—for it often appears that, previous to an abortion, the health was unexceptionable, but since, though years may have elapsed, the patient has complained of uterine symptoms, which may have been misunderstood until the true nature of the case was disclosed by a specular examination. That the os and cervix would be likely to suffer from abortion is no more than might, *a priori*, be expected, considering their organic condition at the time and the amount of force that is required to overcome their resistance. Forced to dilate at a time when there is but little dilatibility, lesion of structure is the not unfrequent consequence, which, though it may be slight, is sufficient to set up inflammation, which is all the more disposed to spread and take deep root on account of the travail so recently encountered. Whether this, my reasoning about the matter, be correct or not, still the fact remains and is unimpeachable, by clinical observation, that abortion is a frequent cause of cervical inflammation and its sequences, induration, hypertrophy, and ulceration.

SECTION II.

THE CAUSES OF ABORTION.

The causes of abortion are doubtless multifarious. Various accidental causes, such as injuries and strong mental emotions, may give rise to it; and so may febrile diseases, especially the exanthemata; drastic purgatives may excite it indirectly or uterine stimulants directly; it may be produced by diseases of the ovum, resulting in the death of the foetus. It deserves to be remarked, however, that the dead foetus may be retained in the uterine cavity for a considerable time, which is, as I suppose, only explicable upon the hypothesis that its mucous envelop—the deciduous membrane—retains its vital connection with the uterus after all the

structures it incloses have perished or at least ceased to grow, and, while in this condition, the ovum cannot be wholly an extraneous body, else expulsive contractions of the organ would be provoked by its presence. The tendency of the decidua to maintain this vital union until the period naturally allotted for its exfoliation is very strong, and may be presumed to be stronger in some cases than in others. Many years ago, I knew a woman who had the foetus to perish, at about the third month, in two successive pregnancies, but who, nevertheless, carried the ovum to the end of the ninth month without experiencing a symptom of abortion or menstruating during the whole time. At the end of the ninth month, uterine contractions came on and expelled a foetus of about three months' development, whose shrivelled and macerated appearance seemed to indicate that it had been long dead, though there was no unpleasant odor about it.

But the most prolific cause of abortion remains to be considered; I allude to a diseased state of the gestative organ itself. What is more reasonable than to suspect such a cause of abortion? When other organs are incapacitated for the performance of their functions, do we not closely investigate their condition and expect to find, in some appreciable lesion, an explanation of their deficiency? And, though it is possible that the incapacity may be purely sympathetic, do we not often discover a pathological state of the affected organ, which furnishes an explanation of its failure? What reason and all analogy might lead us to expect on this subject is amply confirmed by clinical observation. In very many instances of abortion, and especially of abortion frequently recurring in the same individual, it has been found that the uterus is in a diseased state, in whole or in part, and, when a portion only is affected, it is the cervix more often than the body. As to the particular disease itself, it is inflammation of the uterine mucous membrane, which may invade, also, the parenchyma of the organ.

Before the speculum was applied to the investigation of the diseases of the gravid uterus, pathologists had no idea of the frequency of its inflammatory affections, and hence, when a faulty condition of it was suspected to be the cause of abortion, it was vaguely surmised to be weak or irritable. Debility, under the phrase "inward weakness," is still current in the popular pathology as a mighty cause of abortion, whilst irritability of the uterus still claims its hecatombs of foetal victims under the pontificate of our distinguished

countryman, Prof. Meigs. The importance which he attaches to it appears from the citation already made from his *Obstetrics* on page 177, which the reader is requested to peruse again.

The same idea is reproduced and expanded in his *Females and their Diseases*, where he says: "Doubtless, miscarriages often depend upon irritability of the womb, which refuses to dilate under the pressure of the growing ovum. The Hallerian irritability of the womb, or its muscular contractility, may be so great as to repress the advance of the ovum in growth. If you had such an ovum growing inside of a metallic sphere, it would necessarily die, because it is indispensable for the embryo not only to live, but to grow, for its life does not consist in living but in developing itself. But, if the womb won't let it develop itself, will it not die? and hence, don't you perceive that an unyielding, rigid uterus may cause the woman to miscarry again and again, whereas if you cure the rigidity and unyieldingness of the womb you may allow the woman to go out to the full term of utero-gestation?"¹

Of the vast number of cases of early abortion the learned author presumes that a large majority depend upon disorders of the embryo itself, whilst he ascribes the remainder, save the few that casualties may occasion, to simple uterine irritability, without the least allowance for any pathological lesion which the senses can detect. Inflammation and ulceration of the cervix or of the body of the uterus are entirely ignored by him, in both of the works referred to, as a cause of abortion. To practical men, conversant with the speculum, this omission cannot but appear strange. Knowing, as they do, the frequent co-existence of such a morbid state with pregnancy, they can scarcely suppose that it has escaped the notice of Prof. Meigs, and yet unless it has perchance been overlooked by him, they will be sadly perplexed to account for the little importance he attaches to it, whilst he magnifies a morbid condition, which is at best questionable, into such paramount importance. There is no evidence of this uterine irritability (and in the nature of the case there can be none) until it is manifested by expulsive contraction of the organ, and to ascribe abortion to it is, therefore, nothing more than an identical proposition, *i. e.* abortion is abortion—a kind of proposition which, as Mr. Locke has said, though it be certainly true, yet it adds no light to our understandings, brings no increase to

¹ Letter XXXIX.

our knowledge. A cause of abortion, in any proper sense of the term, must be something which is capable of exciting the uterus to expulsive contraction; but mere irritability of the organ is an impalpable and invisible somewhat, of which we can take no cognizance until it is revealed by action, and even then it is not possible to determine whether it exists in a morbid or healthy degree, seeing that numerous causes may operate to excite uterine contraction, even in the most apathetic state of the organ.

Against inflammation of the uterine mucous membrane, either of the cervix or body, considered as a cause of abortion, no such objections lie, nor can it be questioned that it is an adequate cause, for it is in harmony with the influence of inflammatory affections of other mucous membranes on the functions of the organs which they line. Gastro-enteritis, for example, quickens and perverts the peristaltic motion of the alimentary canal and leads to the precipitate ejection of its contents, not permitting the food to remain a sufficient length of time to be digested. In this case, the food may be said to be prematurely expelled, just as the ovum is liable to be, when the organ it inhabits is inflamed.

Analogy might easily furnish other illustrative examples, but it is unnecessary. Before the argument is dismissed, however, I am anxious to direct attention to the special channel through which the inflammatory irritant, when it invades the uterus, may act in exciting the organ to expulsive contraction. Inflammation of the mucous membrane of the body of the uterus may, doubtless, directly excite contractions which shall expel the ovum, just as inflammation of the intestinal mucous membrane may directly excite increased peristaltic movements which shall expel the feces; but when the inflammation is limited to the cervix uteri (and this is most frequently the case), it acts as an abortive through the medium of the relation existing between the neck and body of the organ, alluded to in a previous chapter, by virtue of which impressions made upon the cervical nerves are reflected, through the spinal cord, upon the muscular fibres of the body and fundus, exciting them to contraction. Assuming, for the present, the reality of this relation, upon the proof heretofore adduced which will be hereafter augmented, when we come to discuss the exciting cause of labor, it affords a satisfactory explanation of the *modus agendi* of cervical inflammation in causing abortion, whilst it is evident that the fact at such a morbid state almost inevitably excites abortion, if it be

established by reliable clinical observation, is of itself sufficient to prove the existence of the relation.

The recognition of uterine inflammation as a cause of abortion does add some light to our understandings, does bring material increase to our knowledge, for it gives the proper direction, in many cases, to our prophylactic measures, and enables us to preserve pregnancies which would otherwise have been blasted. I have had many opportunities of verifying the frequent existence of inflammation and ulceration of the cervix during pregnancy, and of satisfying myself that it is not an uncommon cause of abortion. I have also often examined the uterus in its unimpregnated state, in females who had aborted once or oftener, and found inflammatory disease, either of the cervix or of the entire organ, sufficient to account for the failure of its gestative offices. But as this is a vitally important point, I am not willing to rest it upon my own declaration alone but shall seek to support it by testimony which is, as it seems to me, wholly irresistible, namely, that of Dr. Henry Bennet, of London,¹ and Mr. Whitehead, of Manchester, England.²

Dr. Bennet informs us that his attention was first drawn to inflammatory ulceration of the cervix uteri in pregnant females by M. Boys de Loury, one of the physicians of Saint Lazarre, a hospital prison in Paris, where women of the town laboring under syphilis are confined and treated. The speculum being used with all the patients, as a means of exploration, M. Boys de Loury thus discovered that ulcerative inflammation of the cervix is not uncommon in pregnant women, and that when left to itself it frequently occasions abortion.

"Since that time," observes Dr. Bennet, "I have devoted great attention to the elucidation of inflammatory ulceration of the cervix during pregnancy, and have ascertained that it is of frequent occurrence, that it is the keystone to the diseases of the pregnant state, and the most general cause of laborious pregnancy, obstinate sickness, moles, abortions, miscarriages, and hemorrhage." He then goes on to describe the symptoms of the disease in pregnant females, and the data furnished by the touch and by instrumental examination. The symptoms are the same as in the non-pregnant state, except that there is greater pelvic weight and bearing-down, and

¹ *Practical Treatise on Inflammation of the Uterus, &c.* Second American ed., 1850.

² *Causes and Treatment of Abortion and Sterility.* Phila. ed., 1848.

in addition to the muco-purulent discharges, common to the disease under all circumstances, there is often hemorrhage from the ulcerated surface, which may be periodical and simulate menstruation. In a word, the symptoms are those which are known to precede abortion, though they have commonly been erroneously interpreted, and are dependent on inflammatory affections of the lower segment of the uterus, which Dr. Bennet has found to be a most frequent cause of abortion.

Pregnancy impresses upon inflammatory ulceration of the cervix remarkable changes, which are, in Dr. Bennet's opinion, quite characteristic, and by which he has been enabled, in several instances, to recognize the gravid state. To the touch the cervix is softer than in the non-pregnant uterus, the os is much more open than it normally is, its surface is fungous rather than merely velvety, and in a more advanced stage of gestation, it is of a quaggy, pultaceous consistency. Examined with the speculum, the vulva and vagina are redder and more congested than in healthy pregnancy, and the cervix is found to be tumid, congested, of a livid hue, voluminous and soft, and on one or both lips is seen a more or less extensive ulceration, generally penetrating into the cavity of the os, and sometimes covered with large fungous granulations, which may be considered in itself a sign of pregnancy. This surface is covered with muco-pus and bleeds readily upon being touched.

From this condensed account of Dr. Bennet's observations, it will be perceived that it is inflammation and ulceration of the *neck* of the uterus during pregnancy, which he considers, as I think justly, to be a frequent cause of abortion. He nowhere, so far as I remember, ascribes abortion to inflammation of the mucous membrane of the body of the uterus, described by him under the appellation of "Internal Metritis." This, indeed, he regards as a rare form of uterine disease, and thinks that it has often been supposed to exist, when in reality the lining membrane of the cervix only was implicated—an opinion in which I do not concur, and to which I shall presently revert.

Mr. Whitehead's connection with the Manchester Lying-in Hospital appears to have afforded him even ampler opportunities of investigating the diseases of the gravid uterus than those enjoyed by Dr. Bennet in the metropolis. At any rate, the field of his inquiries was exceedingly fertile, and inasmuch as his attention

was directed more especially to abortion, concerning which he succeeded in collecting an unequalled mass of statistics touching, among other points, its prevalent causes, his testimony is, in my judgment, more valuable than that of all other authors with whose writings I am acquainted. This may appear to be inflated encomium, but it is, notwithstanding, my sober estimate of his indomitable labors, and I risk nothing, I think, in expressing it.

In the course of his inquiries, Mr. Whitehead was struck with the great frequency of leucorrhœal discharges during pregnancy; he found them, indeed, to be so common that were it not for the lesion of structure with which he ascertained they are almost invariably associated, and the distressing sympathies awakened during their existence, it might be supposed that they were both natural and useful.

Leucorrhœa, as it occurs during pregnancy, exists under two distinct forms, the one very different from the other, both as regards the properties of the secreted fluid, the sympathetic disturbances by which each is attended, and also as to the nature, extent, and precise seat of the organic lesion upon which each depends. In one, the discharge consists of mucus only; in the other, it is of a yellowish, greenish, or brownish color, being in greater or less degree mixed with pus, sanies, or blood, and for distinction's sake, the former may be named *mucous leucorrhœa*, embracing two varieties, the colorless and the whitish; the latter *purulent leucorrhœa*, all of which are well described by Mr. Whitehead. He gives a table, which is subjoined, showing the number of instances in which leucorrhœa was found existing in two thousand pregnant women; the relative proportion of cases wherein the discharge was simply mucous; those in which it exhibited purulent properties; and the number of abortions which happened under each condition respectively:—

Proportion of Cases in which Leucorrhœa and Abortion existed in Two Thousand Pregnant Women.

	Average prevalence of leucorrhœa during pregnancy.				Prevalence of abortion under the two forms of leucorrhœa relatively.			
	No. of cases in which leucorrhœa existed.	No. of abortions for which no cause could be assigned.	No. of individuals entirely free from noticeable vaginal discharges.	No. of abortions happening from specified causes.	Mucous leucorrhœa.	No. of abortions for which no cause could be assigned.	Purulent leucorrhœa.	No. of abortions for which no cause could be assigned.
1st 200	106	55	94	18	13	3	93	52
2d 200	99	62	101	20	12	1	87	61
3d 200	103	52	97	17	19	1	84	51
4th 200	108	45	92	16	24	4	84	41
5th 200	119	59	81	15	32	8	87	51
6th 200	108	52	92	16	21	4	87	48
7th 200	119	71	81	14	12	4	107	67
8th 200	125	68	75	18	17	1	108	67
9th 200	120	53	80	18	20	1	100	52
10th 200	109	58	91	20	10	4	99	54
Total, 2000	1116	575	884	172	180	31	936	544

It will be seen from this table that 1116 out of 2000 pregnant women had leucorrhœa, and that the discharge was purulent in 936; that 747 suffered abortion, for which no cause could be assigned in 575. When it is stated that abortion occurred without assignable cause, it is meant that the patients themselves could not account for it. In only 172 cases did abortion occur from specified causes, showing the large preponderance of instances in which the event happened inexplicably upon generally admitted views. What is the leucorrhœa, it may be asked, which figures so largely as a cause of abortion in the above table? Mr. Whitehead shall reply: "On submitting these cases to specular examination, the source of the discharge and the cause of suffering appeared to be at once revealed; disease of the lower part of the uterus being found to exist in almost every instance. That this lesion of structure constitutes the true pathological seat of leucorrhœa and of all its associated phenomena, as well as a very frequent cause of disastrous events during pregnancy, is further corroborated by the beneficial effect of the treatment adopted, when this was especially directed to the uterine affection."

The two kinds of leucorrhœa are not associated with the same

pathological lesion, nor are they equally liable to induce abortion. Purulent leucorrhœa is always indicative of suppurative inflammation, seated in the lower part of the uterus, which is found in a state of hypertrophy, sometimes of induration, and very generally presents a surface of ulceration or of excoriation, of greater or less extent; and abortion occurs far more frequently under this condition of parts than any other—so frequently, indeed, that we are constrained to regard it as a sequence of the pathological state of the gestative organ.

To obtain a correct statistical average of the prevailing causes of abortion, 378 cases were examined by Mr. Whitehead as they occurred in immediate succession, and the result is given in tabular form.

Causes of, and Conditions associated with Abortion, in 378 cases.

Accidental agencies.	Placenta prævia.	Constipation of the bowels.	Retroversion of the uterus.	Incurable disease.	Vascular congestion.	Disease of the lower part of the uterus.	Obscure causes.
44	8	3	3	1	15	275	29

These two hundred and seventy-five individuals, he elsewhere says (commencement of Chapter VIII.), “were, with a very few exceptions, examined with the speculum, either before or within three or four weeks after the event took place; and in every case thus submitted to examination, disease of the lower, or of the internal part of the uterus, and, in a few instances, of the vagina, was found to exist.”

Mr. Whitehead describes several forms of inflammatory disease of the os and cervix uteri which he has met with, such as *inflammation and superficial erosion, varicose ulceration, and fissured ulceration*, which interfere injuriously with the process of utero-gestation—the first in the seventh, eighth, and ninth months of pregnancy; the second, after the period of quickening; the third, from the end of the third to the middle of the seventh month—abortion, with him, comprehending all premature expulsions of the ovum, and including, therefore, what are denominated premature labors by obstetric authors.

But besides these affections, which may be confined to the exterior of the cervix, or which, if they penetrate within, do

beyond it, and seldom reach so high as its superior orifice, Mr. Whitehead assigns *endo-uteritis* or inflammation of the lining membrane of the uterus as a cause of abortion, the product of conception being frequently thrown off during the first few weeks, or in the second or third month of pregnancy, accompanied with profuse discharges of blood, and often with intense suffering, similar to what takes place in the worst forms of dysmenorrhœa. In his opinion, indeed, dysmenorrhœa itself is, in the majority of instances, connected with this diseased state of the uterine mucous membrane.

• Dr. Bennet, on the other hand, considering *endo uteritis*, or, as he calls it, *internal metritis*, to be exceedingly rare, assigns it no place among the causes of abortion. Of the diagnosis of the disease I have spoken in the chapter on the Exploration of the Female Sexual Organs, and here I have to say that in my own practice I have often encountered it. It cannot, of course, be detected during pregnancy, and is altogether a more occult affection than ordinary inflammatory disease of the os uteri. But in the intervals of abortion, where it has repeatedly occurred, there is no great difficulty in discovering it. Notwithstanding Dr. Bennet's opinion, very peremptorily expressed, that inflammation of the cavity of the cervix has been often mistaken for it, I am not convinced of any fallacy in my own observations, because, tested by the criterion which he himself proposes, the inference is inevitable that *endo-uteritis* has not been of rare occurrence in my practice; for, first, the dilatation which he says invariably accompanies inflammation of the cavity of the cervix, *does*, as I have found, frequently extend to the os internum, allowing the free admission of the sound into the uterine cavity; and, secondly, therapeutic measures, carried only so far as to the os internum, do *not* effectually cure the inflammation.

My own observations are, therefore, confirmatory of Mr. Whitehead's, and stand in antithesis to those of Dr. Bennet, whose general accuracy I can safely avouch, and to whom I acknowledge my great indebtedness for having been put upon the only right track in the investigation of female maladies, with the inestimable privilege of having him as my guide. According to my apprehension, it is *endo-uteritis* more than the inflammation of the cervix, described by Dr. Bennet, which exercises the morbid reaction upon the ovum, spoken of by him, for it is hard to conceive how such effects can

result from cervical disease, but not at all difficult to comprehend them, when the mucous lining of the body of the uterus is involved. When it is diseased, it may be either altogether incapacitated to undergo transformation into the deciduous membrane or an imperfect metamorphosis of it may be the consequence. In the first case, abortion, and that speedily, must ensue, for the ovum cannot effect an attachment to the uterus, and may be degraded into a mole or a mass of hydatids; in the second, the disease may be communicated to the placenta and through it to the foetus, deranging its nutrition and variously affecting its growth, so as to produce, perhaps, even monstrosities. But this only by the by.

I have been struck with the frequent co-existence of endo-uteritis and anteversion or retroversion of the uterus, especially the latter form of displacement. Can it be that this complication has imposed even on Dr. Bennet, and led him to suppose that the internal orifice is contracted, when it is, in fact, quite patent? Be this as it may, I often find that in the introduction of the uterine sound, its point is arrested an inch or so above the external orifice, but by turning it backwards it easily glides into the uterine cavity even to its fundus, in such a manner as to give assurance that there is no hindrance whatsoever at the os internum.

From the foregoing evidence it cannot be doubted or denied that leucorrhœa at least is a very common complaint of pregnant females, and that those who are so affected are most liable to abortion. It might, however, be contended that leucorrhœa is, under such circumstances, and even in all cases, the essential malady, and that it arrests pregnancy by debilitating the organs concerned. Such a doctrine concerning the nature and importance of leucorrhœa is, in fact, advocated by Dr. Tyler Smith, in his recent valuable work on Leucorrhœa, and is entitled to our candid examination, *en passant*. Dr. Smith admits that, in by far the greatest number of cases of leucorrhœa the secretion is furnished by the cervical glands, and the only question is, is the discharge merely a hyper-secretion produced by simple irritation of the glands, or is it the consequence, and shall it be regarded as one of the symptoms of inflammation of the cervical mucous membrane? Dr. Smith takes the former of these alternatives, and we join issue with him by taking the latter.

To do full justice to Dr. Smith as an accurate observer, it should be stated that he admits and correctly describes the various parts, which others have pointed out; but

as mere sequelæ of leucorrhœa, whilst they maintain that these lesions are the primary disease—the results of inflammatory action—and that the increased mucous or muco-purulent discharge is secondary. Indeed, no one could investigate this class of diseases with the speculum and fail to observe the indications of inflammatory disorder which obtrude themselves upon his notice, in nearly all cases of serious defluxions from the female genital organs. The sequelæ of cervical leucorrhœa, in the order of their sequence, according to Dr. Smith, are, *vascular injection of the os and cervix uteri, epithelial abrasion, superficial ulceration, induration, and hypertrophy* of the same—all produced by the same cause, viz., the irritation of acrid discharges. Leucorrhœa is set up and maintained, from first to last, by irritation, and whatever lesions may follow in its train are nothing more than accidents, which are subordinate and comparatively unimportant.

In examining the pretensions of such an hypothesis the first question which naturally arises is, what is this irritation to which such consequence is attached? The *Medical Dictionary* replies, it is “the state of a tissue or organ, in which there is excess of vital movement, commonly manifested by increase of the circulation and sensibility.” A thousand causes may produce such a modification of vital action, and it is, in fact, of frequent occurrence in all parts of the system; but, if it be no more than mere irritation, it is transient in its duration, or else it induces a change in the organic condition of the part by which it may be perpetuated. The change most likely to ensue is inflammation, and it is only as its precursor that irritation is of much pathological importance. We cannot conceive of irritation, in the abstract, as indefinitely prolonged and continuing, for a great length of time, to derange the functions of an organ or a tissue invaded by it. If there be no organic alteration, which needs time to be repaired, the vital principle, when disturbed, soon recovers its equilibrium, and the healthy balance of the functions is restored.

Entertaining such views of the nature of irritation, which can scarcely, I think, be controverted, I cannot believe, with Dr. Smith, that it alone is sufficient to account for the vitiated and protracted discharges of leucorrhœa, and still less am I disposed to consider the inflammation which accompanies these discharges as their mere adjuncts—simple excoriations caused by their acrimony. Indeed, there is no reason to believe that any secretion of the body ever

becomes acrid or deviates materially from its natural properties simply on account of its being increased by any cause of irritation. The lachrymal secretion, for example, which is poured out so abundantly to wash away any irritant from the eye, is not altered in its qualities; and, though it may lave the cheek, it produces no excoriation along its track. Neither does the secretion of the muciparous follicles, in any part of the body, though furnished most plentifully under the influence of irritation of any kind, inflame the mucous membrane, but shields it rather from harm by bountifully lubricating its surface. Inflammation or some other morbid alteration of tissue would appear to be necessary to change the properties of the secretions and impart to them whatever acrimony they may acquire.

If, then, the inflammation, which is admitted to frequently accompany leucorrhœal discharges, be not produced by them, and cannot, therefore, be regarded as their sequela, what is the connection between them? And do they stand in the relation to each other of cause and effect?

In answer to this inquiry, it must be allowed that there is, probably, a precursory stage of leucorrhœa, in most if not in all cases, during which the discharge is simply an increased secretion of the mucus that naturally lubricates the genital mucous membrane. This may be called its irritative stage, and does not, probably, last long; if the irritation which produces it subside not spontaneously, or be not relieved by the increased secretion, which is its natural remedy, it passes into inflammation, and then the character of the secretion is apt to be changed and the discharge is perpetuated. The discharge may, therefore, in the first instance, be the product of irritation, but if it be long continued, or, being recent, if it be mucopurulent in its nature, it must be considered as one of the products of inflammation. Practically I know nothing of irritative leucorrhœa from my own observation; by which I would have it understood that I have no acquaintance with it through the speculum—the only means of determining certainly what may be the pathological state of parts so far removed from ordinary inspection. But Dr. Smith describes such a phase of the disease, and it is agreeable to analogy to suppose that it may exist. During its continuance, according to him, with but little constitutional or local disturbance, the os and cervix retain their natural size and color; but after a time the os uteri gapes, the cervix is relaxed, the superior part of

the vagina loses its tone, and some degree of prolapsus occurs, and then the ring of superficial redness appears around the margin of the os tincæ; the discharges are now increased in quantity and acidity, the redness is followed by destruction of the epithelium, to which succeeds ulceration, induration, &c. I cannot help suspecting, however, that there is some fallacy in such observations as these, as nothing like them has ever fallen within the circle of my own experience, though its circumference is by no means contracted. It is implied in such a sketch of the march of leucorrhœa that its irritative stage is of long continuance, and that patients suffer so greatly from it as to seek medical advice and submit to frequent examinations with the speculum. All this must be true, else opportunities for studying the disease in its non-inflammatory stage could not be enjoyed. Now, what I have to say emphatically is, that whilst I have granted that there may be a transient stage of mere irritation, I have rarely, indeed, specularly examined a patient, affected with leucorrhœa of sufficient gravity to justify this method of exploration, without finding unmistakable evidences of inflammation or ulceration. I am not, therefore, authorized by my own observation to believe that leucorrhœa, as a mere hyper-secretion, is a malady either of long continuance or of serious consequence, and it may be doubted whether, in the practice of this country, such an affection often comes to the knowledge of physicians most largely occupied with this class of cases.

If, then, inflammation be almost invariably associated with chronic leucorrhœa, and there be no reason to attribute it to acrid discharges, it is most consonant with the laws of general pathology to accord to it the precedence and to consider the increased and morbid secretions that attend it as its products. Such is admitted to be the fact in all analogous affections of the other mucous membranes. What pathologist has ever doubted that the mucous and muco-purulent defluxions attendant upon coryza, bronchitis, dysentery, &c., are purely the products of inflammation, or dreamed, for a moment, that such discharges are the primary and essential disease? Even so must it be with the uterus, unless, indeed, that organ be a *regnum in regno*, which some seem to think, who regard it as altogether peculiar in its physiology as well as its pathology.

I have dwelt thus long upon uterine inflammation, considered as a cause of abortion, and endeavored to extinguish the *ignis fatuus*, by which Dr. Tyler Smith would lure us away from it, under the

conviction that its discovery by the speculum and the treatment founded upon it constitute the only really valuable addition to our knowledge of the subject, which the last half century has produced.

SECTION III.

THE TREATMENT OF ABORTION.

The treatment of abortion may be divided into the *resistive*, the *palliative*, and the *prophylactic*—meaning by the first such measures as may be taken to avert the disaster when it is threatened; by the second, the conducting of it to as favorable an issue as possible, when miscarriage is inevitable; and by the latter, the prevention of it by the cure of any diseased state, which would be likely to occasion it or has already produced it in the previous pregnancies of the patient.

1. RESISTIVE TREATMENT.

The leading indication in the *resistive treatment* of abortion, is, to suppress uterine contraction, which, if it continue, we know must result in the expulsion of the ovum. To fulfil this indication various means may be resorted to, of which the chief are absolute rest in an horizontal posture, and the administration of opium in sufficient doses to quell the muscular fibres of the uterus. The tincture of the drug is, perhaps, as eligible as any other preparation of it, and may be given in the dose of 40 drops, in a little sweetened water, and 20 drops should be repeated every hour or two hours until the object is attained, should it be required to push the remedy even to the extent of producing decided narcotism. When the effects of the opiate wear off, should uterine contraction be renewed, the same course is to be again pursued, and even again and again, so long as just hopes may be entertained of preserving the pregnancy. Other preparations of opium, particularly the sulphate or acetate of morphia, may be prescribed if the practitioner prefers them, or if they agree better with the patient. Where from idiosyncrasy, opium in any form is inadmissible, a combination of extract of hyoscyamus and camphor, in the dose of 4 grains of the former and 6 of the latter, may be substituted and occasionally answers very well.

To control the accompanying uterine hemorrhage, if it be so copious as to deserve special notice, astringents may be adminis-

beyond it, and seldom reach so high as its superior orifice, Mr. Whitehead assigns *endo-uteritis* or inflammation of the lining membrane of the uterus as a cause of abortion, the product of conception being frequently thrown off during the first few weeks, or in the second or third month of pregnancy, accompanied with profuse discharges of blood, and often with intense suffering, similar to what takes place in the worst forms of dysmenorrhœa. In his opinion, indeed, dysmenorrhœa itself is, in the majority of instances, connected with this diseased state of the uterine mucous membrane.

- Dr. Bennet, on the other hand, considering *endo uteritis*, or, as he calls it, *internal metritis*, to be exceedingly rare, assigns it no place among the causes of abortion. Of the diagnosis of the disease I have spoken in the chapter on the Exploration of the Female Sexual Organs, and here I have to say that in my own practice I have often encountered it. It cannot, of course, be detected during pregnancy, and is altogether a more occult affection than ordinary inflammatory disease of the os uteri. But in the intervals of abortion, where it has repeatedly occurred, there is no great difficulty in discovering it. Notwithstanding Dr. Bennet's opinion, very peremptorily expressed, that inflammation of the cavity of the cervix has been often mistaken for it, I am not convinced of any fallacy in my own observations, because, tested by the criterion which he himself proposes, the inference is inevitable that *endo-uteritis* has not been of rare occurrence in my practice; for, first, the dilatation which he says invariably accompanies inflammation of the cavity of the cervix, *does*, as I have found, frequently extend to the os internum, allowing the free admission of the sound into the uterine cavity; and, secondly, therapeutic measures, carried only so far as to the os internum, do *not* effectually cure the inflammation.

My own observations are, therefore, confirmatory of Mr. Whitehead's, and stand in antithesis to those of Dr. Bennet, whose general accuracy I can safely avouch, and to whom I acknowledge my great indebtedness for having been put upon the only right track in the investigation of female maladies, with the inestimable privilege of having him as my guide. According to my apprehension, it is *endo-uteritis* more than the inflammation of the cervix, described by Dr. Bennet, which exercises the morbid reaction upon the ovum, spoken of by him, for it is hard to conceive how such effects can

result from cervical disease, but not at all difficult to comprehend them, when the mucous lining of the body of the uterus is involved. When it is diseased, it may be either altogether incapacitated to undergo transformation into the deciduous membrane or an imperfect metamorphosis of it may be the consequence. In the first case, abortion, and that speedily, must ensue, for the ovum cannot effect an attachment to the uterus, and may be degraded into a mole or a mass of hydatids; in the second, the disease may be communicated to the placenta and through it to the foetus, deranging its nutrition and variously affecting its growth, so as to produce, perhaps, even monstrosities. But this only by the by.

I have been struck with the frequent co-existence of endo-uteritis and anteversion or retroversion of the uterus, especially the latter form of displacement. Can it be that this complication has imposed even on Dr. Bennet, and led him to suppose that the internal orifice is contracted, when it is, in fact, quite patent? Be this as it may, I often find that in the introduction of the uterine sound, its point is arrested an inch or so above the external orifice, but by turning it backwards it easily glides into the uterine cavity even to its fundus, in such a manner as to give assurance that there is no hindrance whatsoever at the os internum.

From the foregoing evidence it cannot be doubted or denied that leucorrhœa at least is a very common complaint of pregnant females, and that those who are so affected are most liable to abortion. It might, however, be contended that leucorrhœa is, under such circumstances, and even in all cases, the essential malady, and that it arrests pregnancy by debilitating the organs concerned. Such a doctrine concerning the nature and importance of leucorrhœa is, in fact, advocated by Dr. Tyler Smith, in his recent valuable work on Leucorrhœa, and is entitled to our candid examination, *en passant*. Dr. Smith admits that, in by far the greatest number of cases of leucorrhœa the secretion is furnished by the cervical glands, and the only question is, is the discharge merely a hyper-secretion produced by simple irritation of the glands, or is it the consequence, and shall it be regarded as one of the symptoms of inflammation of the cervical mucous membrane? Dr. Smith takes the former of these alternatives, and we join issue with him by taking the latter.

To do full justice to Dr. Smith as an accurate observer, it should be stated that he admits and correctly describes the various lesions of the parts, which others have pointed out; but which he regards

delivered at the proper time! Verily, the close of the last century must have been the age of heroines as well as of heroes. Few, in these piping times of peace, will be disposed to imitate this example set them by Dr. Dewees, and there is no need to enter our caveat against it; but it deserves to be considered whether the tendency of the present time is not to the other extreme, and whether the lancet might not be oftener unsheathed to the great advantage of our patients, not only in abortion but also in other diseases.

2. PALLIATIVE TREATMENT.

A vitally important point remains to be settled. How long shall we adhere to resistive measures, and insist on their strict observance by the patient? Shall we persevere to the end, even until the ovum is expelled, in spite of our unceasing endeavors to prevent it? By no means. In the progress of any case, and even from the commencement in some cases, the process of gestation may be so utterly subverted, and there may be such unequivocal signs of the inevitableness of abortion as to render the attempt to avert it not only futile but positively pernicious. Whenever it shall be found, on careful examination per vaginam, that the os uteri is dilated and the inferior segment of the ovum engaged within its circle, all hope of successfully resisting abortion ought to be abandoned, and we should henceforth consider only the best and most speedy means of forwarding it. Resistive appliances can no longer avail anything but will surely do harm, by protracting the sufferings of the patient, consigning her to needless and injurious confinement to bed, and subjecting her to further losses of blood, which must continue to recur, from time to time, so long as the ovum is contained in the uterine cavity. Opium, the basis of the resistive treatment, must now be withdrawn, as it is no longer an object to keep under, but rather to promote, uterine contraction, without which the ovum cannot be safely dislodged.

An important branch of the *palliative treatment* is, therefore, to excite uterine contraction, which may be attempted by the administration of the *secale cornutum* in appropriate doses. Five to ten grains of the article, freshly pulverized, or a teaspoonful of the *vinum ergotæ*, may be given every four or six hours until the ovum is expelled. Admirable as are the oxytocic effects of this medicine in some cases, it cannot, unfortunately, be always depended on, and

we are frequently disappointed in our expectations concerning it. Having relinquished all hopes of preserving the pregnancy, we shall have no motive to insist on repose in a recumbent posture, but ought rather, at least in tedious cases, and when the strength of the patient will permit, to insist on gentle exercise, not only with a view to accelerate her riddance from what is now truly her burden, but also to prevent the general health from suffering by long confinement. The bowels must likewise be attended to, and a brisk purgative may be given occasionally in the hope that the bearing-down efforts at stool will assist in bringing away the ovum.

Should alarming hemorrhage appear after the hope of resisting abortion has been abandoned, we have a sure resource against it in the tampon, which cannot be too highly estimated or too confidently relied on, as a means at least of present security, provided it be properly applied. I have had frequent occasion to know that very loose notions are extensively prevalent concerning the tampon, and am not, therefore, surprised that many practitioners get no good from it. They appear to think that if a bit of sponge or lint be inserted in the vagina, which is soon buried in a mass of coagula, and offers no real obstruction to the flow of blood, the patient is plugged after the most approved fashion, and, if she bleed any more, it is not in the power of the tampon to stay the eruption of blood.

For a tampon I have not found any material so good as cotton batting (clean raw cotton), a double handful of which is to be rolled into a cylinder eight or ten inches long, and as large as can be conveniently introduced. Separating the labia with the fingers of the left hand, the cylinder should be pushed up to the os uteri by the index finger of the right hand, and then portion after portion of it should be crowded up until the vagina is filled to moderate distension from its superior to its inferior extremity. It is better to have a surplus of cotton than not enough, and upon it a compress should be applied and secured with a T bandage. It is evident that such a tampon is an effectual barrier to the further escape of blood by the vulva, and that which is subsequently effused must be retained in the cavity of the uterus, where it coagulates into a lamina between its inner surface and the ovum. Nor need we fear internal hemorrhage, for the uterus is incapable of being dilated to such a degree as to hold any considerable quantity of fluid, and, consequently, the bleeding vessels are soon subjected to such compression as must necessarily arrest any further extravasation of blood.

Valuable as the tampon is as a hæmostatic, it is scarcely less so as an oxytocic in abortive cases, by the irritation of the os uteri it produces, and the increased energy imparted through this medium to the uterine contractions. It is not at all unusual to find that, in a few hours, more powerful contractions are excited, which makes it necessary to remove the bandage and compress, and shortly afterwards the tampon and ovum are expelled together. Should the tampon, however, be tolerated for a longer time, it must be removed about once in every twenty-four hours and replaced by another, as it becomes soaked in bloody serum, which exhales an unpleasant odor, and might prove detrimental by its absorption. It is well, upon the removal of each tampon, to inject the vagina with fine soap and tepid water, or with the liquor sodæ chlorinatæ, largely diluted with water—a tablespoonful or two to the pint.

It has been already observed that, in cases of premature expulsion of the ovum, the process may take the course of labor at the full time, *i. e.* the membranes may rupture and the foetus be expelled first, to be followed by the secundines. When such is the order of events in abortion, it is always to be deprecated, for the secundines are much more apt to be retained than in natural parturition, and their retention may be so greatly protracted as seriously to impair the health of the patient, or even jeopard her life. Meanwhile, she is subject to frequent hemorrhages, and the practitioner is sure to incur censure for permitting this state of things to continue, though it may be wholly out of his power to help it. His disability proceeds from the nature of such retentions, which has been explained on a previous page. It may be impracticable to reach the secundines on account of the contracted state of the os uteri, or even could access to them be had, they may be so firmly adherent to the uterus as to render it impossible to separate them by any safe means. Under such circumstances, it is the dictate of reason as well as of experience not to attempt deliverance either by manual or instrumental interference, but to bide our time, carefully watching the patient, endeavoring to maintain the general health, and using all the resources at our disposal to urge the uterus to throw off the secundines. We should, from time to time, inquire into the condition of the os uteri and of the secundines by digital exploration, for the os will at length be found open and the loosened membranes occupying it. When this propitious conjuncture has arrived, our time for action has come. Placing the patient upon her back,

we bear firmly upon the hypogastrium with the left hand to depress the uterus as much as possible, whilst the right hand, previously well anointed with oil, is introduced into the vagina. The forefinger is then passed into the cavity of the uterus, even to its fundus if need be, and making a hook of it by flexing its last phalanx, it is to be turned upon the secundines to extract them as it is slowly withdrawn. Sometimes they can only be extracted in fragments, and, when this is the case, it may be necessary to reintroduce the finger several times (without, however, withdrawing the hand) to make sure that none is left behind. It is not always necessary to lodge the hand in the vagina; in very protracted cases, when the parts are much relaxed and the uterus low down, by strongly pressing the fundus with the hand, a finger may reach the ovum from the vulva and hook it away, as I have several times done.

The digital extraction of the secundines is necessarily a more or less painful operation; it is even acutely painful, when there is much sensibility of the organs. But, in such cases, the pain may be greatly diminished or even entirely annulled, and the operation itself may be greatly facilitated by the employment of chloroform, of which, as an obstetric agent, I shall speak more at large in a future chapter.

To meet the exigency arising from retention of the secundines, Dr. Dewees devised a little instrument, which he called a wire crotchet, a correct idea of which may be obtained from the annexed cut (Fig. 57), though it is in such general favor that it is found with all instrument makers, and in the obstetric outfit of most practitioners. The conditions already described existing, Dr. Dewees gives the following directions for the use of the crotchet:—

“The forefinger of the right hand is to be placed within, or at the edge of the os tincæ; with the left, the hooked extremity of the crotchet is conducted along the finger, until it be within the uterus; it is now to be gently carried up to the fundus, and then slowly drawn downwards, which makes its curved point fix in the placenta; when thus engaged, it is gradually drawn downwards, and the placenta with it.”¹

Fig. 57.

Dewees' wire
crotchet.¹ Op. cit.

Dr. Dewees strongly affirms the indispensable necessity of his crotchet, denying the possibility of delivering the secundines, while they are yet contained in the uterus, with the hand alone; at least, he declares that the attempt "must almost always fail," though he allows that when the larger portion of them are found protruding at the os tinæ, they may be pressed between the fingers and thus extracted. I have not found the difficulty to be so great as he represents, nay, I have seldom failed in accomplishing deliverance by the procedure which I have recommended, and I do not, therefore, appreciate his crotchet so highly as he did, and as many now do, for it is a maxim with me never to make use of an instrument when the hand will suffice.

Would that there were no more weighty objection against the wire crotchet; but I feel bound, in all good conscience, to refer to a deplorable case which fell under my cognizance, several years ago, wherein a practitioner, not unskilled in obstetricy, transfixed the fundus of the uterus with it, in trying to extract retained secundines after abortion at about the third month. The aperture made by it was so large as to permit several inches of intestine to pass through it into the uterine cavity, which, being mistaken for secundines, was drawn out of the os uteri by the instrument! It need scarcely be added that excruciating pain, obstinate constipation, stercoraceous vomiting—in a word, all the symptoms of strangulated hernia ensued, which destroyed the patient in a few days. I have thought it proper to record this disastrous case as a warning, especially to such of my younger brethren as may have a penchant for instruments. It cannot be doubted that the wire crotchet may have been used by Dr. Dewees with uniform safety and success; I am, nevertheless, persuaded that, in less skilful or experienced hands, it may do much more mischief than good.

3. PROPHYLACTIC TREATMENT.

The *prophylactic treatment* of abortion consists essentially in the cure of the uterine disease, which is, as we have seen, in by far the majority of cases, the true cause of it. Diseases of other organs may, doubtless, lead to the premature expulsion of the ovum, but these belong not to obstetric medicine, and do not, therefore, fall under our jurisdiction.

The local treatment, consisting in divers applications to the dis-

ased part, presently to be explained, is of more consequence than the constitutional, being, in fact, quite indispensable to the subdual of the disease. But the question here arises, can specular treatment be safely instituted during pregnancy? The answer is that, provided the disease is confined to the vaginal portion of the neck, undoubtedly it can. The experience of both Dr. Bennet and Mr. Whitehead, corroborated by that of others, including myself, warrants such a direct and unequivocal reply. After reciting a case of extensive ulceration of the neck of the uterus, existing during pregnancy and subdued by such treatment without abortion occurring, Dr. Bennet remarks, "I have always under my care a number of persons similarly suffering; and have no doubt that there are in this country, at the present time, thousands of females whose health and offspring are similarly endangered." And again, commenting on another successful case, he observes: "Such is generally the result obtained by judicious local treatment, especially if the existence of the inflammatory disease is discovered during the early months of pregnancy."

Mr. Whitehead appears to have directed his attention specially to the topical treatment of the uterine malady during pregnancy, in quite a large number of instances, and his experience may be considered as decisive of the question. He gives the details of a greater number of cases than Dr. Bennet, illustrative of the efficacy of the treatment in the several varieties of ulceration described by him, for which the reader is referred to his work. It will be sufficient for my purpose to draw attention to the summing up of the results, which can be expressed in a few words. Speaking of the 275 cases in which disease of the lower or of the internal part of the uterus was accurately diagnosed (which I have given on page 189, in tabular form), he remarks:—

"One hundred and forty-one of the above individuals have a second, some of them a third time presented themselves for treatment; being again pregnant, and laboring under a precisely similar train of symptoms as on the previous occasions. Their reappearance was in accordance with a preconcerted arrangement. The remaining one hundred and thirty-four I have lost sight of; they may not have found any need of further assistance; or, perhaps, have removed from the district.

"In fifteen of those who have been a second time treated, the issue has terminated unfavorably. Fifty-four have already arrived

at the full period of the process; of whom three were delivered of stillborn children, and in fifty-one the child was born alive and in health in each case. In the remainder, the treatment has been so far successful as to lead to a confident hope that the issue will be favorable."

The treatment of inflammatory ulceration of the uterus, with a view of preventing abortion, may, therefore, be undertaken during pregnancy, or after the mishap has occurred, in order to prevent its repetition in a subsequent pregnancy. It is hardly necessary to observe that endo-uteritis can only be treated subsequently to abortion, for the interior of the uterus is, of course, inaccessible while it is occupied by the ovum.

I shall, then, speak, first, of the treatment of inflammation of the cervix uteri, as it may chance to be met with either previous or subsequent to abortion, endeavoring to point out what modifications, if any, are rendered necessary by the pregnant state; and, secondly, of inflammation of the lining membrane of the uterus.

1. *Treatment of Cervical Inflammation or Ulceration.*—The key-stone of the treatment of the inflammatory and ulcerative affections of the cervix is the application to the diseased part itself of divers agents reputed caustics, though it be doubtful whether the chief one of these, namely, the nitrate of silver, is a caustic or only a peculiar and powerful antiphlogistic, which exerts its salutary influence by changing the mode of vital action of the diseased part. The therapeutic arch embraces other remedies, both local and constitutional, which are of greater or less value, such as the local abstraction of blood, injections into the vagina of mucilaginous fluids, or sedatives and astringents in solution, the regulation of the bowels, the exhibition, according to circumstances, of anodynes, alteratives, tonics, &c. Of these I shall proceed to speak in detail, and, first, of

(1.) *Local Depletion.*—The idea of abstracting blood directly from the cervix uteri by leeches applied through the speculum first occurred, I believe, to Dr. Guilbert, a French physician, who read a memoir on the subject, in 1821, to the Royal Academy of Medicine. This memoir was reproduced in 1826, with additional observations, in a tract published under the title of *Considerations Pratiques sur Certaines Affections de l'Uterus, &c.* By this remedy Dr. Guilbert succeeded in triumphing over rebellious chronic phlegmasiæ of the cervix which had resisted the whole routine of treatment hitherto

employed, and his success speedily led to the adoption of his practice by others.

When it is expedient to detract blood in this way, the operation may be performed without much difficulty. All that is necessary is to introduce a tube speculum of the proper size to receive the extremity of the uterine neck, and having carefully wiped off the mucus or muco-pus adhering to it, with a bit of sponge or cotton, to place the requisite number of leeches—four to eight—in the tube and push them up to the os uteri with a wad of cotton. If the external orifice of the cervix is found to be patent, it is well to plug it with cotton or lint, to guard against the possibility of one of the leeches finding its way into its cavity and fixing itself there—an accident which has never occurred in my own hands, though Dr. Bennet says it has in his, giving rise to the most agonizing pain. “I think,” he observes, “I have scarcely ever seen more acute pain than that which has been experienced by several of my patients under these circumstances.” The leeches, or as many of them as will bite, take hold speedily and gorge themselves in ten or twelve minutes, of which notice is given by the blood that flows from the bites, after they let go, and soaks through the cotton, or by the retreat of one or more of them, in a state of repletion, between the wad and speculum or the speculum and vagina. The bleeding from the leech-bites continues several hours, and may be so free as sensibly to affect the pulse of the patient and pale her countenance. I have, however, never but in one instance found it necessary to stop the bleeding, and then the tampon was resorted to with the desired effect. Dr. Bennet recommends for this accident the injection of a strong solution of alum into the vagina, and, if this fail, the exposure of the refractory bites by the speculum and their cauterization with the nitrate of silver.

I do not myself employ leeches to the os uteri now so often as formerly, having, in a good degree, substituted scarification, which may be more conveniently, expeditiously, and, I may add, economically practised. Many scarifiers have been recommended for this purpose; I have tried most of them, and have found none that answers so well as a narrow-bladed bistoury, an inch and a half long, with a handle adapting it to specular use. With this, free incisions of the vaginal neck should be made, radiating from the orifice to its circumference, and to obtain blood the mucous membrane must be divided in at least a dozen places. Dr. Bennet

speaks slightly of scarification as a means of local depletion, the incisions under his hands often giving but a few drops of blood, and says he has generally found that it only succeeds in occasioning a sufficient flow of blood to relieve congestion or inflammation when the cervix presents varicose veins that can be divided. I have, on the contrary, almost always found that, in the cases which most urgently called for local depletion, a copious effusion of blood may be obtained by scarification, properly performed—so copious that the speculum may be more than half filled before its withdrawal, and moderate bleeding continue for several hours, sometimes upwards of twenty-four hours.

Local bloodletting, in acute or subacute inflammation of the uterus, whether blood be abstracted directly from the organ itself or parts in its vicinity, was opposed by the celebrated M. Lisfranc,¹ on the ground that its tendency is to augment the existing congestion by increasing the fluxionary movement in that direction. Indeed, he maintains that congestion may be originated in this way, not only in this organ but in all parenchymatous organs—local bloodletting being admissible and truly depletory only in inflammatory affections of the membranous structures. In lieu of local he insists on general bloodletting practised on the principle of revulsion, *i. e.* small and frequently repeated venesections in the arm, with a view of changing the sanguineous current and directing it towards the superior parts of the body.

I shall not stop to discuss the doctrine of revulsive bloodletting, but I may be permitted to say that it is by no means established by clinical observation, and is scarcely consistent, in my judgment, with the physiology of the circulation of the blood. Be this as it may, however, we are at present interested in the inquiry, What proof has M. Lisfranc brought forward to establish his position that local bloodletting invites an increased afflux of blood to the uterus and aggravates its congestion? To ascertain what might be the comparative advantages and disadvantages of revulsive bleedings *in the arm* and local bleedings by leeches *in the vicinity of the uterus*, he treated ten uterine cases by the first method, and other ten by the second, with the result that *the former were made better and the latter worse* by the treatment. He does not say that those who were bled revulsively were cured, or that those who were leeched experienced

¹ *Maladies de l'Uterus d'après les Leçons Cliniques de M. Lisfranc fait à l'Hôpital de la Pitié, par H. Pauly, Paris, 1836.*

an exacerbescence of their particular malady, but, as between them, it was an affair of better and worse. As to the application of leeches to the os uteri itself it does not appear that it was put on trial in competition with revulsive phlebotomy, but it is, nevertheless, sweepingly condemned by M. Lisfranc, as not only calculated to engorge the uterus but liable to cause horrible suffering, with increased tumefaction and sensibility of the part to which they are applied.

This denunciation of the practice of applying leeches to the os uteri may terrify the inexperienced, but with those who are somewhat conversant with it, no other emotion but surprise can be excited by it. As often as I have myself applied leeches in this way, I have never seen increased congestion of the os, upon the most careful inspection three or four days subsequently. Nor have I ever known the patient to complain of much pain, or of scarcely any; but diminution of swelling, redness, and sensibility, together with a more or less marked abatement of pain, ordinarily follows the local bleeding. But in order that such favorable effects may be obtained, it is obvious that due attention must be paid to the general state of the system as well as to the local disease. If plethora exist, or if there be much vascular excitement, general bloodletting ought to be premised, and, in all cases, the more purely local the inflammation is, the more salutary will be the effects of local bloodletting.

I have spoken of local depletion first, because it is my usual practice to begin with it, when it is clearly indicated, and if necessary to repeat it, in four or five days, as a preparation for other remedies. With regard to its curative powers I am well convinced that it alone is not competent to extinguish long-standing inflammation of the cervix, no matter how frequently it may be repeated or how long it may be persevered in, and this is also the opinion of Dr. Bennet, who very properly cautions us against excessive and pernicious depletion. In many cases it is not needed at all, and it is seldom proper to repeat it oftener than two or three times. Indeed, strictly speaking, local depletion may be dispensed with, and yet satisfactory cures may be obtained by the principal remedy, namely, *cauterization*, only the treatment will be more tedious and the patient will suffer more, as the same author has proved on a large scale, at the Western General Dispensary, where three hundred cases were successfully treated without leeching.

(2.) *Cauterization of the Os Uteri.*—Concerning cauterization of

the os and cervix uteri much has of late been written, and yet the subject is not quite exhausted. It is, when discreetly managed, as I have more than once said, our main reliance in combating the disease under consideration, but very loose notions in regard to it are entertained by some, who seem to resort to it as a part of the routine that must be pursued according to prescribed rules. To obtain all the advantages of the remedy, it is evident that at least as much care must be taken to adapt it to the morbid condition of the parts as is requisite in the use of other remedies.

Cauterization is a comprehensive term, embracing a considerable variety of articles, which are brought to bear directly upon the inflamed and ulcerated cervix uteri through the speculum, of which the principal are, the *nitrate of silver*, *creasote*, *iodine*, the *acid nitrate of mercury*, *caustic potash*, and the *potassa cum calce*. It is not without design that I have placed the nitrate of silver at the head of the list, because the range of its application is greatest, and it is by far the most useful. In the majority of cases, indeed, I do not myself make any other specular application or find any other needful, and the form in which I employ it is the stick, taking care to procure a pure article. The cervix being embraced and fully exposed by the introduction of a proper-sized speculum, and the mucus or muco-pus being wiped from its external surface and also from the internal, if the disease extends into its cavity, there is no difficulty in conveying the solid nitrate to it with a porte-caustic (which may be a goose-quill for want of a better), and in passing it over the whole of the diseased surface, until a whitish pellicle is formed upon it. If it be necessary to cauterize the cervical canal, the stick of nitrate of silver ought to be an inch long, or a saturated solution of it, made extemporaneously by lightly drawing it over a strip of wet lint, may be substituted. The medicated lint may be pushed into the cervical cavity with a probe, and allowed to remain a minute or so, taking the precaution not to introduce the whole of it, in order that it may be more readily retracted by the speculum forceps.

The application of the nitrate of silver to the cervix does not generally cause much pain, but the patient usually complains, for a day or two, of aching and soreness in the uterine region, and some aggravation of the pains, which are symptomatic of the disease under which she is laboring. It is not at all unusual for slight hemorrhage to follow the application, and the leucorrhœal discharge

is always increased for the next three or four days, both of which may be regarded as favorable. One of the most common errors which I have noted is, the too great frequency of these applications; patients have often come under my care who had been treated by other physicians, and they have assured me that they had been cauterized, some every day, and others every second or third day. When the treatment is thus hotly pursued, it is evident that sufficient time is not allowed for the effects of one application to subside before another follows, and so a degree of irritation is kept up perpetually, which is preventive of a return of the parts to their normal condition. The nitrate of silver ought not, in my opinion, to be applied oftener than once a week, or once in every ten or twelve days, and when it has been kept up at this rate until six or eight applications have been made, or until there is perceptible improvement, it is sometimes judicious to suspend its use in order to see whether the disease will not wholly disappear under milder remedies.

The existence of pregnancy demands some precautions in the use of the nitrate of silver and other topical applications; at least, I have been led by my own observation to doubt the safety of cauterizing the internal surface of the cervix to any considerable depth, for it has appeared to me that expulsive contractions are more liable to be excited than when cauterization is limited to the external surface.

In respect to the *modus operandi* of nitrate of silver, topically applied, a diversity of opinion exists, and, perhaps, it is not after all very clearly comprehended. We are accustomed to speak of it as a caustic, but, if it deserves to be so considered, it is only in a qualified sense. Certainly it does not destroy the vitality of the part deeply, like caustic potash, and produce an eschar, whose detachment by an inflammatory process leaves an excavated ulcer to be healed by granulation. Nitrate of silver cannot be so applied, no matter how long it is held in contact with the mucous tissue, as to be followed by any such consequences as these. I feel warranted in making this unqualified assertion, for it has more than once happened to me, in cauterizing the interior of the cervix, that the stick of nitrate of silver has broken, and half an inch to an inch of it has been incarcerated in the cervical cavity. When this accident occurs, it is not always possible to extract the fragment on account of the contraction of the orifice excited by the nitrate, and I have

been compelled to let it remain. More severe pain and much more hemorrhage are apt to ensue than from ordinary cauterization, but I have never, on the closest inspection made a few days subsequently, satisfied myself that there was any loss of substance, and, in a week or ten days, the appearances are the same as though the part had been but lightly touched.

I conclude, therefore, that if nitrate of silver be a caustic at all, it is a very superficial one, and that it cannot be made to burn deeply. How, then, does it act, so as to exert its acknowledged control over the inflammatory and ulcerative processes? Perhaps the candid reply to this query is, we do not know; we know only the ultimate effects, and this knowledge is altogether empirical. I have, nevertheless, formed certain conceptions which I may be pardoned for emitting. The first and most conspicuous action of nitrate of silver is, I conceive, that of a *peculiar and most powerful astringent*, instantaneously condensing the tissue to which it is applied in the greatest degree compatible with its vitality. This astringent action is, as it appears to me, extended to a greater depth than the tissue to which the application is made, so that all the anatomical elements of the cervix are brought under its influence, the immediate effects of which are contraction of the capillary vessels, and likewise of the muscular fibres, diminishing the congestion and increasing the tonicity of the tissues. Its secondary action resembles that of cantharides more than that of a pure caustic; it does not, it is true, produce vesication—for the exceedingly delicate structure of the epithelium compared with the epidermis does not admit of this—but it excites an increased secretion of the part, which changes from serous to muco-serous and muco-purulent. The mucous surface, under its influence, may be conceived to be in a similar condition to the skin blistered by cantharides but protected by the unbroken cuticle, as the mucous surface is protected by a pellicle of coagulated albumen; the condition is one of benign inflammation, which is relieved by the increased secretion, and is remedial in its tendency. According to this view, the nitrate of silver, applied to the genital mucous membrane, may subdue its inflammation by an action analogous to that of cantharides applied to the skin to arrest erysipelatous inflammation.

A very different view of the therapeutic powers and uses of the nitrate of silver, in these cases, is taken by Prof. Meigs, in his elaborate *Report on the Acute and Chronic Diseases of the Neck of the*

Uterus, presented to the American Medical Association, and published in their *Transactions*, vol. vi. The reporter maintains that the contacts of the pencil of nitrate of silver with the diseased neck are either simply antiphlogistic, resolving inflammation, or escharotic, destroying the tissue, according to the length of time they are allowed to continue; i. e. light touches disperse inflammation, whilst heavy ones only aggravate the malady. The importance which he attaches to touches of the proper degree of levity, otherwise called "antiphlogistic contacts," may be inferred from the following citation: "Certain women, who are in vain treated for these cervix inflammations for months in succession by contacts of nitrate of silver, recover their health very speedily, upon a few such touches, lightly made—that is, made with due regard to the resolvent or antiphlogistic power of the drug."

I have already expressed the opinion, in the truth of which I am confirmed, that it is not possible to make the nitrate of silver act as an escharotic, even if we would, and it follows as a necessary consequence that I regard as untenable, the distinction of "touches," contended for by the reporter. Indeed, I have no hesitation in declaring that all contacts of the nitrate of silver are antiphlogistic, not, it is true, in their immediate but in their remote effects.

The fact mentioned in the citation above is explicable upon a different principle; the patients referred to, who were so long and fruitlessly treated before they came into the hands of the reporter, got well speedily, not by any virtue inherent in his "light touches," but on account of a suspension of treatment, which, it may be, was pressed too vigorously.

How often does it happen that patients, who have been drugged until patience ceases to be a virtue, fall into the hands of homœopaths, under whose "masterly inactivity" they soon recover? Shall their cure be attributed to the virtues of infinitesimals, and not rather to the cessation of too active treatment and the resiliency of their constitutions?

I should not have thought it worth while to argue this point were it not that the view, set forth by the reporter, is calculated, though not so intended, to intimidate practitioners in this line, by leading them to infer that the application of the nitrate of silver to the uterine neck is an exceedingly nice affair, requiring the skill of an artist for its proper execution, which, in truth, it is not. Should general practitioners acquire a conviction of this kind,

fearing to undertake such cases, they would consign them to hands already possessed of the requisite tact, thus defeating the benevolent efforts of the reporter to parcel out these cases among the brethren.

The *acid nitrate of mercury*, very much used by French practitioners in these and other cases, is unquestionably a caustic, producing, very promptly, a whitish eschar on the part to which it is applied, which is detached piecemeal in the course of six or eight days.¹ It does not, however, destroy the tissue to any great depth, and I do not remember ever to have seen exulceration perceptibly depressed below the level of the surrounding surface, follow its use, neither have I observed that it generally causes more pain than the nitrate of silver, though I think that it sometimes does. Being a liquid, it needs to be applied on a pellet of cotton or lint (a camel's-hair pencil will not answer, as it is instantly crisped by the caustic), held in the speculum forceps, and care must be taken not to have the pellet fully saturated with it lest it drop or run upon the sound parts. After neatly applying the acid nitrate to the affected surface, water must be conveyed to it, through the speculum, to render innocuous by dilution any surplus that may remain, which might flow upon the vagina when the speculum is withdrawn. With this view I was formerly in the habit of throwing up water with a syringe, as recommended by some writers; but finding this inconvenient without assistance, which we can seldom have in these cases, I soon substituted fine sponge as an aqueous conductor, with which it is easy thoroughly to wash the parts. It is not necessary to take such precautions in using the nitrate of silver, for, should ever so great an excess of it be applied, no corrosion need be feared that can result in permanent injury; but, on the contrary, the flowing of its solution upon the vagina is desirable, when its mucous membrane is involved with the cervix in inflammation, which is not unfrequently the case. My own practice is, however, to absorb any excess of nitrate of silver with sponge or cotton, when there is no vaginitis, not for fear of its caustic action, but to prevent its coming in contact with the vulva, where it always causes very severe pain, on account of the great sensibility of this organ.

¹ The preparation which I am accustomed to employ I have had made according to the formula of Dr. Bennet, viz: To 100 parts of mercury add 200 parts of pure nitric acid; dissolve the mercury in the acid with the aid of heat, and evaporate to 225 parts.

The acid nitrate of mercury is not appropriate to mere inflammation of the cervix, nor is it necessary in most cases of simple ulceration, consisting only in abrasion of portions of the inflamed mucous membrane. For these, the nitrate of silver is, as I have said, ordinarily sufficient. But when the ulceration is of the fungous kind, and the granulations bleed on being lightly touched, it is the proper remedy, and its effects are indeed admirable, a single application often changing the whole aspect of the morbid surface—repressing the granulations, which henceforward do not bleed so easily, and disposing the ulceration to heal. It may, however, be necessary to apply it a second time or oftener, but then it is important that a sufficient interval be allowed for all the effects of the previous application to be realized. I seldom reapply it in less than a fortnight, using the nitrate of silver once in the mean time. Pregnancy imposes no prohibition upon the use of the acid nitrate of mercury any more than upon the nitrate of silver.

Potassa or the *potassa cum calce* is the most potent of all the caustics employed in the treatment of the diseases of the cervix uteri, rivalling the actual cautery itself, which has also been resorted to in these cases. It is a caustic, indeed, disorganizing and breaking down the tissues and deepening its ravages in proportion to the time allowed for its operation. Although it is a valuable remedy when circumspectly used and restricted to the cases suited to it, yet it has been dreadfully abused in practice, and I almost shudder when I hear of physicians applying it, perhaps a score of times in the same case. Verily, we are a heroic people! On the other side of the Atlantic, much and irreparable mischief has, in my judgment, been done with caustic potassa even by men distinguished in the profession.

When this article is applied with the view and the effect of producing deep cauterization, a lesion of structure is the necessary result, which is irremediable as far as the restoration of the lost tissues is concerned. True, the lesion is repaired by the formation of new tissue to take the place of the old, but this is only patchwork—the cicatricial tissue being different from the original, whose uses are but indifferently subserved by it. Among other differences, it lacks the pliancy of the original; and how great a deficit is this in the labia uteri, should they be reduced, in large part, to this condition! Mutilation and deformity of the parts are sometimes the consequences of mal-adroitness in the use of caustic potassa,

one or both lips of the os uteri being destroyed by it, and extensive cicatrices of the vagina being formed, which contract the superior portion of the canal.

I have thought it proper to allude to these deplorable results, the more forcibly to impress upon the reader the extreme necessity of great caution in the use of so powerful a remedy. It ought, obviously, never to be resorted to except for the purpose of fulfilling an indication which milder and safer remedies cannot fulfil, and then the utmost care must be taken to guard against its pernicious effects. I know of no morbid condition of the os uteri except great indurated enlargement, resulting from an alteration in its organic state, that imperiously calls for deep cauterization, nor does this warrant it unless it gives rise, *per se*, to grave uterine symptoms, or is associated with inflammation or superficial ulceration, which cannot be subdued so long as the enlargement and induration continue. I have met with a few cases of pathological lesion of this kind, unaccompanied with any notable inflammation, which appeared to be the only assignable cause of uterine symptoms, and, with others, attended with marked inflammation and ulceration of the labia uteri of a very rebellious character. Under such circumstances, my own practice is to try milder remedies first, such as leeching, nitrate of silver, iodine, &c., and, if these fail, then to have recourse to deep cauterization. The object of this recourse is, not to destroy the affected part, root and branch, but to modify its vital state and bring it back to its normal condition. This may be accomplished, not by applying the caustic to the whole extent of the diseased part, but only to a small portion of it, with a view of making an issue merely, which acts remedially upon the surrounding parts by the suppurative inflammation excited to eliminate the eschar. The issue continues open ordinarily for a fortnight or upwards, discharging pus more or less freely, and under its influence the induration is softened and the enlargement diminishes. If only one labium is diseased, a single issue upon its most prominent part is usually sufficient; if both are involved, it is necessary to make an issue on each, first on the labium which is most implicated, and then on the other when the first has healed.

In applying caustic potassa with a view of forming an issue, several precautions are necessary for the protection of the contiguous parts from injury; a tube speculum must be used as the medium,

as a bladed one will allow the caustic, as it rapidly dissolves, to flow upon the vagina; the cylinder of caustic must be held steadily in contact with the point selected for cauterization and pressed firmly against it; to intercept and neutralize the caustic solution as it trickles down in the speculum, sponge or cotton, saturated with vinegar, must be placed underneath the os, so as to fill the space between it and the speculum; and, lastly, when the caustic is withdrawn, plenty of vinegar must be conveyed to the os uteri, in wads of cotton or pieces of sponge, effectually to destroy all superfluous caustic before the speculum is removed.

Deep cauterization, practised in the manner now described, hardly leaves a perceptible scar, and I concur with Dr. Bennet in the opinion that it does not unfit the cervix for its parturient uses. But the practice of so cauterizing the whole of the os uteri, though it has its advocates, cannot, in my opinion, be too severely reprobated. It is this, together with the careless and unskilful limited application of it, which has caused the mutilations that have brought reproach on cauterization in general.

What has now been said relates to the application of caustic potassa to the *exterior* of the neck; with a view to deep cauterization, indeed, its application to the *interior* is never admissible, and yet I have reason to believe that this mischievous error has been repeatedly committed. I have had cases sent me from the country, in which there was a total obliteration of the cervical canal and as great solidity of the neck as though it had never had a cavity—feeling like cartilage to the touch and looking preternaturally white through the speculum. The canal, it is true, may be restored by a surgical operation, but there is no reason to believe that the mucous membrane can be reproduced; a mucous, or at least a smooth surface, may appear upon the artificial canal, but it is not a fac simile of the original tissue, rich in mucous follicles, and fully equipped for the various and important offices of this part of the uterus. Is it not, then, mutilated?

Notwithstanding these strongly deprecatory remarks (and they could not be made too strong), we meet, every now and then, with cases of inflammation of the os uteri extending into the cervical cavity or having its principal seat there, which defy all milder remedial means, and justify, if they do not call for, the application of the potassa fusa. But then it is never as a caustic that it is to be used, but as a peculiar modifier and extinguisher of the ruthless morbid action, so firmly established in the mucous membrane. In

such cases, I have not scrupled to introduce the potassa cylinder into the cervical cavity even to its os internum, and the effects have been generally satisfactory. This is truly a ticklish operation, the success and even the safety of which depend altogether upon the manner in which it is executed. Having previously explored the direction and depth of the cavity with a probe, the cylinder is to be pushed in slowly to the requisite depth and instantly retracted, so as not to allow it time to produce a cauterizing effect; and then a pellet of cotton, soaked in vinegar, which had been previously prepared, should be inserted with a probe and permitted to remain a minute or so, to arrest the further action of the remedy.

Dr. Bennet sanctions the use of potassa fusa, in this cautious manner, for combating obstinate inflammation of the neck, and my own experience has fully satisfied me of its efficacy. But, it may be objected, if the remedy is not resorted to as a caustic, why not employ others which are milder and from which no mischievous consequences can possibly arise? Such is, in fact, the suggestion made by Dr. Tyler Smith, in the following paragraph: "In my opinion there is no good which can be effected by the more powerful caustics, which cannot be accomplished by the nitrate of silver, or by other means. It is true that (?) by the prolonged application of the nitrate of silver, loss of substance may be caused, but this is far less likely to occur with lunar caustic than with the more powerful escharotics. It is also true that some practitioners apply the more violent caustics so lightly that they do not exceed the milder medical action of the nitrate of silver, but in such cases it would be quite as well to use the safer remedy where a caustic is required."¹ This remonstrance against potassa fusa, it will be observed, proceeds upon the assumption that the action of all remedies, belonging to the same class, is identical, and that there is no other difference but plus and minus between them—a doctrine which must crumble under the slightest critical manipulation. The truth is that there are no two articles of the materia medica whose therapeutic action is precisely the same, notwithstanding their proximity in a scientific classification. Take ipecacuanha, and tartarized antimony, for instance; they are both emetics, yet they are very dissimilar in some of their effects, and one cannot be substituted for the other. Suppose a practitioner, who had frequently witnessed the harsh operation of antimony, were to propose to discard it on this account and sub-

¹ On Leucorrhœa, p. 188.

stitute ipecacuanha; and, in support of his proposition, allege that the milder emetic is possessed of all the remedial virtues of the harsher, provided the latter be administered in very reduced doses, who that has the least experience with these articles would be converted to his opinion? Dr. Smith has seen something of the harsh operation of potassa, profusely applied, and his recoil from it is quite natural; but it is to be regretted that he too hastily, as I think, denounced it even as a caustic, and, in his revulsion, lost sight of the intrinsic differences among medicines, to such a degree as to imagine that lunar caustic and potassa fusa are the same, save only one is stronger than the other.

But though potassa be a highly valuable remedy, when discreetly used, in certain affections of the uterine neck, it must not be forgotten that the pregnant state contra-indicates its application. The immediate impression made by it is so much more powerful, and the inflammatory reaction runs so much higher, than when the nitrate of silver is applied, that I should apprehend that abortion would be necessarily provoked by it. I speak not from experience on this point, for I have never made trial of the remedy during pregnancy, and know not that any other practitioner has.

Of *iodine*, *creasote*, and *other* topical remedies in diseases of the os uteri, much need not be said. I have frequently employed both the articles mentioned, and occasionally others, such as the *sulphate of copper*, but I esteem them as altogether subordinate to those which we have just been considering. Creasote, in point of potency, is nearly equivalent to nitrate of silver, although its *modus operandi* is different. Like the nitrate of silver, it instantly forms a whitish pellicle upon the abraded surface of the mucous membrane, which is not so apparent if there be only inflammation without abrasion; like it, also, it exerts an astringent influence, which is quite manifest, and which might be, perhaps, better expressed by designating it as *styptic*, *i. e.* expending its force principally upon the bloodvessels. I do not remember, in any instance, to have witnessed hemorrhage following its use, and on this account I have occasionally substituted it for the nitrate of silver, with good effect, where rather profuse sanguineous discharge constantly supervenes upon the argentine application. In other cases, in which the disease has resisted the long continued use of the nitrate, and yet more potent caustics were not indicated, I have had recourse to creasote with benefit, simply on the principle of change, if I may so call it. The

tincture of iodine I have chiefly employed with the same view, but in cases of hypertrophy and induration, where I have been reluctant to resort to the Samsons, I have used it in preference to the nitrate of silver, and think that I have often obtained good effects from it.

(3.) *Intra-Vaginal Injections*.—Various medicinal substances in solution may be beneficially applied to the os uteri, without the mediation of the speculum, by means of a suitable syringe in the hands of the patient herself. In order that any decided benefit may accrue from this kind of medication, it is obvious that the disease must be confined to the exterior of the cervix, and that the medicament be adapted to the existing morbid action. It is equally obvious that the medicated solution must be made to operate as a douche upon the diseased part. From inattention to some or all of these pre-requisites, many fail to derive any advantage from intra-vaginal injections and relinquish them in disgust. When it is considered that the opposite walls of the vagina are naturally in apposition, there can be no doubt that the common “female syringe,” as it was unworthily designated, utterly failed to throw the fluids with which it was charged to the superior portion of the canal, nay, it did not meet even the rugæ near the ostium vaginæ. The capacity of this little straight instrument was as insufficient as its performance was contemptible—holding not more than a few teaspoonfuls. The syringe for administering these injections ought to hold at least six ounces, and have a long tube bent nearly to a right angle with the barrel; or, better still, a pump with a flexible, gum-elastic tube, or the instrument acting on the principle of the pump, made principally of caoutchouc, may be used for the purpose. The patient should be particularly directed to insert the tube three or four inches in the vagina, or as high as it can be conveniently introduced, so that when the injection is made, it may shower the os uteri. To deny that an inflamed or ulcerated os uteri may be benefited by proper lotions thus applied would be tantamount to the denial that this class of local remedies can be usefully employed in similar diseases of the other mucous membranes. Remedies used in this manner must, however, necessarily be in weak solution, otherwise they would act injuriously on the sound parts with which they are unavoidably brought into contact, and hence it is that they are mostly resorted to as adjuvants rather than principals in the process of cure.

The injections which I am in the habit of directing most frequently, are the *mucilaginous*, the *sedative*, and the *astringent*, according to the indications of each particular case. If the inflammation is comparatively recent and acute, and is accompanied by unusual heat and sensibility of the parts, an infusion of flaxseed or slippery elm may be prescribed, either cold or tepid, as may be most agreeable to the patient, and often we cannot do better than to continue it throughout the treatment. Benefit will, however, be occasionally derived from changing the injection under such circumstances, and then the acetate of lead, in the proportion of ℥ij to the quart of rain water, with the addition of a wineglassful of vinegar, I have found to answer very well. To cases of longer standing and attended with considerable leucorrhœal discharge, together with relaxation of the vagina and prolapsus uteri, astringent injections are better adapted, and I have found none superior to the sulphate of alumina and potassa (alum), and sulphate of zinc. They may be used separately or in combination, but my usual practice is to combine them in equal parts, *i. e.* ℥j to ℥ij of each to the quart of water, commencing with the weaker solution and gradually increasing its strength. I have sometimes prescribed tannic acid in conjunction with alum (the favorite prescription of Dr. Tyler Smith), and the country people often use decoction of white oak bark and alum, which is nearly the same; but, as I have said, my preference, founded on close observation of the effects of various injections, is decidedly for alum and zinc. These various injections, being weak remedies, need to be frequently repeated—at least twice a day, and thrice is not too often—observing to suspend them during the menstrual period.

Pregnancy imposes no prohibition on intra-vaginal injections; on the contrary, the leucorrhœal discharge, accompanying the inflammatory diseases of the uterine neck, being at such time unusually abundant, there is greater necessity for such lotions, not only to restrain the discharge, but also for the sake of cleanliness.

The local treatment of inflammation and ulceration of the os uteri, the principal points of which have now been explained, is, doubtless, of chief importance; at the same time, our success will much depend on the attention bestowed upon the preservation and improvement of the general health. It could not be otherwise than that an organ, which exerts such a powerful sympathetic reaction upon the whole economy, as does the uterus, must draw other organs

along with it, in its aberrations from the orbit of health and variously derange their functions. I shall not attempt to trace these various sympathetic derangements, or to speak in detail of the remedies that may be necessary for their correction—for their name is legion, and they would lead me too far astray from the path that is marked out before me. I may, however, observe that the functions of the digestive organs and of the spinal cord are more frequently disordered than any others—there being but few cases of uterine disease unattended by dyspeptic symptoms and various local neuralgiæ, referable to spinal irritation. At the same time, the general state is one of debility, with more or less anæmia, rather than the reverse; and hence, tonics, such as the ferruginous preparations in conjunction with the bitter tinctures or infusions, are commonly indicated, and the diet should be nutritious. The habitual tendency of the bowels is to constipation, which should be sedulously obviated by mild laxatives, or, what is far better, enemata of cold water taken every morning, when there is not a natural motion. To promote the same object, as well as with a view to its general influence upon health, daily out-door exercise ought to be taken, unless there is some manifest contra-indication. Much injury, I am persuaded, results from too absolute repose and too prolonged confinement to the bed and sick-room, and it has appeared to me that the local disease is not unfrequently only the more firmly established by this sort of *nimia diligentia doctorum*. In the commencement of the treatment, especially if the local inflammation be somewhat acute and exercise painful, it is doubtless expedient to confine the patient to a recumbent posture; but so soon as her condition will permit, she ought to be advised and even urged to take regular and systematic, but moderate exercise. Pregnancy is no special bar to this counsel, not even though miscarriage may be feared on account of its having occurred at a previous period. The advice of Professor Meigs on this point is commendable, though it be not in unison with the voices of the profession, when he exhorts his patient “to walk out or to ride out daily, to receive and return visits, go to the party and the ball, and try to forget that you are pregnant, acting, indeed, as if you were not; be always, however, a little careful of using violent muscular effort or awkward positions of the body; and, above all things, do not tumble down stairs.”¹

The additional advice, immediately subjoined, is also excellent,

¹ Op. et Epist. cit.

viz: the use of an anodyne enema of laudanum and starch, every night at bedtime, as a part of the prophylactic treatment of abortion, which, he says, he learned from the late Dr. Physick, but I beg to dissent from the learned author of the *Letters, &c.*, concerning the rationale of the opiate enemata in such cases: instead of their allaying the abstract and naked irritability of the uterine muscular fibres, they subdue, as I conceive, the irritation dependent on inflammation of the cervix, which might otherwise be transmitted to the spinal cord and reflected thence to the body of the organ, giving rise to excito-motory muscular action.

2. *The Treatment of Endo-uteritis.*—It hardly need be observed that the remarks which I shall make concerning the treatment of inflammation of the uterine mucous membrane, considered as a cause of abortion, are equally applicable to the disease, whether it has actually occasioned abortion or not, or whether the patient has ever been pregnant or not. Endo-uteritis may supervene to abortion or delivery at the full time, and operate as a barrier to future conception, and it may also be met with subsequent to the child-bearing period or previous to marriage, existing in connection with disordered menstruation, most commonly with dysmenorrhœa.

In recent cases of endo-uteritis or when the inflammation is acute, accompanied with some degree of enlargement and considerable tenderness on digital pressure in vaginal examination, the treatment must be commenced with local depletion, by the application of leeches to the os uteri or to the hypogastrium or sacrum; or, if the os be patent, disclosing the mucous membrane of a vivid red color and tumid with blood, a sufficiently free bleeding may be procured by scarification.

Rest in a recumbent posture ought to be enjoined; the bowels should be freely purged by saline cathartics, and if there is much pain in the uterine region an opiate may be administered at bedtime, to which may be often conjoined a few grains of calomel or blue mass.

When the acute symptoms have subsided, either under treatment or by lapse of time, the local treatment becomes of paramount importance. But how shall remedies be directly applied to the affected membrane? And can they be introduced into the uterine cavity and diffused over its surface with impunity? These are important questions, for analogy would lead us to believe that if the uterine mucous membrane be as tolerant of efficient topical remedies as other

membranes of its class, it must likewise be equally modified by them. But whether such tolerance exists or not, and supposing its existence proved, whether the inference from analogy is sustainable or not, can only be ascertained by clinical observations and experiments.

The first writer, so far as my limited researches extend, who conceived the bold design of pursuing inflammation even into the penetralia of the uterus, was M. Melier, in a memoir entitled *Considérations Pratiques sur le Traitement des Maladies de la Matrice*, published in 1833, in *Mémoires de l'Académie Royale de Médecine*, tom. ii., in which will be found a most graphic description of inflammation of the lining membrane of the *cervix*, which the author suspected often extends into the body, but he makes no positive affirmation as to its limits. Finding this internal inflammation rebellious to the treatment which he had so successfully pursued, when it is confined to the exterior of the neck, he determined to attack it with *intra-uterine injections* of various kinds.

To accomplish his purpose he made use of a hydrocele syringe with a gum-elastic tube, which was introduced into the *cervix*, to a short distance above its external orifice, with a view of injecting its cavity, first with simple water to absterge it of its viscid mucus, and then with aqueous solutions of medicinal agents, according to the indications to be fulfilled. He had reason to believe that the entire cavity of the womb was injected by his procedure. Sometimes there was reflux of the injected fluid before the tube was withdrawn; in other cases, it was retained until expelled by uterine contraction, accompanied with sharp pain, of transient duration, followed by no accidents or dangerous consequences. M. Melier reports favorably of these uterine injections, though he states expressly that the cases in which they were employed were very protracted and difficult to subdue—a confession which proves his good faith to the satisfaction of every one practically conversant with such cases.

Since the publication of M. Melier's memoir, injection of the uterine cavity has been resorted to by many practitioners, some of whom profess to have obtained satisfactory results from it, whilst others question its safety as well as its utility. In 1840, M. Vidal (De Cassis), who is a great champion of the practice and has charge of a female hospital in Paris, the *Lourcine*, published an essay¹ on

¹ *Essai sur un Traitement Méthodique de quelques Maladies de la Matrice.*

the subject, in which he endeavors to account for the different results and conflicting opinions, which he ascribes to—

1st. Difference of procedure. 2d. Errors of diagnosis. 3d. An erroneous interpretation of the symptoms consequent to these injections.

To obviate the objection that there is danger of the injection passing along the Fallopian tubes and thus penetrating into the peritoneal cavity, he performed a number of experiments on the dead body, characterized, according to the manner in which they were performed, as—1st. Forcible injections. 2d. Abundant injections. 3d. Moderate injections.

It would not be interesting or instructive to transcribe the details of these experiments; their result may be briefly expressed. The subjects were women of different ages, most of whom had borne children. In some, the uterus and its appendages were left in their natural connections; in others, they were removed from the body. Both large and small syringes were used for the injections, with long canulæ inserted in the mouth of the womb, secured, in some, by ligatures around the cervix to prevent reflux of the fluid. When a large syringe was used, and the injection was made forcibly or abundantly, it often penetrated into the uterine veins, and sometimes exuded by one or both Fallopian tubes. When, however, the injection was made with a small syringe, and of course in moderate quantity and with little force, it always returned by the mouth of the womb by the side of the canula, and never passed into the Fallopian tubes, or reached the peritoneal cavity.

These experiments indicate, as M. Vidal thinks, the kind of injections which ought to be made in the living, and accordingly he recommends for the purpose a *bivalve speculum*, a *small syringe*, not containing above twenty grammes of liquid, and a *small silver canula*, with several little holes in its bulbous extremity. Care is to be taken to expel the air from the syringe, and other precautions are also inculcated by him, such as—

1st. Injections ought not to be practised three days before the approach of the menses, or three days after their cessation.

2d. They ought to be deferred six months after accouchement or abortion.

3d. They ought to be taken on an empty stomach (*La femme devra être à jeun*). M. Vidal, moreover, usually prepares the

patient for these injections, which he distinguishes as *intra-uterine*, by injections thrown with great force from a large syringe on the os uteri, having previously exposed the part by the introduction of a bivalve speculum, and this is his *intra-vaginal* injection. External affections of the cervix he treats by intra-vaginal injections, which may be repeated daily, and his favorite injection of this kind is a decoction of walnut leaves. The intra-uterine injections are not repeated so frequently, and a weak aqueous solution of iodine and the iodide of potassium, viz: a half grain of the former and one grain of the latter to the ounce of water, is most commonly preferred by him.

The *effects* produced by uterine injections are, according to M. Vidal, very variable. Some females experience no pain, either immediate or consecutive, whilst others complain, at the moment, of a burning sensation in the womb or pain in the iliac regions, which either gradually abates or increases in intensity. If no pain is felt at the time, the patient may be attacked with a violent abdominal pain or colic, an hour after the operation, accompanied with so much tenderness and febrile reaction as to simulate peritonitis, for which it has been mistaken; but M. Vidal insists that the phenomena are purely nervous, and will subside, in a day or two, without the employment of antiphlogistic remedies, which indeed do not even abridge their duration. Dr. Ashwell is of a different opinion. In his chapter on leucorrhœa, he relates several cases of what he deemed hysteritis consequent to uterine injections of a mild kind; in one of them nothing but tepid water was used, which, however, was followed by such "marked evidence" of hysteritis, as to call for bleeding, both general and local, purgatives, fomentations, and a strict antiphlogistic regimen.¹

Other authors have witnessed alarming symptoms and even a fatal issue following these intra-uterine injections: "I have always treated the uterine cavity with great respect," Dr. Henry Bennet observes, "owing partly, no doubt, to a painful lesson, which I received long ago, whilst house-surgeon to M. Jobert de Lamballe, at the Hôpital St. Louis. A fine young woman, twenty-six years of age, died under my charge from acute metro-peritonitis, the result of an injection into the uterine cavity. She was suffering from enlargement of the womb, and it was only discovered after death

¹ A Practical Treatise on the Diseases peculiar to Women.

that the cause was the presence of a small fibrous tumor. *The os internum being thereby opened, the injection penetrated freely into the uterus, and caused the inflammation which rapidly destroyed her.*"

In my own practice I have not resorted to uterine injections for the last several years, having been deterred from their employment by the violent and apparently alarming symptoms which were occasioned by them in a few of my cases. The symptoms were sudden severe pain in the uterine region, accompanied with cramps, coldness of the extremities, and depression of the pulse. Brandy and laudanum, repeated at short intervals, together with frictions and sinapisms to the extremities, afforded relief, in the course of a few hours, and no injurious consequences ensued. But I was reluctant to incur the risk of such sudden alarms and agitations, even for the sake of all the benefit that might be expected from the practice. This was the more to be regretted, as I had unequivocal evidence of the efficacy of the treatment where it could be borne without these alarming effects.

Considering the subject in all its bearings, it occurred to me that such sudden and violent symptoms must be owing more to the *mode* in which the remedies were applied than to actual intolerance of the internal surface of the uterus. Acting upon this view, instead of abandoning the use of topical remedies altogether, I began to introduce them upon strips of lint, pushed into the uterine cavity with a probe or sound. I first applied the nitrate of silver in this way, notwithstanding that experience had taught me that a weak solution of it—two grains to the ounce of water—injecting into the uterus, might be followed by the alarming symptoms that have been detailed. I used, in commencing, a very weak solution, carefully prepared by the apothecary, and finding that it caused no more pain than an ordinary cauterization of the os uteri, I was emboldened to make it stronger and stronger, until I ceased to have it prepared by weight and measure, but took a strip of lint, wet it thoroughly with water, and passed the stick of caustic over it till it was imbued with, as I judged, a saturated solution. I have cauterized the internal surface of the womb in this manner, in quite a considerable number of cases, without any of the alarming consequences incident to intra-uterine injection. No practitioner hesitates, in cervicitis, to push the nitrate crayon into the neck to cauterize the whole extent of its internal surface. Experience warrants me to declare that we may, with as little hesitation, treat

the internal surface of the body in the same manner, only a saturated solution is preferable to the stick, on account of its liability to break and be retained in the cavity—an accident which sometimes happens in the neck.

The foregoing remarks on intra-uterine injections and cauterization of the interior of the uterus, by means of strips of lint imbued with nitrate of silver, are extracted from my Lectures in reply to Dr. West, published in the *Western Journal of Medicine* upwards of two years ago.

Since that date I have cauterized the cavity of the uterus a great many times, not only with the nitrate of silver, but also with creasote, sulphate of copper, tincture of iodine, and even with the acid nitrate of mercury, without any more pain than attends cauterization of the cervix, and without any evil consequences whatever. My own multiplied clinical observations compel me to dissent from the prevalent, if not universal, opinion that the cavity of the body of the uterus is a sanctum, which is much more sensitive than the neck, and will not brook any form of therapeutic approach—an opinion, with which even Dr. Bennet is strongly imbued. I say again that I have not found it so; but, on the contrary, I treat the cavity of the body topically as familiarly and with as little apprehension as I do that of the neck. It will be esteemed paradoxical that a cavity which will not bear the injection of a solution of the nitrate of silver, of the strength of two grains to the ounce of water, will, nevertheless, bear to be cauterized with a saturated solution after my method—and so it doubtless is; it does not, however, concern me to explain paradoxes but only to avouch facts, which can be confirmed or refuted by others. The paradox in this instance will, I suspect, find its solution in the peculiar anatomical circumstances of the uterus, in the fact of its being the medium of opening a communication with a great serous cavity, that of the peritoneum, through the Fallopian tubes—the only example in the whole animal economy of a serous cavity communicating with another lined by a different kind of membrane. Through these apertures it is not unreasonable to believe that fluids injected into the uterus may find their way and excite peritoneal irritation or inflammation. It is true that the experiments of Vidal, already referred to, appear to negative this supposition; but these experiments, it must be remembered, were performed on the *dead* body, and the inferences deduced from them may, therefore, be wholly inapplicable to the living, in which vital

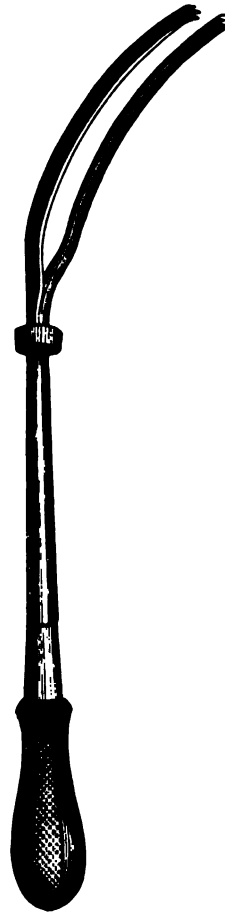
motions may convey even the smallest quantity of fluid far beyond the point to which it is artificially projected. But whether a drop of the fluid of intra-uterine injections can penetrate through the Fallopian orifices or not, the fact remains that this kind of topical medication is pregnant with danger, whilst that which I have recommended is innocuous.

The safety of intra-uterine cauterization being established, we are concerned to inquire into its therapeutic value, and I have no hesitation in affirming that it is as efficacious in subduing inflammation, in its various grades, here as elsewhere. In scores of cases, where it had either been overlooked by others or deemed inaccessible, I have been enabled successfully to combat it chiefly by local treatment.

The ulterior results of the topical treatment of endo-uteritis have appeared to me to be as satisfactory as those usually obtained in cases of inflammation of the os and cervix uteri.

To facilitate the introduction of medicinal agents in a state of solution, I often make use of a little instrument which might be called a fluid porte-caustic, of which Fig. 55 will give a correct idea. It is made of steel, and consists of two branches, springing from a common stem, which diverge abruptly at their origin, and then run parallel with each other to their termination. The extremity of each branch is dentated, the teeth of one fitting into those of the other, so that when they are closed by a sliding ring, they present a smooth and roundish point, like that of the uterine sound. The whole instrument measures nine inches and a half in length, and the handle is made rough

Fig. 58.



Fluid porte-caustic.

on the side, corresponding to the concavity of the branches. A pellet of lint or cotton is placed between its branches, so as to project slightly at its point, which, being secured by a sliding ring, is wet with the medicated solution and introduced into the uterus through the speculum, used for ocular sounding, represented on page 108.

The frequent co-existence of displacements—deviations of the uterus, as they are often called—especially anteversion and retroversion, with inflammatory lesions of the organ, has been oftener than once adverted to in this work. In my own practice I am accustomed to meet with retroversion and the modification of it called retroflexion much more frequently than any other deviation, and this much more often in connection with endo-uteritis than with simple inflammatory ulceration of the os. The relation which subsists between the inflammatory affection and the accompanying displacement has been a fruitful theme of discussion, and yet eminent uterine pathologists continue to hold directly antagonistic opinions. Some, as for example Dr. Henry Bennet, in England, and M. Depaul, in France, maintain that uterine inflammation is the prior and paramount malady, the displacement being only secondary and quite subordinate, whilst others, as Prof. Simpson, and MM. Amussat, Velpeau, &c., hold the opposite view. As might be expected, these opposite pathological views conducted to opposite methods of treatment—the one being directed to the subdual of inflammation to the neglect of the displacement; the other, to the restoration of the uterus to its natural position, and its retention there, the inflammation being overlooked or receiving but slight attention. To retain the uterus in its place, a great variety of mechanical means, particularly pessaries, have been resorted to, including even a modification of the stem pessary to be inserted in the uterus itself. It is obvious that no two modes of treatment can be more diametrically opposite than are these, when exclusively pursued, and as they are founded upon directly conflicting views of uterine pathology, I could not, if I would, eschew the controversy, though I shall not pretend to enter minutely into it.

Dr. Henry Bennet may justly be ranked among the ablest advocates of inflammation *versus* displacement, as the cause of the sufferings incident to uterine molestation, and his arguments in support of this view may be found in one of a series of articles, entitled *A Review of the Present State of Uterine Pathology*, published in the

London Lancet for last year. I cannot spare time or space to inquire particularly into the validity of his reasoning, but the assertions which, he thinks, experience authorizes him to make relative to the transcendent importance of inflammation, are very strong and pointed. For many years he has practically ignored all manner of uterine displacements, whether prolapsus, anteversion, retroversion, &c., and casting aside pessaries, bandages, &c., aimed his therapeutics at the accompanying inflammation and its sequelæ, with the result of freeing his patients from uterine suffering, and that too whether the organ continues displaced or, as most frequently happens, spontaneously resumes its normal position. "I speak," Dr. Bennet observes, "within very reasonable limits when I say that scores and scores of my former patients, who had for years suffered from uterine ailment before they were treated by me, are now living like other people, perfectly free from inconvenience of any kind, walking, standing, running, and going through all the ordinary ordeals of life, although the uterus has remained displaced."

Dr. Bennet does not pretend that these halcyon days return speedily, but, speaking like a man of enlightened experience, he says that some time is required after treatment—three, six, or twelve months—to allow Nature an opportunity, under proper hygienic and dietetic discipline, to fine down swelling, and to restore healthy tone and action. Alas! that Nature's opportunity should ever be desecrated by being rendered subservient to quackery in any of its protean disguises! How often it happens that patients in this transition state, reminded by an old ache or pain that all is not yet quite well, fall into the snares of empirics, who reap where they have not sown, and teach even the patient to revile her true healer! If I speak feelingly, it is because I have felt. But a truce to moralizing.

The doctrine, which magnifies displacements of the uterus at the expense of inflammatory or other lesions of the organ, is more ably defended by Prof. Simpson than by any other writer. It was first fully set forth by him in an article published in the *Dublin Quarterly Journal of Medical Science*, May, 1848, "*On Retroversion of the Unimpregnated Uterus*," and has since reappeared in his *Obstetric Works*, First Series, p. 188. The indications to be performed, he maintains, in the treatment of retroversion of the uterus, are: 1. To remove, if necessary and possible, any morbid action in the uterine structures that may exist along with the displacement. 2. To restore the

verts to its normal position. 3. To use means to retain it in its reposed and normal position. Under the first head, he distinctly recognizes stages of hypertrophy, and inflammation of the uterus as not infrequently ensuing along with retroversion, and admits the propriety of removing or at least moderating these morbid states by appropriate treatment before engaging with the other indications to be fulfilled, particularly when they are apparently the cause of the retroversion; more frequently, however, they are considered by him to be the effect of the retroversion, and then they will not yield to treatment but absolutely persist until the second and third indications have been accomplished.

The second indication, as he truly says, is easily fulfilled: nothing is easier than to restore the uterus by the sound or bougie, but to retain it there is much more difficult. The difficulty is in fact, so great that it required all the mechanical ingenuity of the Scottish professor to surmount it. He had pessaries of several kinds fabricated, all agreeing, however, in possessing a stem, scratching upwards, of two inches in length, which is to be inserted in the cavity of the uterus and retained there by vaginal and perineal pieces attached to it. For a description and figures of these uterine pessaries I refer to the article just cited.

The success obtained by Prof. Simpson, with his mechanical or *perineal pessary*, appears, from his own report, to have been considerable. The first patient upon whom he tried the riskful experiments, with, as he himself says, "extreme anxiety and great misgivings," was almost entirely incapacitated from walking, by retroversion of the uterus, but after wearing for some weeks a wire pessary in her uterus, she so far recovered as to bear two children, one in Scotland, and, subsequently, another in India. No cases are particularly detailed by Prof. Simpson, but he avers, in general terms, that these uterine pessaries will cure many, but by no means all cases of retroversion of the unimpregnated uterus. When properly fitted and adjusted, the instrument can be borne, in most cases, for even long periods (ten months in one instance, with perfect safety and without any pain or inconvenience, though it is admitted that, in some cases, so much irritation is created as to render its withdrawal necessary in a few days.

Taking Drs. Bennet and Simpson as the representatives of the adverse opinions in controversy, and attributing to them equal candor, we are bound to conclude that both the inflammatory lesion

and displacement are operative in giving rise to uterine symptoms, and that sometimes the inflammation, and at other times the displacement are most operative. Upon no other hypothesis, as it appears to me, can we account for the success, *in any degree*, of such opposite modes of treatment, for, if inflammation were the sole universal cause of uterine suffering, in these complicated cases, it is evident that the restoration and retention of the uterus *in situ* by any means, and least of all by spiking it with a pessary, could not cure the inflammation. There is, then, no other alternative but to accredit displacement or discredit Prof. Simpson's testimony, and, for my own part, I cannot hesitate to accept the former. At the same time, I am thoroughly convinced that the inflammatory element preponderates over the purely mechanical, in by far the majority of cases, and that it is justly entitled to the largest share of our attention, in the treatment of the compound malady.

There is, I conceive, no more difficult problem in uterine pathology than to determine the relation which subsists between uterine inflammation and displacements in general. Our worthy representatives, as we have seen, occupy antipodal positions on this question, Dr. Beunet holding that inflammation is the cause of the displacement, and Dr. Simpson holding, with only slight qualification, that displacement is the cause of the inflammation. With unaffected deference, I would suggest that both may be wrong. Of the sufficiency of inflammation to cause uterine displacement there can be no rational doubt, and this may be fairly held to be the cause, when it exists in a very marked degree, and the history of the case warrants the inference that displacement has taken place in a gradual manner. But, on the other hand, displacement may be considered as the cause of the inflammation, when it has occurred suddenly and completely, and the inflammation is not particularly prominent or conspicuous. Although it may not be possible to make this discrimination in all cases, yet, in very many, I am satisfied that it is not only possible but practicable, and the necessity of a correct diagnosis is too obvious to be insisted on.

When inflammation is recognized as the predominant morbid state of the uterus, it will, of course, claim our principal attention, and, if it be presented in the form of endo-uteritis, it is to be treated in the manner already recommended.

But what shall be done for the accompanying displacement? Shall it be let alone, as Dr. Bennet advises, trusting to its sponta-

neous rectification, after the inflammation has subsided, or to its ceasing to give trouble, should it remain displaced? Or shall we, after Dr. Simpson, seek to restore the uterus to its normal situation? In reply to these questions, I would advise that all proper efforts be made for the restitution of the uterus to its lost position, and this whether the displacement be regarded as primary or secondary, for, in either case, we can have no assurance that it might not, if its malposition be not remedied, continue to give trouble though it be freed from inflammation.

To retain the uterus in place, in cases of anteversion or retroversion, there can be no doubt but Dr. Simpson's pessary is the most effectual instrument that has been devised, or, indeed, can be imagined, and in his hands it appears to have had a good measure of success, and to have been productive of no evil consequences. Others, who have employed it, have not derived equal advantages from it or been equally fortunate in doing no positive harm. In the practice of M. Valleix and others in Paris, the employment of the intra-uterine pessary was followed by fatal results from acute metritis or metro-peritonitis in six cases, as it appears from M. Depaul's report to the Imperial Academy of Medicine, cited in a previous chapter, and yet M. Valleix was an enthusiastic advocate of it! The possibility of such an issue in even one out of a hundred cases appears to me to be a very formidable, if not an insuperable, objection to Prof. Simpson's uterine pessary, when all the circumstances are taken into consideration, such as the non-fatal tendency of the disease for which it is applied, and the probability that the patients might have been restored to at least a comfortable degree of health by less hazardous treatment.

But apart from such considerations as these, this kind of mechanical contrivance for holding the uterus in its proper situation appears to me to be the most unphysiological of all others that have been proposed. The uterus, in its natural state, possesses great mobility, amounting almost to locomotion, by which it is enabled to accommodate itself to the various disturbing influences by which it is surrounded. Pressed upon by the contractions of the diaphragm and abdominal muscles, during great muscular exertions, it descends towards the vulva; pushed up during coitus, its fundus is tilted forwards and its cervix backwards, whilst considerable distension of the urinary bladder necessarily retroverts it; in a word, it readily adapts itself to its circumstances, whatever they may be.

Now, to rigidly fix such an organ upon a metallic axis, and leave it no possibility of escape from the thousand impulses which it daily receives, is to place it in a more unnatural predicament than any malposition can possibly be. The intra-uterine pessary is, however, not more unphysiological than unpathological. Rarely is inflammation altogether absent in these displacements, and sometimes it is very intense; to irritate the uterus, in such a state, by thrusting a foreign body into it to compel it to keep its place is a species of surgery which would not be tolerated in the outward parts. That some of Prof. Simpson's patients should not have been able to bear his pessary is not surprising; the wonder is that any of them could bear it, whilst it is a miracle that many of them got well. But I wonder at my own boldness in speaking so freely of any plan of treatment, recommended by an author whom I so greatly respect and for whom I entertain sentiments of such unbounded admiration.

After all, the intra-uterine pessary fulfils its indication—albeit it performs its duty somewhat too sternly—that is, it keeps the uterus in the place allotted it by obstetric authority, with its metallic axis coincident with the axis of the pelvic brim. And this is more than I am warranted to say in favor of any other pessary that has been recommended for retroversio uteri, not even excepting Prof. Meigs' elastic annular pessary, so much lauded by him in his report to the Association, heretofore cited. In the figure given to illustrate its application and uses, the elastic annular pessary performs its function admirably, but, from the trials I have made of it, I am afraid it will only perform *figuratively*. Speaking plainly and without antithesis, I am bound to say that the annular pessary, though tried by me and as carefully adjusted as possible, in a half dozen cases, failed altogether to keep the uterus in place, and, what is worse, it could not keep its own place.

If it should be inferred from the foregoing remarks that I have but a poor opinion of pessaries, the inference would be logical and just, for though I have tried all kinds of pessaries, not excepting Dr. Simpson's, I have derived but little benefit from them, whilst they have been a fruitful source of vexation to myself and of annoyance to my patients. As, however, I have admitted the validity of the indication to restore the uterus to its natural position, it may be reasonably demanded, if pessaries are unavailing or mischievous, how is the indication to be accomplished? After I had discarded

pessaries in the treatment of endo-uteritis complicated with retroversion, I was led to conjoin repeated replacement of the uterus by the sound and cauterization of its cavity, whilst the organ is *in situ*, and by this method of treatment which I may venture to call my own, have obtained more satisfactory results than by all other methods which I had previously tried.

Simply replacing the uterus by the sound will avail nothing, for no sooner is the sound withdrawn than the organ reverts to its vicious position, not seeming to possess more stamina than a cap of wet paper. In truth, there is a marked deficit of tonicity of the uterus, in such cases, the consequence, probably, of the enervating influence upon its muscular fibres of chronic inflammation of its mucous coat. Similar relaxation is often met with in the vulvo-uterine canal, in cases of vaginitis. But if the uterus be cauterized *in situ*, the disposition to revert is not so strong, owing, I suppose, to the constricting effect of the caustic upon all the tissues of the organ, and thus tonicity, a vital property, is invoked to perform what has been hitherto attempted by mechanical powers. Whether this explanation be accepted or not, I have found the matter of fact to be that in by far the largest number of these complex cases, which I have treated during the last five or six years, by the time the inflammation is subdued the vicious position of the uterus is rectified. Some of the most satisfactory cures I have ever witnessed have been cases of this kind, treated after this method; females, who had been suffering since the date of their last confinement, eight or ten years previously, being restored to health and renewed fecundity.

CHAPTER VI.

THE FLOODING OF ADVANCED PREGNANCY AND INCIPIENT PARTURITION.

PARTURITION is the complement of utero-gestation, and succeeds as orderly as day follows night, unless something occur to precipitate or postpone it. Among the causes that may operate to bring utero-gestation to a premature close, there is none more potent than uterine hemorrhage, whilst at the same time nothing can befall a pregnant woman fraught with greater danger. Appearing, then, on the confines of pregnancy, and leading, not unfrequently, to the premature expulsion of its products, uterine hemorrhage forms, in a practical point of view, a fit connecting link between the study of pregnancy and parturition, developing some of the great cardinal principles of obstetrics.

SECTION I.

THE CAUSES OF FLOODING.

The slight sanguineous discharges from the uterus, which may take place at any stage of pregnancy, on account of a turgid or over-active state of its vessels, or which may proceed from an ulcerated surface, are not now under consideration; but those sudden, profuse discharges, which have aptly been denominated flooding, and always imply the separation, to a greater or less extent, of the placenta from the uterus, and the laceration of the utero-placental vessels. Such hemorrhages differ radically from those occurring in early pregnancy in connection with abortion, in that they take place from ruptured vessels, and are, therefore, traumatic rather than pathological in their nature, resembling the bleeding from the stump of an amputated limb more than an epis-

taxis or hæmoptysis, to which the hemorrhage of abortion may be likened.

When the placenta is detached in part from its usual connection with the uterus, it is probable that blood is effused slowly at first, owing to the resistance of the uterine paries on the one side, and that of the ovum on the other; but when it has found its way to the os uteri, there is sudden gushing forth of what had accumulated, followed by more rapid extravasation, which now finds a ready outlet. Hence, upon its first eruption, the discharge consists, in large part, of dark grumous blood, but presently becomes more fluid and of a brighter color, and continues so until it is arrested. Instead of issuing from the os tinæ, the extravasated blood may be retained in a kind of capsule formed by the separated portion of the placenta and the inner surface of the uterus, and *concealed hemorrhage* is the consequence, of which we have several well-authenticated cases on record. Baudelocque relates, briefly, four instances of concealed hemorrhage in his *System of Midwifery*; Mr. Ingleby has given us several others in his lectures, and I have myself met with one. It must, however, be a rare occurrence, as Dr. Meigs informs us, in his *Obstetrics*, that he has never met with a "sample" of it. One of the most remarkable cases of which I remember to have read is recorded by Mr. Ingleby: the patient was reported to be in convulsions, and died before he reached the house, although, as the respectable surgeon employed in the case reported, there had been no apparent hemorrhage, and the liquor amnii, which had been discharged, was colorless. On *post-mortem* examination it was found that the form of the uterine tumor was strikingly conical, and on cutting through the uterine parietes, so as barely to receive the end of the scalpel, fluid blood rushed out like the stream in venesection. "By means of a sponge 60 ounces of liquid blood were collected, and, on enlarging the aperture, a coagulum was removed which weighed 61 ounces, the whole comprising 121 ounces of blood; the placental edge was still adherent, so that there had been no escape of blood underneath the membranes. The circumference of the placenta was inordinately large." The conical elevation of the uterus opposite to the sanguineous effusion shows clearly that room is made for it chiefly by the yielding of the walls of the uterus, though the placenta doubtless contributes by being depressed to the utmost degree which the slight compressibility of the ovum will allow.

In a large proportion of cases of flooding, it has been found that the placenta is attached to the mouth of the womb, as it is commonly expressed, and this abnormal attachment is itself a cause of hemorrhage, and most frequently the premature expulsion of the foetus, independently of any other agency whatever. These cases are frequently designated *placental presentation* and *placenta prævia*, and have received, as they deserve, a large share of attention from the most eminent practitioners in our department. Placental presentation, though rare, must have occurred in all ages and countries, and yet it appears to have escaped the notice of accoucheurs until comparatively recently, and the true nature of it was not understood until the celebrated M. Levret published his observations, about a century ago.

In his "*Dissertation sur la cause la plus ordinaire, et cependant la moins connue, des Pertes de sang qui arrivent inopinément à quelques femmes dans les derniers temps de leur grossesse, et sur le seul et unique moyen d'y remédier efficacement,*" he incontrovertibly establishes the fact that in all cases where the placenta is found over the mouth of the womb prior to delivery, it has grown and become rooted there, and necessarily gives rise to hemorrhage by its disruption, in advanced pregnancy or at the time of parturition. By a singular coincidence, Dr. Edward Rigby, of Norwich, in England, came to the same conclusion, as the result of his own observations, in a large number of cases of flooding, before he was aware of the researches of M. Levret. The fruit of his investigations was given to the world in his work, entitled "*An Essay on the Uterine Hemorrhage which precedes the Delivery of the full-grown Fœtus,*" which gave him not only an European but world-wide reputation. There is no ground to impeach the veracity of Dr. Rigby (and God forbid that I should do it), yet the historical fact is, that Levret's *Dissertation* was printed several years before Dr. Rigby's *Essay*, the first edition of the *Essay* being published in 1776, whilst the *Dissertation* is contained in the *third* edition of Levret's Works, published at Paris in 1766. The date of the first edition is unknown to me, as likewise the precise date of the first appearance of the *Dissertation*, but it must have been several years previously; and one of the cases adduced in confirmation of his doctrine bears the date of March 18th, 1752, whilst Dr. Rigby's first case happened December 1, 1772. There is abundant evidence that the presence of the placenta at the mouth

of the uterus, in cases of flooding, had been noted long before Levret's time, and the true light had begun to dawn upon his immediate predecessors—upon M. Puzos among others. It had often been noted by the great Mauriceau, who was too good an observer to overlook it; but I cannot agree with Prof. Meigs that the nature of it was understood or even suspected by Mauriceau, although it be true, as the learned professor observes, that “he gives (at full length?) the description of twelve cases of placenta prævia most admirably managed by himself;” but this only proves that a very accurate knowledge of the whole nature of obstetric cases is not always necessary for their successful treatment. It is the pleasant and instructive manner of this good old French author, in reciting his cases, to give his reasons for all his procedures, mingled with reflections on the men and things of his day, and in this way we get a clear insight into the workings of his great mind, and almost fancy he is holding a familiar colloquy with us. Now, let us hear him talk in relating to us his eighth observation.

“Le 18 Aoust 1669 j'ay accouché une femme qui avoit une tres-grande perte de sang, causée par le détachement de son arriere-fais qui se presentoit le premier au passage, avec un pied et un genouil de l'enfant. Et comme cet arrierefais estoit à demi-sorti du passage, lors que fus arrivé pour secourir cette femme, j'essayé aussi tost de la tirer, afin qu'il ne m'empeschast pas de jouir facilement des pieds de l'enfant; mais ayant reconnu qu'il estoit encore en quelque façon retenu, non pas qu'il fust adherent au lieu où il est ordinairement attaché, qui est le fond de la matrice, mais cette adhérence qui le retenoit en cette occasion, ne procedoit plus que des membranes de l'enfant, auxquelles il tenoit encore fortement; ce qui fit que ne le pouvant tirer facilement sans en déchirer toutes les membranes, je fus obligé de repousser aussi-tost en dedans la partie de cet arrierefais qui se presentoit au passage, et incontinent après je tiray dehors l'enfant qui estoit encore vivant, mais si foible qu'il mourut une heure ensuite. Le prompt secours que je donnay à cette femme, qui estoit preste d'expirer avec son enfant dans le ventre, à cause de la grandeur de sa perte de sang, sauvá la vie à la mère qui se porta bien ensuite, et procura le baptesme à son enfant, dont il auroit esté privé sans cette assistance.”¹

¹ Traité des Maladies des Femmes Grosse. quatrième ed. Paris, 1694.

In this case, and others like it, Mauriceau plainly tells us that when the placenta is found at the mouth of the womb, it is *entirely detached* and is retained only by its connection with the membranes, and that he would have removed it at once, since it was but a hindrance to delivery of the infant, had it not been for its adhesion, not to the uterus, but to the membranes. Besides, had Mauriceau ever conceived, for a moment, that the placenta might be organically united to the neck of the womb, so remarkable a deviation from what his predecessors had esteemed an immutable law of gestation, would surely have been considered worthy of distinct notice, and yet he nowhere in his voluminous writings describes the placenta as *attached* to the cervix, but constantly speaks of it as *presenting* first, and of its presentation necessarily involving its *complete detachment*. Hence his extraordinary haste, in all his cases of flooding, complicated by this untoward accident, to deliver by turning, in order that he might rescue the child from its imminent danger, and procure for it the grace of baptism. Supposing it to be an established maxim in obstetrics, that, in all cases of flooding from placenta prævia, it is incumbent on the practitioner to deliver as promptly as possible by bringing down the feet of the child (and this was the maxim in his day), then it is plain that an acquaintance with the abnormal attachment of the placenta was not necessary to enable Mauriceau to treat these cases both properly and successfully; for whether the placenta had been united to the cervix or had only fallen upon it after its detachment from the fundus, was wholly immaterial; in either case, there was flooding, and the precept enjoins delivery: Mauriceau was not the man to disobey.

I have hitherto spoken somewhat vaguely of this abnormal attachment of the placenta—this *lusus naturæ*, as it might truly be called—and indeed it is difficult to refer to it in strictly accurate phrasology. When it is remembered that during the first six months of pregnancy, the cervix uteri preserves its cylindrical figure and keeps both its orifices, but especially the superior, tightly closed, it is plain that the placenta is implanted originally over the cervix, but attached, nevertheless, to the parietes of the inferior part of the *body* of the uterus. It is with the body, and the body only, that it forms an organic union by the reciprocal passage of blood-vessels between them. This much must be conceded by all obste-

tric physiologists; but concerning the further connections formed by the placenta with the uterus, during the last three months of gestation, there is room for difference of opinion.

Those who hold to the commonly received explanation of the development of the gravid uterus, must needs believe that as the cervix expands from above downwards, the placenta obtrudes itself into its infundibuliform cavity and becomes organically attached to it, so that by the time the cervix is completely unfolded, it may reach the os uteri and adhere to its circumference. Such is substantially the view of M. Levret, which has been adopted by nearly all subsequent writers, who speak of the placenta's being attached *to the os uteri* or *to the internal surface of the cervix*. Prof. Simpson evidently proceeds upon their idea as though it were one of the demonstrated truths of obstetric science; thus in his very able and original article "*On the Spontaneous Expulsion and Artificial Extraction of the Placenta before the Child, in Placental Presentations,*" in speaking of the dangers of delivery by turning, he observes—"For in placenta prævia the structure of the cervix is extremely vascular, being permeated by those numerous and enlarged vessels which are always developed, in a high degree, in the interior walls opposite the seat of the placenta."

Notwithstanding that this dogma has been so generally received, it is unsupported by any proof that should entitle it to our credence, and is at irreconcilable variance with the very doctrine with which it was intended to square, and which seems, indeed, to necessitate it. The doctrine to which allusion is made is, that during the latter third of pregnancy, the neck of the uterus is prodigiously unfolded to contribute its quota to the grand cavity provided for the lodgment of the growing fœtus. I do not remember any estimates of authors as to the proportion furnished by the neck, but from the tenor of their remarks and their plates of the gravid uterus, I may safely say that it cannot be less than one-third. Inasmuch, then, as the fully developed uterine cavity measures say twelve inches from the os uteri to the fundus, the inferior third, viz., four inches of its parietes, must be furnished by the expanded cervix. It is evident, therefore, that the area of the developed cervix is at least equal to that of the full grown placenta, and in order that the placenta may implant itself upon it, even to the borders of the os uteri, it must either be enormously hypertrophied during the last three months of gestation, or it must be transplanted from the body

to the cervix uteri. The latter alternative, being simply ridiculous, will not be defended by any one, nor do I see how the first can be maintained with any show of reason; for, first, the supposed hypertrophy must take place at the centre of the placenta instead of its circumference, which is contrary to the law of its development, and implies that new cotyledons spring up among those whose formation is the oldest; and, secondly, were there such an expansion of the placenta, as the doctrine supposes, the entire organ, in placenta prævia cases, ought to be twice as large as under ordinary circumstances. This follows from the well known fact that the growth of the placenta is nearly, if not quite, complete by the sixth month of gestation, when its cervical implantation must begin, and new placental structure, equal in extent to that already formed, must be produced.

If this reasoning be valid, the conclusion follows that *the placenta is not, and in the nature of the case never can be, implanted upon the internal surface of the neck of the womb.* Accurately speaking, it is, in placenta prævia cases, implanted upon the inferior part of the body of the uterus over the cervix and around the margin of its internal orifice, and there it abides until its disruption takes place. When the internal orifice relaxes and the short neck of the uterus opens as parturition approaches, in the manner explained in the chapter on Pregnancy, then the finger can reach and feel the placenta, attached all around, not to the os tinæ or external orifice, but to the internal or cervico-uterine orifice.

Some may say, "This is fastidious refinement, even allowing that it has truth for its basis. It is enough for us to know that the placenta may be found offering at the mouth of the womb." But I am not of their way of thinking, and hold that there is as much need of reason, aye, of the highest reason, in elucidating the problems of obstetrics as those of any other science. I shall, therefore, make no apology for digressing in order to observe that, if the close proximity of the attached placenta is inexplicable in consistency with the common doctrine of uterine development during pregnancy, the facts of placental presentation go far to refute the doctrine. It must be obvious that, if the cervix be so largely amplified, as the doctrine alleges, and the placenta be incapable of corresponding growth to occupy it, the placenta, in cases of abnormal implantation, would be ultimately stretched across the uterine

cavity, upon a level with the junction of the cervix with the body of the organ, and thus be far removed from the os uteri. That it is not thus situated, but, on the contrary, that it is found so near the os, proves that the neck is not magnified, but simply opened, just as the proximity of the membranes to the os, and their adhesion round about it, in normal pregnancy, prove the same embryological truth, as was observed in the chapter on pregnancy.

The implantation of the placenta over the cervix is in itself a cause of flooding during the latter months of pregnancy, and this so almost constantly and necessarily, that the flooding thus induced is denominated, by Dr. Rigby, "*unavoidable hemorrhage*," in contradistinction to that which may occur from the casual detachment of the placenta from its normal connection with the uterus, and which he called "*accidental hemorrhage*."

This division of uterine hemorrhages into the "accidental" and "unavoidable" is convenient, and has been generally adopted by authors, who consider it of greater or less importance according to the views they entertain in respect to the practical bearing of the distinction. Dr. Rigby maintained, as we shall presently see more particularly, that the two kinds of hemorrhage required diverse treatment; and the distinction which he proposed was, with him, of transcendent importance. It must be observed, however, that the unavoidableness of hemorrhage, in cases of cervical implantation of the placenta, was no discovery of his; at least, it had been distinctly declared, before the publication of his Essay, by M. Levret, who also insisted, with great emphasis, on the same mode of treatment as that advocated by Dr. Rigby.

The rationale of uterine hemorrhage, in the latter months of pregnancy, where the placenta is implanted over the cervix, is not difficult; but perhaps it is more obvious on the theory of Levret than on that which I have adopted; and this may have contributed to recommend the theory. It is well known that hemorrhage, though inevitable in such cases, is variable as to the period of its occurrence. It may show itself as early as the seventh month; or it may be deferred until the eighth or ninth, or even to the commencement of labor at the full time. Now, supposing M. Levret's view to be correct, these irregularities are easily explained. In fact, we have only to suppose, with him, that the placenta is attached around the os uteri itself, and it is at once apparent that the connections of the placenta need not be broken up until the os uteri

begins to dilate under the influence of regular parturient contractions. If, on the other hand, we suppose, with him, that the placenta is attached *to*, or just *beneath* the internal orifice, we see why it is that hemorrhage comes on in the seventh month, for this portion of the neck is dilated at about that period by the natural growth of the gravid uterus. If, finally, the placental attachment occupy an intermediate portion of the neck, hemorrhage will occur, sooner or later, in proportion to its distance from the internal orifice, and proximity to the external.

But, though this explanation is apparently more simple, it is not more satisfactory than that which may be given in consistency with the opinion that the placenta is attached to the inferior part of the body of the uterus, more or less directly opposite the cervix, as M. Cazeaux has shown. The explanation is as follows: During the first six months of pregnancy, the uterus is developed at the particular expense of the fibres of the fundus of the organ, whilst, during the last three months, the fibres of the inferior part of the body are rapidly developed, insomuch that the further increase of size in the uterine cavity is acquired principally by the expansion of this portion of the uterus, as its pyriform shape in the early, and its perfectly ovoidal shape in the later months of pregnancy proves. This fact in respect to the development of the uterus, taken in connection with a fact already adverted to, viz., that the placenta has nearly completed its growth by the sixth month of pregnancy, affords a ready explanation of the occurrence of hemorrhage. When the placenta has its usual insertion, its development corresponds with that of the portion of the uterine walls upon which it is implanted, and there need be no hemorrhage; but, when it is inserted over the neck, or even in its immediate vicinity, the matured placenta cannot follow the rapidly expanding parietes of the uterus, and hence the stretching and rupture of the utero-placental vessels, and the unavoidable production of hemorrhage.

From this explanation, it appears that, whether we suppose that the placenta is attached to the interior of the cervix or to the inferior part of the pyramidal body of the uterus, the mechanism of hemorrhage is the same. In either case, the development of the uterine parietes, taking place more rapidly than the placenta can follow, causes a separation of the maternal from the fetal tissues: rupture of the connecting vessels, and hemorrhage, are the inevitable consequences.

It has recently been much disputed, whether, in utero-placental hemorrhage, the blood proceeds from the area of the uterus, made bare by the detachment of the placenta, or from the external surface of the placenta itself, separated from the uterus; and although the controversy has sprung up in connection with *unavoidable* hemorrhage, it is equally pertinent to *accidental* hemorrhage: the immediate source of the bleeding being necessarily the same in both cases. The late Prof. Hamilton, of Edinburgh, maintained, in his *Practical Observations*, that the blood flows chiefly from the placental surface; and so confident was he in the correctness of this view, that he recommended astringent injections for its suppression, which he supposed acted by constringing or tanning the exposed surface. The opinion of Dr. Hamilton has been embraced and very ably defended by his distinguished successor, who fills at present the chair of midwifery in the University of Edinburgh, whilst it has been controverted, with much skill and logical acumen, by Dr. Chowne, in a series of papers in the *London Lancet*. I shall not enter into the details of the controversy, but content myself with a brief allusion to it, and a statement of the grounds on which my own opinion rests.

It may be well enough to premise that, if our anatomical idea of the placenta be correct, then there is no reason to doubt that hemorrhage *may* take place from the maternal vessels through the detached placental surface. This is but a necessary deduction from the nature of the vascular connection existing between the uterus and placenta: for, if the curling utero-placental arteries throw blood into the hugely dilated capillaries of the placenta, which circulates freely through them, by reason of their large and frequent anastomoses, before it is returned to the maternal system, it is evident that a portion of this blood may escape from the torn veins upon its detached surface. But whether the blood does so escape, or whether rather, as has been generally believed by obstetric writers and teachers, it pours from the large venous orifices upon the internal surface of the uterus, left uncovered and unprotected by the separation of the placenta, is precisely the question mooted, which it is now proposed to investigate.

The strongest argument, adduced by Prof. Simpson, in favor of the *placental origin*, as it may be called, of the hemorrhage, is the highly interesting fact that, *when the placenta is entirely detached, there is usually a cessation of it, and that, within certain limits, the*

smaller the portion of placenta is that is separated, the more copious will be the hemorrhage. Opportunities of observing this fact are presented by cases of placenta prævia, in which the spontaneous expulsion or extraction of the placenta precedes the birth of the child, many instances of which have been collected and carefully collated by Dr. Simpson. To these, I shall more particularly advert hereafter.

Such a remarkable and, *a priori*, incredible phenomenon as the sudden cessation of the hemorrhage, following the total detachment of the placenta, seems to necessitate some other explanation of the immediate source of the blood than that which has been commonly given, for it would appear to reason that, if the denudation of a few of the orifices of the uterine sinuses can give rise to profuse flooding, the denudation of all of them, by the complete avulsion of the placenta, ought, *a fortiori*, to swell the flow to an exhausting torrent of blood. But the prediction of reason has not been verified by observation, and we are bound to believe, on the evidence of reliable testimony, that *complete* is not so hazardous as *partial* separation of the placenta. What then? Does it follow that the *placental*, and not the *uterine* surface is the source of hemorrhage? I think not. It is true that such an hypothesis affords the readiest explanation of the phenomenon, and it was apparently on this account that it was adopted by Prof. Simpson. The explanation is this: that so long as any portion of the placenta is adherent to the uterus, blood continues to flow into it through the utero-placental arteries, in quantities proportioned to the extent of remaining adhesion; but when its separation is entire, receiving no blood from the maternal system, it can, of course, disembody none. Meanwhile, the attraction of blood to the uterus being diminished, in consequence of the cessation of the placental functions, and the utero-placental vessels upon its surface contracting, a stop is put to the further effusion of blood. But another explanation, consistent with the immediate uterine source of the hemorrhage, may be offered: it might be said, as Dr. Ramsbotham has, indeed, said—"The head of the child is pushed down upon the os uteri, which suddenly gives way. Under its relaxation, the placenta is loosed from its previous attachment, and falls down before the head, which now comes into immediate contact with the bleeding vessels, and, by mechanical compression, closes their mouths; from this moment, therefore, the loss of blood

is suspended, and the head is afterwards expelled by uterine action."¹

Prof. Simpson endeavors to invalidate the placental surface of the uterus as a source of hemorrhage, by an appeal to anatomical and physiological considerations, and the absence of hemorrhage under certain circumstances of labor, when, notwithstanding the complete detachment of the placenta, there is an entire absence of hemorrhage.

To all this it may be replied that the argument, to be conclusive, ought to prove that the uterus is wholly incompetent to furnish any hemorrhage at all, independently of the placenta, which will hardly be pretended by any, and surely not by Prof. Simpson; for, though it be true, as alleged by him, that under certain circumstances of labor there is no hemorrhage, when the mouth of the uterine sinuses are exposed by the separation of the placenta, yet no one knows better than himself that much more frequently *there is hemorrhage*, and these identical vascular mouths are the unique source of it. It appears to me, therefore, that just so far as instances can be collected from the various circumstances of labor, in which these mouths, though bare, pour out no blood, the probability will be increased, rather than diminished, that they are the source of hemorrhage in placenta prævia; but that their *indisposition* to bleed is favored by the total detachment of the placenta.

It will be observed that I have not impugned the *facts* brought forward by Prof. Simpson; they stand firmly, whether his hypothesis be accepted or not, because they rest on the immovable basis of observation, and, in truth, it was the laborious collection and collation of the facts, which naturally suggested the hypothesis. And it is due to him to add, that his explanation is but incidental to his main design, which was to fructify these facts and render them subservient to practice, by proposing a new line of treatment, in placenta prævia cases, which seemed to be fairly deducible from them.

In favor of the hemorrhage having its immediate source in the uterine substance, it may be urged, in addition to this being its recognized and sufficient source under other circumstances, that the maternal currents in the placenta are, in all probability, too slug-

¹ Observations in Midwifery, part ii. pp. 191, 192.

gish to afford the impetuous streams that not unfrequently gush forth in these floodings.

The circulation of the blood is slow in all capillary vessels, in accordance with the functions which they perform, and there is a special reason why it may be presumed to be particularly slow, in the vast mass of placental capillaries, viz., to favor the exchanges there made between the maternal and foetal blood. Besides, the external surface of the placenta exhibits no orifices that appear to be adapted to the projection of blood, in streamlets, under the feeble impulse imparted by the spiral utero-placental vessels, or even under a more powerful *vis a tergo*. Other reasons might be alleged in support of the immediate uterine source of flooding, but it is not worth while; were they brought forward and piled mountain high, they might all be overthrown by a few well-attested observations, of which there appears to be a dearth upon this question—practitioners having, in these appalling cases, but little time or inclination to explore curiously the source of the discharge. I can remember but one instance in which an observation of this kind was made. It was in a case of placenta prævia in the practice of Dr. R. E. Bland, extracted from the *Missouri Med. and Surg. Journal*, and incorporated by Dr. James D. Trask, of New York, with additional particulars, in his prize essay, *Statistics of Placenta Prævia*,¹ to which I shall have occasion to refer oftener than once in the course of this chapter. In his narration of this case, Dr. Bland observes: "Whenever I placed my fingers upon the placenta, and gradually and firmly pressed upon the parietes of the uterus, from which it was separated, I completely arrested the discharge. For some half hour the hemorrhage was completely controlled by these means." When opportunities of making observations on the source of hemorrhage have offered, under other circumstances, the blood has been *seen* to flow from the uterine surface more than the placental. Of these several have been afforded by cases of inversion of the uterus, with the placenta still adherent, and by Cæsarean operations, to many of which reference is made by Dr. Chowne, in the papers published in the *London Lancet*, already cited. I will only quote one, a case of *inversio uteri*, reported by Dr. Lever, "in which," says Dr. Chowne, "the hemorrhage appears to have been *less* while the placenta remained *partly attached* than when it

¹ Transactions of the American Medical Association, vol. viii.

became *wholly detached*." Dr. Lever says: "Without loss of a moment, I tried to return it (the uterus) without previous separation of the placenta, but failed. I now peeled off the after-birth; but as there had been some blood already lost, owing to its partial detachment, the entire separation was attended with such fearful flooding, that she sank almost immediately." Dr. Chowne avers that Mr. Crosse's essay on *Inversio Uteri*, which I have not myself consulted, is rich in examples of hemorrhage, demonstrating that the blood flowed from the uterus, not the placenta.

From the foregoing considerations, but most of all from the analogy of uterine hemorrhage often occurring, under other circumstances of parturition, particularly *post partum*, where the placenta is wholly separated and expelled, I conclude that the great source of hemorrhage is the placental surface of the uterus itself.

Besides the inevitable cause of hemorrhage we have been considering, other causes may operate to excite hemorrhage during advanced pregnancy, among which the most frequent, perhaps, is mechanical violence of any kind, such as falls, blows, &c., sufficiently violent to produce detachment of the placenta from its normal connections. Probably, also, an excited state of the circulation, especially in plethoric habits, may suffice, in some instances, to bring about the same disastrous result. Irritation of the intestinal canal, whether induced by disease or the operation of drastic purgatives, exciting tenesmus and violent straining efforts, may also be reckoned among the causes of uterine hemorrhage.

SECTION II.

THE SYMPTOMS, COURSE, AND TERMINATION OF FLOODING.

The *symptoms*, *course*, and *termination* of flooding are various in different cases. When there is a flow of blood, the patient is, of course, immediately admonished of the attack, and will, sooner or later, exhibit the effects of it, according to the quantity and rapidity of the discharge. The countenance becomes pale, the pulse sinks, the skin feels cold; there are shuddering and faintness, yawning and oppression of the chest; the patient urgently calls for fresh air; and, if the discharge be very sudden and profuse, she may fall into a fit of syncope, during which there is at least a temporary suspen-

sion of the hemorrhage. Should the hemorrhage be concealed, the blood being pent up between the placenta, or the placenta and membranes, and the internal surface of the uterus, it may, notwithstanding, be recognized by these well-known morbid effects of loss of blood (for blood is lost when it is extravasated), together with the altered figure and size of the uterus. In the case already referred to as occurring in my own practice, the sanguineous effusion was both sudden and great. The patient, a delicate lady, the mother of three children, and advanced to the eighth month of her fourth pregnancy, had taken some purgative medicine, and got up, at a late hour of the night, to the close-stool. She fainted while on the vessel; and her husband, greatly alarmed, ran for me. I soon reached my patient, whom I found on the carpet, looking deathly pale, and nearly pulseless, insomuch that I durst not have her moved. By pouring down as much brandy as she could be got to swallow, and the application of sinapisms to the epigastrium and extremities, with frictions, dry heat, the smelling-bottle, and fan, reaction was slowly excited. When she was removed to the couch, it was easily discoverable that the uterus was much enlarged beyond what belonged to the period of her gestation, and was conical withal. Upon examination per vaginam, the os uteri was found considerably dilated, and the membranes unusually tense, though there had been no labor pains. The sequel of the case I reserve for a future page, as we are here studying symptomatology only; but I would call particular attention to the *tension of the membranes*, as felt through the os uteri, which is, if I mistake not, a valuable diagnostic in such cases. It is to be attributed, I suppose, to the compression of the ovum by the extravasated blood to the greatest degree of which it is susceptible, making some room in that direction, though the sanguineous pouch be formed principally by the yielding of the uterine paries. When the extravasation is more limited, and takes place more slowly, its diagnosis is not so clear; but a dull, deep seated pain, accompanied by a sensation of weight in the place where the extravasation is made, felt at the instant of its commencement, and insensibly increasing with it, together with enlargement of the uterus correspondent to the sanguineous collection, may serve to indicate it, according to the observation of Baudelocque.¹

¹ L'art des Accouchements, par. 1085.

As to the *course* of uterine hemorrhage, it is to be observed that it may be confined to a single copious eruption, the recurrence of it being prevented by the formation of coagula in the mouths of the bleeding vessels, which takes place while the action of the heart is slackened by the loss of blood. This appears to be the first natural resource against the continuance of the hemorrhage; and, frail though the barrier would appear to be, it is sometimes sufficient, the bleeding vessels being stopped, although the detached portion of placenta be not reunited to the uterus to cover them more securely. The portion of placenta, whose connection with the uterus has been thus finally dissolved, undergoes a series of pathological changes; blood becomes infiltrated, and coagulated in its substance by which its cellular structure is totally obliterated.

When, however, a pregnant woman has sustained one attack of flooding, there is but too much reason to expect that she may experience another, and yet another, the successive returns being attributable, probably, not so much to the washing away of the coagula, by which the mouths of the vessels were sealed, as to the successive separation of portion after portion of the placenta. This is assuredly the case where the placenta is implanted over the os uteri, as we know, not only from the fact that the cause which produced the first detachment is still in operation, but also from the different phases of the separated surface of the placenta, indicating the different ages of the pathological alterations it has undergone.

By these frequent repetitions of hemorrhage, the patient's life is ultimately brought into great jeopardy, if it had not been imperilled by the first attack; and then nature, always vigilant and always fruitful in resources, essays to put in operation the grand remedy provided for great emergencies of this kind; and, if the patient's energies have not been too greatly exhausted to bear the operation, it is always effectual in stanching the blood, and turning its tide in favor of life. The remedy in question is none other than parturient contraction of the muscular fibres of the uterus. When we consider the enormous size of the uterine vessels, especially the veins, their free inosculations, and their destitution alike of valves and of a muscular coat, we can appreciate the boon vouchsafed them by the muscular coat of the uterus, in admitting them among its fibres in such manner as to virtually supply their need. But the muscular fibres belong not to the

veins, and can avail them nothing unless they are thrown into active contraction, which they will not be until the time or the occasion has arrived for the uterus to expel its contents. The present is such an occasion. The expedient of plugging the vessels has been tried, and found to be insufficient; now, let the muscular fibres, surrounding the veins, contract and constrict them as with so many fleshy ligatures. With the diminution of their calibres, the sanguineous streams will be diminished; and when, eventually, the uterus is evacuated of its contents, the vessels will be so small and so tightly embraced, withal, by the uterine fibres, that nothing but a dribbling of blood will remain.

The natural remedy, whose efficacy I have lauded and whose *modus operandi* I have tried to show, is familiarly designated *uterine contraction*. It now confronts the student of obstetrics, under truly appalling circumstances, and he will do well to scan it closely, for among the axioms of practical obstetrics, he shall find none of greater importance than those which are founded upon a recognition of its importance. If he inquires how this saving property of the gravid uterus is invoked to action, in cases of desperate flooding, the answer, dictated by a proper sense of our nothingness in the comparison, is, that we do not fully understand it, but it is allowable to suppose that the direct and indirect irritation of the part of the uterus to which the expulsive faculty belongs, excites its organic contractility into action. In the case of accidental flooding, the direct irritation results from the contact of coagula and the lesion caused by the avulsion of the placenta; the indirect, or orificial irritation, is produced by the presence of coagula, aided, in placenta prævia cases, by the violence done in its separation. In cases of *concealed* hemorrhage, it is reasonable to believe that the tension of the membranes and their pressure upon the os uteri powerfully contribute to awaken uterine contraction; so, at least, it seemed to me in my single case.

When uterine contraction has been evoked, it will be observed that the hemorrhage is arrested during each paroxysm (for it works by fits), in cases of accidental hemorrhage, whilst it is augmented during each paroxysm, if the hemorrhage be of the unavoidable kind. The former phenomenon is not difficult of explanation; contraction brings the walls of the uterus into closer and firmer contact with the ovum, and the pressure thus made upon the mouths of the bleeding vessels, whose calibres are at the same time diminished, arrests the flow. But why the bleeding should be temporarily in-

creased in placental presentations, is not, at the first blush, quite so apparent: indeed, Prof. Simpson declares it to be "very inexplicable," upon the idea generally received that the discharge comes from the exposed surface of the uterus, and proceeds to offer the following very plausible explanation, which accords with his view of the immediate source of the blood: "Each uterine contraction in pushing down the presenting part of the child against the compressible placental mass, will squeeze out from its maternal cells, as from a sponge, a portion of the fluid blood contained in them; and hence, during the pressure, an increased flow of the blood will issue from the vascular orifices opening upon its detached surface. During the intervals between the pains, a reaccumulation of maternal blood will take place in the interior of the placenta; but the quantity actually escaping will be comparatively less, till again it is forced out in accumulated amount by the compression to which it is subjected by a returning pain."

I fear that this explanation, ingenious though it be, will destroy the credit of the placenta as an active bleeding fountain, for if, like a sponge, it is emptied of its blood and bleeds little or none till it is refilled by a fresh absorption, it can scarcely be believed to be the source of the great overflows that take place in these hemorrhages, which have exhausted the vocabulary of epithets, descriptive of their great profuseness and danger. Prof. Simpson not only declares a solution upon the opposite hypothesis to be impracticable, but avers that none has ever been attempted, "for," says he, "if in placenta prævia the hemorrhage proceeded from the vascular orifices laid open on the interior of the uterus, it ought to be diminished and not increased in quantity during the pains, as these orifices will necessarily be temporarily diminished under the contraction of the uterine fibres." To this it may be replied, that if the hemorrhage be increased, according to his solution by the blood being *squeezed* out of the placenta implanted over the os uteri, it ought to be increased also by the same *squeezing*, no matter where it is implanted. If it be rejoined, that "the placenta is peculiarly situated, being subjected to pressure when it is over the os uteri, towards which the fœtus is impelled" (which is the best plea that could be put in), it may be sur-rejoined, that the inferior

¹ It is "very explicable" in the edition of his Works, which is evidently a misprint.

segment of the uterus is also peculiarly situated at the time of parturition, being *dilated* instead of *contracted*, as the superior segment is during the pains. If the os uteri and inferior part of the body of the uterus, which jointly I have called the inferior segment of the womb, be dilated during the pains, then its vessels must be more open than in the intervals between them, and hence the increased flow of blood. This rationale lies couched under the following words of Dr. Rigby, in speaking of the effects of rupture of the membranes upon uterine hemorrhage in general: "The fundus and sides of the uterus being in a state of contraction during the presence of pain, press upon the placenta, and lessen the flux of blood into the womb. Moreover, when the water is escaped, the child's body comes in contact with the uterus, and the placenta may likewise be pressed upon by it, so as to have its vessels stopped; and these are, without doubt, the reasons why it is observed that the flooding usually abates whilst the pain continues; but this must obviously be only when the placenta is fixed to any part but the collum (cervix) and os uteri, in which case the reverse must happen, as those parts are dilated during pain. It may be of use to attend to this circumstance, when we cannot, so soon as we could wish, make a manual inquiry into the cause of the flooding."¹ To the explanation, contained in this quotation, I may add that during the pains, further separation of the placenta takes place, exposing the mouths of other vessels, from which the blood must instantly escape, and that the placenta cannot here be so effectually pressed against the bleeding vessels, because being opposite the outlet of the uterus, a part of it is thrust into the orifice and thus the stress is taken off from the uterine parietes.

There is no difficulty in detecting the placenta over the mouth of the womb, by the usual mode of conducting a digital examination per vaginam, when labor has set in and the os is considerably dilated. The finger encounters, at once, a fleshy mass, with an uneven lobulated surface, adherent to the vicinity of the os, all around, if the placenta be centrally attached, as in what are called *complete* placental presentations, or only on one side, if merely a margin of the placenta intrude upon the os, as in *partial* placental presentation. How different the sensation imparted to the finger is, when it explores such a substance, from that imparted by the

¹ *Essay on Uterine Hemorrhage*, sixth ed., London, 1822, pp. 77, 78.

smooth, even, thin membranes, rebounding when the impulse of the finger is removed, and giving, more or less distinctly, the sensation of the included waters of the ovum, even the inexperienced may readily conceive.

But when labor has not supervened, and the os uteri is high up and closed or but little open, the diagnosis is not so easy, and cannot, at all times, be satisfactorily determined. When, however, there has been more than one attack of hemorrhage, and the patient's condition is regarded as at all critical, it is a matter of considerable moment, both in a prognostic and practical point of view, to ascertain, if possible, whether the placenta overlies the os uteri or not. And this can always be determined if sufficient dilatation exists to admit the finger, no matter how highly the os may be placed, for a part or even the whole of the hand may be introduced into the vagina, to increase the reach of the finger. Should the inquiry result in the discovery of the placenta at the mouth of the womb, we may, with greater confidence, predict the return of hemorrhage, and ought to warn the patient's friends of her impending danger, and the necessity of our immediate summons upon its recurrence.

SECTION III.

THE TREATMENT OF FLOODING.

The division which I would make of the *treatment* of flooding is into the *medical* and the *obstetric*; including, under the former, all that can be done, either by hygienic measures or the administration of medicines, to control the discharge and prevent its return; and under the latter, the institution of labor and the delivery of the patient, when pregnancy can be no longer maintained without jeoparding her life.

1. MEDICAL TREATMENT.

The medical treatment of flooding is essentially the same, whether it be of the *unavoidable* or of the *accidental* kind. It rests on the principles of common sense, and consists of such observances and the use of such remedies as are calculated to insure the most perfect tranquillity of body and mind that can be attained. The first measure that is instinctively suggested, upon an attack of flooding,

It is that the patient should be placed in an horizontal posture, with the legs somewhat elevated and the head low, in order to promote the return of the venous blood from the inferior parts of the body. The room should be large and well ventilated: its temperature ought to be carefully regulated, keeping it as cool as possible in warm weather, and not permitting it to be too much heated in cold. With the same view, namely, the subduction of the stimulus of heat, the patient ought to lie on a mattress instead of a feather bed, and her clothing and bed-covering should be as light as possible. The diet must be simple and unstimulating, with nothing for drink but cold water or lemonade, unless there be great exhaustion, which may make it necessary to give brandy or other stimulants until reaction is established. Cloths wrung out of cold water or ice water ought to be applied to the hypogastrium and pubes, as directed for the hemorrhage of abortion. To allay nervous excitement, as well as with a view of quieting any irritability of the uterus that may exist, an anodyne, of morphia or other preparation of opium, may be usefully administered.

When, however, the discharge has been so great as to result in perilous exhaustion—blanching the face and suppressing the pulse, chilling the surface, and even temporarily suspending the action of the heart by syncope, the shadow of death, from which the patient emerges with an unconscious gaze—I know of nothing more cordial, or which is better calculated to fortify the system against the powers of dissolution, than opium, a teaspoonful of its tincture, to be repeated in smaller doses, until the pulse fills and the nervous system is reconciled to the great loss of blood. Next to opium, brandy or good old whiskey should be brought into requisition in these trying emergencies, and it may be exhibited in portions of a tablespoonful every twenty or thirty minutes, undiluted, if it can be so swallowed, if not, with an equal quantity of hot water. Mustard poultices must be laid over the stomach and on various parts of the limbs, until warmth is restored to the skin. So soon as reaction is obtained, there must be a cessation of the treatment; all stimulation is to be replaced by the simple hygienic precautions and quieting treatment which have been advised.

Some may be surprised that I have omitted to recommend the exhibition of astringents, such as acetate of lead, tannic, or gallic acid, &c., which are much resorted to by many practitioners in this country,

and, as they think, with advantage. But I cannot say that I have ever known any good effects from their use, and I have, therefore, ceased to employ them. What experience has taught me on this point ought, in truth, to have been anticipated by reason, for who would expect any benefit from, or be so mad to rely on, astringents internally administered, in a case of hemorrhage from the stump of an amputated limb? And the analogy between the bleeding in the two cases has already been pointed out.

To prevent a recurrence of flooding, which is always to be dreaded, strict repose in a recumbent posture, and the avoidance of everything calculated to excite or agitate the patient should be strenuously insisted on, even to the end of gestation. This precept cannot be too highly estimated, or too emphatically urged, for nothing is more certain than that the infraction of it may, at any time, renew the hemorrhage; and it is an object of no small importance, even should we fail to carry the patient to her full time, at least to prolong her gestation as much as possible. Whilst the patient is in this state of surveillance, her mind ought to be kept as free as possible from care and anxiety; her diet ought to be light; and none but the most simple beverages should be permitted; in fact, nothing but cold water or lemonade ought to be allowed. It is an object of prime importance to regulate the bowels, endeavoring to secure an adequate action of them daily, as nothing is more likely to disturb the uterus than intestinal accumulations, and the straining efforts at evacuation consequent to this condition. This object may be accomplished by a teaspoonful of sulphate of magnesia taken in a tumbler of water, to which fifteen or twenty drops of the aromatic sulphuric acid may be added, or by an enema of simple cold water; and, when the latter answers the purpose, it is undoubtedly preferable to the former. Other mild aperients may be prescribed; but the practitioner cannot too carefully refrain from directing irritating cathartics, and such as are liable to operate excessively.

2. OBSTETRIC TREATMENT.

Should the flooding return, notwithstanding all our efforts to avert it, and, by its profusion, bring the patient into a state of extreme prostration, so that there is just reason to apprehend that she will sink under it, then *medical* means have been proved to be

unavailing, and the resources of *obstetrics* must be invoked. There is no safety for the woman but in the evacuation of the uterus, in order that its bloodvessels may be contracted below the bleeding point. Nature, as we have seen, points out this path; and it is surprising that it was not trodden until a Frenchman, Jacques Guillemeau, had the hardihood to venture on it, in 1598, and beckoned others to follow him, the succeeding year, in a work which he published.¹ A French woman, Louise Bourgeois, was the first to heed the summons, or at least openly to advocate the practice, in a work² published by her, ten years subsequently to Guillemeau's, which fairly entitles her to be regarded as the prototype of the Boivins and Lachapelles of more recent times.

The method of evacuating the uterus of its contents, pursued and recommended by these authors, is *artificial*, or, as it is sometimes distinguished, *forced delivery*, by which, no doubt, many women were rescued from a bloody death, under their administration, and yet many more by the eminent obstetricians, in every part of the civilized world, who have followed their bold practice. The operative procedure itself consists in the gradual introduction of the hand through the os uteri, as gently as possible, inserting first a finger, and then another, until the entire hand is admitted, when the membranes are ruptured, and the hand glides over the surface of the infant in search of the feet, which are seized and brought out of the vulva, thus accomplishing the *turning* of the child, and acquiring complete control over the delivery, which is to be finished, more or less rapidly, according to the exigencies of the occasion, by tractions at first upon its inferior extremities, and then upon other parts, as they are successively brought through the maternal passages. In turning and delivering by the feet, Guillemeau adopted the practice recommended by his great master, Ambrose Paré, previous to whom, the prevalent custom, from the earliest dawn of obstetric art, was to bring the child, in all manual deliveries, by the head, even should it be necessary to push back the feet. It was, therefore, Paré's mode of delivery, applied by his favorite pupil, to carry out the bold scheme, devised by him, effectually.

¹ *De la Grossesse et Accouchement des Femmes, du gouvernement d'icelles, et moyens de subvenir aux accidens qui leur arrivent.* Paris, 1599.

² *Observations diverses sur la Stérilité, perte de fruit, maladies des femmes et enfans nouveau-nés.* Paris, 1609.

ally to arrest the floodings of advanced pregnancy and incipient parturition. And it was applied to all such cases indiscriminately, for as yet the distinction into unavoidable and accidental hemorrhage had not been made; nor was it known that the placenta is ever attached over the mouth of the womb.

Artificial delivery, thus inaugurated by Guillemeau, held undisputed possession of the obstetric kingdom until its sceptre was broken, or rather divided, by M. Puzos, who proposed a memorable innovation upon it, not quite a century and a half afterwards, in his *Mémoire sur les Pertes des Sang*, published in the Memoirs of the Royal Academy of Surgery, vol. ii., 1743.

As the proposal of Puzos does not appear to me to have been rightly apprehended or properly appreciated by most of his successors, and as, moreover, I deem it of priceless value, I must be excused for the attempt to set it in its true light, and thus to confer, as I surely believe, an inestimable boon on womanhood. The subject cannot be better introduced than by adverting to some of the perils as well as the triumphs of artificial delivery, the clear perception of which, indeed, led M. Puzos to profound reflection, and ultimately to the excogitation of a *better method* of performing the great indication, which he admitted in all its force, and with all its binding obligation, namely, *to evacuate the uterus*.

It is an indisputable fact, attested by every faithful obstetric record, that, whilst artificial delivery has saved many women from going down to death, it has also accelerated the progress of many thitherward, and delivered over not a few, who might otherwise have been restored to life. This melancholy issue of our well-meant and most skilful endeavors to serve our patients, by imitating nature as closely as we can, is incidental to the imperfection of art in the comparison with nature. The aim of nature, in these cases, is, truly, to evacuate the uterus; but then she has a manner of accomplishing it which, at the best, can be but poorly imitated by art; and none, before or since, understood the perfection of nature and the imperfection of art better than did M. Puzos. In confirmation of this, I will draw attention to the critical comparison which he institutes between natural and artificial delivery. It should first be observed, however, that, according to M. Puzos, the capital disadvantage, or, as it might be called, the incurable deficiency of artificial delivery, is to be found in the state of the uterus subsequent to delivery, which is always one of exposure to hemorrhage,

which nothing can counteract but energetic uterine contraction. Now, with this view of the danger ahead, we proceed to our comparison, in order to show that uterine inertia and consequent hemorrhage are much more likely to supervene upon artificial than natural delivery.

They differ: *First*, in respect to the *force* employed. The natural or parturient force, applied gently at first, increases by insensible degrees, being adjusted to the obstacle to be overcome in the successive stages of the operation, and expels the child in a gradual manner; whilst artificial, or obstetric force, is not and cannot be thus accurately graduated, but is made to extract the child rapidly.

Secondly. This hasty abstraction of the child from the cavity of the uterus, no matter how carefully it be executed, being a more sudden evacuation than the organ is accustomed to, or fitted to endure, is liable to leave it in an uncontracted condition, and exposed to hemorrhage; whereas, in natural delivery, the engagement of the child in the os uteri is itself a pledge and token that the fundus is contracting, and that, when it shall be expelled, the uterus will be found contracted and secured against hemorrhage.

Thirdly. In natural delivery, the flow of blood is commonly arrested during the pains, the uterus contracting upon the child, and being itself compressed by the solid body of the child, which hermetically seals the openings of the vessels placed between them; but artificial delivery is not necessarily attended with uterine contraction, and, consequently, whilst the child is being abstracted, blood continues to flow from the open vessels in undiminished quantity. Exposed, thus, to a continuance, if not an aggravation of the hemorrhage, during artificial delivery, with the certainty of its continuance, also, subsequent to the operation, it ought not to surprise us that many women survive it but a short time.

With such an insight into the deep things of labor, and a persuasion that nature is inimitable in her great parturient operation, it is no wonder that M. Puzos should have felt reluctant to supersede her, and set to work in order to devise some scheme of compounding with her. The basis of the compromise was, on his part, a full recognition of the disposition of nature to perform her office, but her incapacity, from the weakness consequent to the great loss of blood, and what he proposed to do, instead of proceeding to extract the child, *vi et armis*, was to second the drooping forces of nature, that she might be enabled to accomplish her own work.

The method he pursued to carry out his purpose, I shall give in a translation of his own words: "The means of remedying the slowness of natural delivery, is to borrow something from forced delivery, which, I am satisfied, from experience, is entirely practicable: namely, to increase the dilatation of the os uteri with the fingers, in the same gentle manner in which nature is wont to proceed. It is seldom that the loss of blood, produced by the detachment of the placenta, does not occasion more or less dilatation of the uterine orifice, the coagula about it acting as so many wedges, that distend it and dispose it to yield. This incipient dilatation has a tendency to bring on labor, and is sometimes accompanied by slight pains. But, inasmuch as the exhaustion and faintness arising from the loss of blood are opposed to the continuance of the uterine contractions, we must renew these when wanting, and increase them when too feeble. With this view, one or two fingers must be introduced within the os uteri, which is to be gradually opened by the employment of force proportioned to its resistance. These dilating efforts should be suspended, from time to time, to allow intervals of rest. By this means, the uterus is roused to action, labor pains come on, and the membranes are rendered tense. The next object is to rupture the membranes without delay, to give escape to the liquor amnii, and bring about a diminution in the size of the uterus equal to the space the waters had occupied. The condensation of the uterus, that succeeds the discharge of the liquor amnii, presses the foetus upon the os uteri, when stronger pains ensue, which, aided by the pressure of the fingers around the margins of the orifice, succeed in advancing the child. Meanwhile, the blood that would otherwise have escaped, is retained in the vessels by the contraction of the uterine fibres, and the compression to which they are subjected. By this coöperation of nature and art, the delivery is greatly expedited, and we may enjoy the satisfaction of saving both mother and child, who must have been lost, if left to nature alone, and might have been destroyed by artificial delivery."

To illustrate the practical working of Puzos' treatment, I will quote one case from his memoir. "In 1737, I was called in haste to Maisons, a village near Charenton, to assist a woman who had a very violent hemorrhage towards the end of pregnancy. I immediately obeyed the summons, and found my patient very low and faint, insomuch that she could only speak in broken sentences. I

found, on examination, that the os uteri was dilated as large as a twelve sous piece, and that she had but slight pains. Considering the quantity of blood she had lost, with no abatement of the hemorrhage, and the rigidity of the os uteri, I was fearful that my method might be insufficient, and that I should be compelled to resort to forced delivery. Inspired, however, by the courage of my patient, whose hopes were raised by my arrival, I gradually dilated the os uteri with my fingers, whereupon the membranes that had been in contact with the child's head began to be distended, not sufficiently so, however, to admit of their being punctured until the lapse of an hour. Upon the discharge of the liquor amnii, the uterine contractions became more powerful, the child advanced, the hemorrhage slackened, and the labor was soon terminated. It is proper to add that the patient's strength was sustained by broth and wine, alternately administered by spoonfuls."

Upon careful analysis of Puzos' method, it must appear incontrovertibly, that it consists *primarily* of digital dilatation of the os uteri, gently made, it is true, but nevertheless effected by whatever force may be required, and carried so far as to command uterine contraction in a sufficient degree to give tension to the foetal membranes. It is *not* the mere insertion of the tip of the finger in the uterine orifice, and moving it to and fro for the purpose of titillating it, but it is a *bona fide* expanding of the os uteri with one or two fingers, making a feint, if I may so say, of artificial delivery, but desisting so soon as parturient contractions are excited. The efforts of nature, thus aroused, are to be promoted by the fingers employed in making counter-pressure upon the os uteri. The method consists *secondarily* in rupturing the membranes *after* they are rendered tense by the genuine labor pains, excited by the artificial dilatation of the os uteri. I particularly request the reader to bear in mind this analysis of Puzos' method, and to compare with it the partial or distorted exhibitions of it, which will be found in nearly all of our best treatises on midwifery. As an example of a *partial* exhibition of it, I will cite the criticism of Dr. Burns, the able and eloquent author of one of our best practical works on midwifery. He had just been commenting on the danger of undertaking artificial delivery before the os uteri is properly prepared for it, rightly alleging that "the rash and premature operation is fatal," and he then remarks: "It was the fatal consequence of this blind practice that suggested to M. Puzos the

propriety of *puncturing the membranes*, and thus endeavoring to excite labor. His reasoning was ingenious; his proposal was a material improvement on the practice which then prevailed. The ease of the operation, and its occasional success, recommend it to our notice; but experience has now determined that it cannot be relied on, and that it may be dispensed with. If we use it early, and on the first attack, we do not know when the contraction may be established; for, even in a healthy uterus, when we use it on account of a deformed pelvis, it is sometimes several days before labor be produced. We cannot say what may take place in the interval. The uterus being slacker, the hemorrhage is more apt to return, and we may be obliged, after all, to have recourse to other means, particularly to the plug. Now, we know that the plug will, without any other operation, safely restrain hemorrhage, until the os uteri be in a proper state for delivery. The proposal of M. Puzos then is, I apprehend, inadmissible before this time. If after this, there be occasion to interfere, it is evident that we must desire some interference which can be depended on, both with respect to time and degree. This method can be relied on in neither; for we know not how long it may be of exciting contraction, nor whether it may be able to excite effective contraction after any lapse of time. If it fail, we render delivery more painful, and consequently more dangerous to the mother, and bring the child into hazard.”¹

These observations of Dr. Burns are an admirable specimen of close logical reasoning upon the proposition assumed; but it must be obvious that this is widely different from the proposal of Puzos, being but a part of it, and only the secondary part withal. Merely to puncture the membranes could hardly be expected to exert any control over uterine hemorrhage, and experience has, indeed abundantly proved its inefficacy, as I shall hereafter take occasion to show. It might easily be shown, by reference to numerous other standard treatises on midwifery, that precisely the same partial and erroneous views are taken of M. Puzos' method, but I shall cite only one other, and that deservedly esteemed one of the most valuable contributions to practical midwifery in our time. In his *Practical Treatise on Midwifery*, Dr. Robert Collins, of Dublin, observes, “It is here the great difference between the treatment of unavoidable and accidental hemorrhage consists; in the former,

¹ Principles of Midwifery.

we are almost always obliged to force delivery; while in the latter, *rupturing the membranes*, so as to bring on uterine action, is, in most cases, sufficient. There is no point I have felt so anxious to impress with effect upon the pupil's mind as this. The operation is very simple, and may often be performed by the finger; however, when the os uteri is high up, or the membranes are in a relaxed state, it may be necessary to introduce some *blunt* pointed instrument, as a probe, to make the opening; this will be more easily effected *by having the membranes made tense by pressure over the uterine tumor.*" The reader easily perceives that if this be intended as a statement of Puzos' practice (whose name is not, however, mentioned), it is nothing less than a caricature; but if it be only what Dr. Collins regards as sufficient, it is justly amenable to the criticism of Dr. Burns, who must have had just such a conception of Puzos' idea when he penned it.

As an exemplification of the distortion to which it has been the hard fate of M. Puzos to be subjected, I beg to offer a quotation from Dr. Robert Lee:¹ "It is to Mauriceau that all the honor must be awarded, and not to Puzos, or to any subsequent writers, of having first pointed out the efficacy of rupturing the membranes, where the placenta does not present." * * * "Puzos recommended puncturing the membranes, as Mauriceau had done, gently dilating the os uteri with the fingers to excite contractions, and leaving the expulsion of the child to nature." Here, *rupturing the membranes* is brought prominently forward, whilst *dilating the os uteri* is thrown into the back ground, as though the former were recommended to be done first, and were of chief importance, whilst the latter is to be attended to secondarily, and is altogether subordinate. This is evidently an inversion of the order observed by M. Puzos, and a departure, moreover, from the order of nature, which is, first, dilatation, and, secondly, rupture of the membranes; it is, in other words, a palpable distortion of his plan, which seems to have confused Dr. Lee's perceptions to such a degree that he loses sight of the wide difference between the practice of Mauriceau and that of Puzos. It is true that Mauriceau did recommend rupturing the membranes, in cases of flooding, before Puzos; it is, moreover, not unlikely that Puzos was indebted to Mauriceau for this part of his method. But an examination of Mauriceau's cases, referred to by

¹ Lectures on the Theory and Practice of Midwifery, Phila. 1844, pp. 370, 371.

Dr. Lee, will clearly show that he pursued this line of practice only in one set of well-defined circumstances, namely, *where, in cases of accidental hemorrhage, labor actually exists and has caused some dilatation of the os uteri, with tension of the membranes, the patient's strength being good, giving assurance that, with only slight assistance, nature is adequate to the work of expelling the child.* It is not necessary to analyze all of Mauriceau's cases, thus treated, for the purpose of establishing the position I have laid down; but I will give the essential features of a few. Case 307—Hemorrhage at the eighth month of pregnancy; pain slight during the whole of the labor, but as the hemorrhage was only moderate, and the os uteri was gradually dilating, it was considered safe to trust to nature, only the membranes were ruptured, and the reason assigned for this is, that they might not cause a greater separation of the placenta, by advancing before the child. Case 479—Slight hemorrhage occurring at the commencement of labor at full term; membranes ruptured to prevent an increase of the discharge, on the principle enounced in the case just cited. Case 480—Labor at the eighth month; hemorrhage considerable; membranes pierced, so soon as they were felt to be prepared (*viz.*, when they were made tense by the uterine contractions). And thus I might go on to the end of the list, and show that Mauriceau proposed nothing but to rupture the membranes, and this only when labor existed, with reasonable assurance that it would be consummated.

Perhaps there never lived an obstetrician, who more strenuously insisted on the absolute necessity of forced delivery, in the floodings of advanced gestation and early labor, than did Mauriceau. Why, only hear him; in the opening of the 28th chapter of his second book, he says: "De quelque temps que la femme puisse estre grosse, qu'elle soit à term ou qu'elle n'y soit pas, le plus expédient et le plus salutaire remède qu'il y ait à la grande perte de sang, pour sauver la vie à la mère et à l'enfant, qui y sont toujours tous deux en tres grand danger de la perdre, est de l'accoucher au plutost et sans aucun delay, en allant chercher les pieds de l'enfant pour le tirer dehors." Guillemeau did not lay down the law of artificial delivery more peremptorily, but Mauriceau had the good judgment to relax it, in the manner we have seen, which is, also, inculcated in this same chapter.

To puncture the membranes, as a means of checking hemor-

rhage and expediting labor, was, then, plainly the practice of Mauriceau. He says not a word of dilating the os uteri with the same view, much more of originating labor or exalting its feeblest demonstrations to a pitch that may avail to supersede forced delivery. Rightly interpreted, M. Puzos' plan might be denominated *semi-artificial* delivery. The first stage of labor, or a good degree of it, viz., the dilatation of the os uteri, is performed by art; and then, finding nature well disposed to perform the remaining acts of the drama, art wisely refrains from thrusting her hand into the womb, well knowing that her best performance, in turning and extracting the infant, would be but a mimicry of nature.

I have dwelt thus long, perhaps tediously, upon M. Puzos' substitute for forced delivery, because, as I have said, it does not appear to me to have been fully appreciated, or rightly understood, and because, moreover, I am assuredly of the opinion that it is entitled to a high rank among the solid improvements in obstetric practice; nay, it marks, I think, an era in the history of obstetric medicine. And such is my estimate of its value that, as I can myself lay no claim to its discovery, I shall be content with the humble merit of exhuming it, and restoring it to its proper position.

Having unfolded M. Puzos' method, we are prepared to consider the extent of its applicability to cases of flooding, and how far it has answered the ends for which it was proposed.

It does not appear that its application was limited by its author to special cases, for, in his day, the distinction was not made into accidental and unavoidable hemorrhage; but, at the same time, it is proper to remark that no case of placenta prævia is related in his memoir, and it is impossible, therefore, to say whether he would have attempted the application of his method to such a case or not. Not long afterwards, however, Dr. Rigby's Essay on Uterine Hemorrhage was published, in which this distinction is made, and, whilst the sufficiency of Puzos' expedient in accidental hemorrhage is admitted, the absolute necessity of artificial delivery in unavoidable hemorrhage is urgently maintained, and this has been the prevailing doctrine and practice to the present time. It being, then, generally conceded that Puzos' treatment is an adequate substitute for forced delivery in cases of accidental hemorrhage, our first inquiry will be into its success, with a view of

inspiring confidence in it, and pointing out the causes of its failure in certain hands.

In the hands of M. Puzos himself, it does not appear that it failed in a single instance, though it was relied on in many, only a few of which are, however, detailed in the memoir. We might be inclined to receive such a statement with considerable abatement, allowing for the misguiding influence of partiality for one's own invention or discovery, but it is so remarkably corroborated by Dr. Rigby's experience, that there is no room for incredulity.¹ In the fourth edition of his *Essay*, he relates sixty-three cases of accidental hemorrhage treated by Puzos' method, and in the fifth edition, it is observed that, since the date of the former, *many more* cases have occurred to him, "in every one of which the termination of the labor was safely effected by the natural efforts."

What a testimony! What practitioner ever lived who could honestly declare that he had safely relieved sixty-three pregnant women, affected with flooding, by forced delivery? When we come to read the recital of Dr. Rigby's cases by the Puzosian lamp, we find that the practice was well understood by him, and *tolerably* faithfully executed. In illustration of my meaning, I will quote a few sentences from one of his cases. It is the case of — Leman, and happened August 12th, 1772, being among the worst recorded in the *Essay*. "After attending her in this manner," says he (referring to his care to keep her cool and to give her cold

¹ Dr. Collins observes: "Thirteen cases of accidental hemorrhage occurred in the hospital (the Dublin Lying-in) during my residence as master, in *four* of which the membranes were successfully ruptured; *three* were delivered by the natural efforts; *three* by the crotchet; *two* of the children were turned; and in *one* the feet presented. *One* only of the children was born alive; *four* were putrid. *Two* of the thirteen women died; one where the child was turned, and one where the head was lessened." We are furthermore informed in a note that "*ten* cases of accidental hemorrhage occurred in the Dublin Lying-in Hospital during Dr. Clarke's residence. *Four* had delivery forced, of whom one died. *One* had a defective pelvis, the head was perforated, the mother died. *One* had a cross presentation, the fœtus was turned, the mother died. *Two* had the membranes ruptured at an early stage of the labor; both recovered. *Two* were left entirely to the efforts of nature; one died. Hence it is evident," Dr. Clarke observes, "that of the *ten* cases, *four* proved fatal under very different modes of treatment; which result is entirely at variance with Mr. Rigby's experience."

I would make a very different observation from that of Dr. Clarke, viz., that although *four* of the mothers died, none of all the *ten* had the benefit of Dr. Rigby's plan of treatment, but only the miserable mockery of it, consisting in rupturing the flabby bag of membranes.

drinks, &c.), "about two hours, frequently examining and gently stimulating the os internum, there came on at length a slight pain, and soon after I could just feel the membranes with the end of my finger; I immediately introduced a probe in the manner I had before done, and punctured them. It had the same good effect as before, for the discharge immediately stopped, and pain coming on, the uterus opened, the head of the child was pushed down, and, notwithstanding the very alarming state she had just before been in, she was soon easily and safely delivered, by the natural pains, of a dead child."

In this case let it be observed that Dr. Rigby did not first puncture the membranes and then frequently stimulate the os uteri with his finger, much less did he simply puncture the membranes and then complacently fold his arms; but he first aroused the dormant uterus to action, and then ruptured the membranes. This is the natural order, and it is also according to Puzos; but the qualifying epithet I have ventured to apply to Dr. Rigby's manipulation appears to be called for on account of his dealing more gently with the os uteri than is warranted by the prescription of M. Puzos, or required by obstetric prudence. Labor might, perhaps, have been more promptly invoked had a little more freedom been taken with it. This is, however, mere suggestion, and it were unreasonable to find fault with Dr. Rigby for his manner of carrying out the practice, seeing that it was clearly apprehended by him, and performed with such signal success.

Other eminent practitioners might be cited, in whose hands the Puzosian practice was equally successful, but as my object is not to write a history but to illustrate an important principle, I turn to Dr. John Ramsbotham to furnish us with cases of accidental hemorrhage, exemplifying the disastrous defeat of this same practice, misunderstood and of course misapplied.

We search in vain, through the introductory observations to his cases of accidental hemorrhage or in the recital of the cases themselves, for anything to substitute forced delivery but "the discharge of the liquor amnii by the rupture of the bag of membranes,"¹ as a means of inducing labor, although none knew better than he that a ruinous time may elapse ere labor is excited, and hence he makes provision to fall back on what he justly calls "the disagreeable expe-

¹ Practical Observations in Midwifery, Part II. London, 1832.

dient" of forced delivery. In order to see how "rupturing the bag" will operate, we may look at one of his cases (No. CXXX.), not without edification. I shall take the liberty of abridging it and Italicizing its salient points. Flooding with faintings at the ninth month *without* labor pains; head presentation, membranes whole: the doctor *ruptured the membranes* and left the patient in charge of the midwife; on visiting her again in two hours, learned that there had been no active hemorrhage, but a *slight drain had continued with trifling* labor pains, which had little or no effect on the head of the child; the patient being considered *in a worse condition* than at first visit, *forced delivery* was resorted to, the child was slowly withdrawn, *a sudden gush of blood immediately ensued*, followed by restlessness, and the patient soon expired.

How graphically does this case set forth the poverty of artificial delivery, when there has been a great loss of blood and nature can brook no more! the *post-partum* bleeding turned the trembling balance of life against the patient. The case is, however, cited to show the impotency of mere rupture of the membranes, under such perilous circumstances. The criticism of Dr. Burns, already quoted, which proscribes such an expedient, is true to the letter, and deserves to be held in perpetual remembrance. It cannot be too often repeated, that *the discharge of the liquor amnii alone can never be depended on to control hemorrhage, but only to induce prospective labor*. How much blood may be lost before its aim is attained, we have no arithmetic to compute, but experience has abundantly taught that before an uterine fibre is set in motion by it, the flame of life may be quenched in blood. Why, nearly one-half of Dr. Ramsbotham's cases of accidental flooding terminated fatally, and yet, strange infatuation, as it seems to me, he talks complacently enough of "rupturing the bag."

The genuine Puzosian expedient is sufficient for these great emergencies. I have found it so; even in the case of concealed hemorrhage, which I have referred to as occurring in my own practice, it stood me in stead, and when the womb was aroused to action, great black clots of blood were expelled, previous and subsequent to the birth of the (dead) child; the mother recovered, and I have since delivered her of two children without accident of any kind. In instances of unavoidable flooding from *partial* presentation of the placenta, experience has equally declared in its favor.

The only question that remains to be discussed is, Can the practice of Puzos, either in its original or in a modified form, be opposed to floodings of the unavoidable kind, where the placenta is centrally implanted over the mouth of the womb? Dr. Rigby answered this question in the negative, in his world-renowned Essay, one of the great doctrines of which is, indeed, that nothing but artificial delivery can save the patient from her otherwise almost inevitable doom. Whilst he gives, as we have seen, the greatest encouragement to hope for a fortunate issue from the employment of Puzos' method, in accidental hemorrhage, he avers, with equal confidence, that the unavoidable flooding "cannot possibly be suppressed by any another method whatever than the timely removal of the contents of the womb;" "for," says he, "it will inevitably return when nature is so far recovered as again to bring on labor, and every return of pain must be a return of the bleeding, and it must become greater and greater as the uterus opens more and more, and the placenta is in proportion detached, till it increases to a degree that exhausts the patient, and she dies before nature has been able to expel the child. That such must inevitably be the progress and event of floodings arising from such a cause, if left to nature, is too obvious to be further insisted on." Elsewhere, it is more explicitly and specifically declared that "nothing but turning the child will put a stop to the flooding." The deservedly high reputation of Dr. Rigby as an obstetric practitioner, the persuasive rhetoric and decisive tone of his classical Essay, the numerous cases brought forward in support of his doctrine, all contributed to cause his opinions to be generally received as decisions of the highest court of judicature, from which there is no appeal. Hence, few have ventured to deviate from the practice so strongly urged by him until quite recently, and even now it may be considered as the established practice, notwithstanding the indications of innovation, which threatens materially to modify or altogether displace it.

In considering the claims of forced delivery to our acceptance, the first questions which would naturally be propounded by an earnest inquirer are, What success has crowned it? and, How many women and children have been saved by its interposition? To these questions we are now enabled, thanks to the indefatigable investigations of Prof. Simpson and others, to reply satisfactorily, by the evidence of statistics. The result of delivery by turning, in 421 cases of placenta prævia, collected and tabulated by Dr.

Simpson, was fatal to the mother in 144 instances, which is more than one in three (one in two and nine-tenths), the result to the children being not stated—a fatality but little less than that attendant upon the Cæsarean operation, which is, according to Dr. Churchill, one in two and four-tenths. The result was rather more favorable to the mother, according to the statistics of Dr. Trask, 141 out of 200 recovering, while 59 died, or one in three and four-tenths; nor can we learn the foetal fatality here, because the table in which these cases are registered contains other cases in which the mode of delivery was different. We may, however, get a pretty good idea of the result to the child of all kinds of artificial delivery, in placenta prævia labors, from this table. "Among the *recoveries* by the mother," Dr. Trask remarks, "in which the fate of the child is noticed, in 46 cases the child was *living*, and in 61, or 57 per cent., it was dead. Among the *deaths* of the mother, in 10 the child was *living*, and in 23, or 70 per cent., *dead*, affording a total of 56 living and 84 lost. Adding to these cases those in Dr. Lever's table, we have a total of *seventy-four* children saved and *ninety-nine* lost. If we add to these the results of Dr. Merriman's experience, viz., 22 children saved and 67 lost, we get a total of *ninety-six* saved and *one hundred and sixty-six* lost, or 1 in 2.7 of the whole saved."

As an estimate of the maternal mortality from delivery by turning, in unavoidable hemorrhage, Dr. Simpson's table should be relied on in preference to Dr. Trask's, not only because it embodies a larger number of cases, but because, also, it is made up from the registers of only a few eminent men, set apart and devoted to obstetric practice, who published *all* their experience, while Dr. Trask's table contains a good many *scattering* cases, by which I mean cases reported by general practitioners, who never had more than, some one, and others two, in the whole course of their practice. Now, of such, we know that, as a general rule, none but those who were successful will publish their cases; the rest are well content to consign theirs to oblivion. Could the unsuccessful cases be gathered up, they would, I have reason to believe, more than counterbalance those which appear in our medical journals, and soon find their way into our statistical tables.

It thus appears that about *one-third* of the mothers and *two-thirds* of the children have been lost after the operation of delivery by turning in placental presentations. This startling mortality, be it

remembered, occurred under the most favorable circumstances, both as regards the condition of the patients and the skill of the operators, for most of the cases were in the hands of such obstetricians as Mauriceau, Portal, Giffard, Smellie, Rigby, Clarke, Collins, Lachapelle, the Ramsbothams, &c.

To form some approximate idea of what must needs be its results in *general practice*, we have only to consider cursorily some of the conditions which must exist before the operation can be performed without almost the certainty of disastrous consequences. The first of these conditions is that the os uteri be either sufficiently dilated or *dilatable* to enable the operator to introduce his hand into the womb without lacerating it—a condition which all good practical writers take pains to explain and to insist on as an indispensable prerequisite. If the os uteri be opened to only a slight degree, and indisposed to dilate, so that force is required to overcome its resistance, then there is danger of lacerating it by the insertion of the hand; and let it not be forgotten that such a wound is always of a more serious nature in cases where the placenta is implanted over the os uteri, because the inferior segment of the womb is so much more vascular than in ordinary cases. This high vascularity may give rise to fatal *post-partum* bleeding, even though the uterus be contracted; or, if the patient be not carried off by *surgical* hemorrhage, she is more liable to fall a victim to metro-peritonitis. The obstetric record is reddened with cases of fatal results following the forcible entrance of the uterus in placental presentations attended with rigidity of the os uteri. What more convincing proof of this can we have than is furnished by the *eleven* instances of this kind reported in Dr. Lee's *Clinical Midwifery*, where there was "more or less *rigidity* of the os uteri, with dangerous hemorrhage, *eight* of the mothers dying, and two narrowly escaping with their lives"? In view of these cases, well might Dr. Simpson observe that "the operation of turning and artificial delivery in unavoidable hemorrhage, with the os uteri imperfectly dilated, would, from these and other cases, appear to be more deadly than any operation that is deemed *justifiable* in the whole circle of surgery."

But if, deeply impressed with the tremendous risk of *forcible* delivery, we anxiously wait until we are sure that the requisite dilatation and dilatability exist, we are in danger of procrastinating until the patient is so greatly exhausted that she cannot bear the

shock of the operation; and then not more surely would a thunder-bolt destroy her than artificial delivery. On this point there is, likewise, great unanimity of opinion among obstetric writers; and there is no need of fortifying it by citations. Now, here is the great obstetric dilemma: If delivery be undertaken too early, we may cruelly add to the sufferings of our patient, and violently hurry on a fatal termination; if it be too long deferred, we dare not operate, lest we extinguish the flame of life, already flickering in its socket. If the most experienced accoucheurs have found difficulty in extricating themselves from this dilemma, or rather if they have been repeatedly caught upon both its horns, what can be expected of the inexperienced? Will one mother in three, instead of two in three, be saved by their ministry? Will one child in a dozen be brought alive into the world?

On the whole, then, the success of the operation of turning, in placental presentation, is not calculated to create any prepossession in its favor, but the reverse; still, it may be that it is our only resort, and that, in giving our patients even the slim chance of escape which it holds out, we shall enjoy "the satisfaction," as Dr. Rigby expresses it, "of knowing that nothing but turning can relieve the woman, and that, therefore, we do not give her unnecessary pain." Let us inquire, then, whether it be, indeed, true that there is no alternative, and that nature is powerless. If nature can interpose, and is well inclined to do so, it is highly probable that art may learn some useful lessons from a close observation of her method of procedure.

Spontaneous delivery is by no means so rare as it was formerly supposed, and it will be interesting, as well as profitable, to compare its results with those of artificial delivery. Dr. Simpson has taken pains to collect the history of many cases of natural delivery with unavoidable flooding, which he has arranged in tabular form, so as to show, at a glance, the prominent features of each case in comparison with the rest. The collection was made chiefly in reference to *one phenomenon*, which almost uniformly occurs in such cases, viz: the spontaneous subsidence, or total cessation of hemorrhage, when the labor has proceeded so far as to detach the placenta, *i. e.*, when the os uteri is fully dilated. The arrest of the bleeding at this time, and the inference drawn from it by Dr. Simpson in respect to the source of the hemorrhage, have been already adverted to. The table embodies 141 cases, in all of which the

expulsion or extraction of the placenta preceded the birth of the child, but the child was expelled without the assistance of art in only a part of them; in all of the cases, therefore, the parturient forces were in operation, for the dilatation of the os uteri and the separation of the placenta are no inconsiderable part of the travail of child-birth.

The table might, therefore, with equal, if not greater propriety, have been entitled "A general tabular view of one hundred and forty-one cases of natural expulsion of the child, with only incidental assistance, in placental presentations," rather than, as Dr. Simpson entitles it, "A general tabular view, &c., in which the expulsion or extraction of the placenta preceded the birth of the child." This criticism will not, I hope, be deemed impertinent, because these cases, for which we are under many obligations to Dr. Simpson, teach us much more than the incident that, in a manner, engrossed his attention, as I shall endeavor to show, and they are truly exemplifications of the *vis obstetricia naturæ*, not in a single stage, but in all the stages of labor, from which art may, if I mistake not, derive some useful hints. It may be proper to say that what I mean by incidental assistance, in the cases comprised in this table, is manual or instrumental aid, necessitated by mal-positions of the foetus, &c., but *not* required on account of the flooding. Should the shoulder of the child, for example, be found presenting above the placenta stretched over the os uteri, turning would have to be performed on account of the foetal position, notwithstanding that the flooding might not require it, as, indeed, it did not, strictly speaking, in any of these cases. They may all, therefore, with but few exceptions, be considered as examples of the sufficiency of the natural resources, in a large proportion of cases, to restrain flooding within safe bounds, and ultimately to arrest it even before the completion of labor.

Having premised these general remarks, I proceed to notice some of the more important points, which Dr. Simpson has deduced from the table under consideration, and others, to which he has not directed attention, though they are as clearly deducible, and have an important bearing on the subject we are discussing. One of the deductions of Dr. Simpson is, that *the number of preternatural, and particularly of cross-births, in placenta prævia, is remarkable: the presentation being specified in 90 cases.*

In	4	cases	the	feet	presented.
"	6	"	"	breech	presented.
"	21	"	"	trunk or upper extremities	presented.
"	59	"	"	head	presented.

Total, 90

The greater comparative frequency of presentations other than the head is closely allied to the circumstance that, in many of these cases, labor comes on prematurely, before the foetus has definitively taken up its position with the head downwards, as it has been shown in the chapter on Pregnancy.

Another deduction of Dr. Simpson upon which he puts the greatest stress, making it the support of a new mode of treatment, as we shall see, is, that *hemorrhage is seldom absent prior to the separation of the placenta and as rarely present subsequent to its separation.* There are returns in 111 out of the 141 cases, regarding the extent of the hemorrhage that was present, previously to the detachment and expulsion of the placenta, it being reported as

Great in	.	.	.	.	.	72	cases.
Considerable in	.	.	.	.	.	24	"
Slight in	.	.	.	.	.	8	"
Little or none in	.	.	.	.	.	7	"

Total, 111

In 39 out of the 111 cases, the absence or presence of hemorrhage after the expulsion of the placenta is not stated or alluded to by the reporters; "but it is evident from the other circumstances which they describe, that in most of these cases there could have been no serious, if indeed any, extent of flooding, because the woman was allowed to remain undelivered, in many of them, for a considerable time after the placenta was separated—a state of matters which would not have been permitted if there had been any degree of discharge calling for the immediate delivery of the patient."

In 70 of the 111 cases, the existence and degree of hemorrhage, after the complete separation of the placenta, is distinctly stated, and may be tabulated as follows:—

In	44	cases,	the	hemorrhage	was	completely	arrested.
"	10	"	"	"	"	very	slight or almost none.
"	7	"	"	"	"	inconsiderable.	
"	1	case	"	"	"	ceased.	

In 1 case, the hemorrhage was much diminished.

" 1	"	"	"	considerable.
" 1	"	"	"	'a good deal.'
" 5 cases		"	"	profuse.

Total, 70

Dr. Simpson enters into the history of the five cases in which the hemorrhage is said to have continued profusely, for the purpose of showing that they are not really exceptions to the rule, but may be otherwise accounted for. But I do not consider it necessary to follow him in this investigation.

It is very interesting to know the influence of separation and expulsion of the placenta before the child on the life of the mother and child, and it is found by Dr. Simpson that the mortality for the mother was 1 in 14, and for the child, a trifle more than 2 in 3, viz., there were 10 maternal deaths in the 141 cases, and 73 foetal deaths in the 106 cases in which the result as to the child is stated, which, it will be perceived, is a great saving of the mothers without appreciable sacrifice of their offspring, compared with the results of artificial delivery, especially by turning.

Inasmuch as the result, favorable or unfavorable, of cases of unavoidable flooding must needs be affected by the *modes of delivery* which are employed, we are anxious to gather from this table all the information it can afford on this point, which seems to have been overlooked by Dr. Simpson. He merely observes: "The means by which the children were ultimately delivered have varied greatly according to the peculiarities arising from the presentation, and the supposed necessity or non-necessity of direct instrumental or other interference.

In 1 case,	the child was delivered by the long forceps.
" 3 cases	" " " short forceps.
" 1 case	" " evisceration.
" 2 cases	" " decapitation.
" 3 "	" " simple traction.
" 40 "	" " turning.
" 66 "	" " natural pains.

Total, 116

In the remaining 25 cases, the manner of delivery is not specified."

Now we wish to learn the influence of these different modes of delivery, especially natural expulsion and turning, on the result both in regard to the mother and child, and an examination of the 66 cases of spontaneous expulsion of the child warrants the deduction that this mode of delivery is much more favorable to the mother and scarcely less favorable to the child than delivery by turning, considered as the authorized practice in placenta prævia cases generally, for only 2 mothers and 47 children were lost, or 1 in 33 instead of more than 1 in 3 for the mothers, and only a trifle more than *two-thirds* of the children, which is the ratio in regular deliveries by turning. Nature, then, interposes much more efficaciously in behalf of mothers in these perilous cases than art, and is scarcely less mindful of their children.

But again: If we scrutinize the 40 cases of delivery by turning, it will be found that the result was more propitious to mother and child than where turning is resorted to in an earlier stage of labor, and of course, before the placenta is either detached or expelled, as is commanded by the canons of obstetrics, for in the 40 cases of turning there were 6 maternal and 25 foetal deaths, or 1 in $6\frac{2}{3}$ of the mothers, instead of 1 in 2.9, and 1 in $1\frac{1}{3}$ instead of 2 in 3 of the children. The greater success of turning in such cases as are comprised in the table before us, than in the generality of cases of placenta prævia is, doubtless, attributable to the dilatation of the os uteri, implied by the spontaneous detachment of the placenta, and consequently the diminished risk of lacerating it or doing other violence by the introduction of the hand. It must, however, not be forgotten that, notwithstanding this preparedness for the operation, delivery by turning was far less favorable to the mother and but little more favorable to the child than natural expulsion, which would seem to interdict turning where the head presents, though it was practised in 14 such cases, with the loss, in these particular instances, of 2 mothers and 5 children.

It was the critical examination of the numerous cases of natural expulsion of the child, scattered through the medical journals and found here and there in works of authors on midwifery, which led the indefatigable and philosophic professor of midwifery in the University of Edinburgh to propose, a few years ago, a novel mode of treatment in cases of unavoidable flooding. Having observed, in the perusal of these memorials of the operations of the *vis obstetricia naturæ*, that when the placenta is wholly detached

there is almost uniformly a marked mitigation or a total suppression of the hemorrhage, and that, moreover, the risk to the mother is greatly diminished, Dr. Simpson proposed the *artificial separation of the placenta*, with or without its extraction according to circumstances, as a substitute for delivery by turning, in certain cases, to be presently specified. The proposal is certainly a bold one, and no man, it may be safely affirmed, would have had the hardihood to publicly make it, upon the strength of deductions derived from the scrutiny of obstetric records, unless he were largely imbued with the philosophic spirit and impelled by unwavering confidence in the soundness of his conclusions. A merely practical man might have read of a thousand such cases, with no more attention or thought than a twice-told tale would excite, or he might have met with scores of such in his own practice, and considered them only as instances in which obstacles were thrown in his way by the blindness or awkwardness of nature. It is, therefore, Dr. Simpson's method, and to him all the praise or blame justly belongs, which future experience may award. True, the late Mr. Kinder Wood, who for some years was lecturer on midwifery in the Manchester Medical School, was well acquainted with the fact that the detachment of the whole of the placenta will put a stop to the hemorrhage, and pursued this course of treatment, where the hemorrhage had produced great exhaustion; but he published nothing on the subject, and his views do not appear to have been known to many of his associates or fellow-townsmen, and, if divulged to his pupils, as it may be presumed they were, they seem to have made no impression. We are bound, then, to give full credit to Dr. Simpson, when he says: "I was long under the belief, that I was original in the idea of a practice, which, so far as I was myself concerned, was in the first instance the result of simple reasoning upon the data afforded by two cases that I had personally observed, and by the histories of a few others that I had read of or collected."

As a good illustration, though somewhat verbosely delivered, I will cite Dr. Simpson's first case, in which he subjected his idea to the test of experiment:—

"CASE.—*Great hemorrhage; rupture of the membranes insufficient; the os uteri not so dilated as to allow of turning; the placenta artificially extracted about two hours before the birth of the child.*—I was called to see the lady who was the subject of this observation, at about five in the afternoon of the 1st of October, 1844. The gentleman who

was in attendance upon her, Mr. Hill, of Portobello, informed me on arriving, that she was between the seventh and eighth month of pregnancy; that she had almost daily suffered from considerable discharges of blood, without pain, for about a fortnight previously; and that she had been flooding with slight uterine contractions for about ten or twelve hours before my visit. I found her a weakly person, with bleached features, and much sunk and prostrated by the preceding hemorrhage. The pulse was very small, soft, and compressible. The abdomen seemed much distended with liquor amnii. On examination, I found the vagina filled with coagulated blood. It was exceedingly difficult for me at first to reach the os uteri, partly in consequence of the rigidity of the parts, and partly from the very high situation of the os uteri itself. On touching the os uteri I found it still very slightly dilated, and on passing the finger through it, it came in contact with the anterior edge of the placenta; the presentation being one in which the placenta was attached to the posterior lip of the cervix uteri, and so as to project over the os itself. Mr. Hill and I agreed together to allow the escape of the liquor amnii, provided I could reach and rupture the membranes. I was enabled to do so with some little additional difficulty; and immediately upon perforating the membranes anteriorly, an immense gush of liquor amnii took place, and the abdomen became comparatively smaller. I had hopes that I had done enough to arrest, in all probability, the hemorrhage under which the patient was evidently sinking. She got at the same time a large dose of the ergot of rye, and we waited with some impatience for the result. Stronger uterine contractions came on, and shortly afterwards I re-examined, in order to know their effect on the os uteri. I was distressed to find the vagina again filled with clotted blood, showing too manifestly that the rupture of the membranes, and the supervention of more powerful pains had been anything but sufficient to arrest the progress of the flooding. A small portion of the anterior part of the placenta was by this time threatening to protrude through the os uteri. I passed my finger by the side of it posteriorly, endeavored to detach as freely as possible the organ, and then seizing the protruded part between two fingers, I gradually and steadily pulled the whole mass downwards into the vagina, and through the vulva. After accomplishing this, I confess that for a few minutes I felt a degree of timidity at what most of my professional brethren would have at once denounced as a most im-

proper line of proceeding on my part, and one in direct opposition to all the most approved and established rules in obstetric medicine. The result, however, was such as to answer my best expectations. All fears were dissipated, by ascertaining in a few minutes that there were no new clots, nor any new discharge of blood accumulating in the vagina, and that the head of the infant was presenting—a circumstance which could not be previously ascertained. The cervix, however, was still so undilated as to hold the head from impinging directly on the interior of the os uteri—a band of contracted fibres high up in the cervical canal acting as a shelf on which it rested.¹ The patient got an additional dose of ergot, and I cut through the umbilical cord, and separated the placenta, for the purpose of ascertaining, by ocular inspection of the mass, if the whole of the organ had been extracted. It was for this purpose placed upon a plate nearly two hours before the labor was completed. The infant came down slowly, but without any additional hemorrhage. The mother made a perfect recovery. Her pulse, during convalescence, never, I believe, rose above 80.”²

Before entering on a critical examination of the merits of Dr. Simpson's proposal, it will be proper, at least on account of the student in obstetrics, to premise a few observations on the nature of labor in general, in order to point out more distinctly the peculiarities of placenta prævia labors. Labor, as the term itself imports, is a *work* performed with intense exertion, requiring frequent intervals of rest, and parcelled out, so to speak, into *three tasks*—the first being the dilatation of the os uteri, to open a passage for the child; the second, the expulsion of the child, when the way is cleared; the third, the detachment of the placenta and membranes, and their ejection from the uterus, which completes the travail. This natural threefold division of labor is recognized by the great majority of practical writers under the denomination of first, second, and third *stages* of its progress. Now, it must be observed that where the placenta is implanted over the os uteri, and natural delivery takes place, there is necessarily an inversion of the usual order of these several stages, viz: the placenta is expelled before

¹ “See an analogous and very interesting case of placental presentation, with the os uteri largely dilated, and stricture in the upper part of the cervix, recorded by Dr. James Reid, in the *London Medical Gazette*, vol. xvi. p. 145. Dr. Reid's case was further remarkable, as being one of those instances in which the placenta presented *without* any attendant hemorrhage.”

² Works, First Series, page 663.

the child, and not only so, but the first stage is confounded with a part at least of the inverted second, *i. e.* while the os uteri is being opened, the placenta is in process of detachment, and when the opening is completed, the placenta is nearly or entirely detached and partly expelled, it may be, into the vagina.

With the aid of only this physiological taper which I have lighted, let us proceed to consider the merits of Dr. Simpson's proposal. Deriving the idea from an observation of Nature's method of proceeding, in the cases collated by him, the author must, of course, think that his method is an imitation of Nature's, and that, consequently, it has the highest sanction that can be claimed for any device of man. But it does not require much reflection to satisfy us that it is an imitation of nature only in appearance, not in reality.

The points of difference are glaring. In the natural operation, the placenta is gradually separated by the divellent force of uterine action, gently exerted; in the manual operation, one or more fingers, or the entire hand is thrust into the uterus, and the bonds of union between it and the placenta are rudely sundered; rudely I mean, even when most delicately performed, in comparison with nature. Whether it be possible for art, especially when the os is rigid and but little dilated, to manage the separation of the placenta, without inflicting some injury upon the inferior part of the womb, which may unfavorably affect the final result, must be deemed exceedingly doubtful.

But, again. In the natural operation, the dilatation of the os uteri is carried on, *pari passu*, with the detachment of the placenta. It is, indeed, the dilatation that effects the detachment, and when it is complete, two stages of labor have been accomplished; in the manual operation, the os uteri is not dilated and it may be not even disposed to dilate, but the placenta is merely torn loose from it, and instead of two stages of labor having been performed, labor may have not even commenced. Now, it may be reasonably doubted whether hemorrhage is as likely to be restrained in such a condition as where uterine contraction detaches the placenta and continues to be exerted.

Yet, again. Though it be true that when the placenta is naturally separated and expelled, the hemorrhage usually ceases, yet it may be confidently affirmed, that the restraining of hemorrhage is no part of nature's object, so to speak, in separating and expelling

the placenta; but she institutes labor, and the placenta being in the way, is first expelled as a matter of course. Nor, indeed, is much blood saved by the natural process, the expulsion of the child not unfrequently following that of the placenta almost immediately, and in the majority of instances, in the course of a few minutes. Dr. Simpson makes a division of the 141 cases which he has tabulated, founded on the interval between the expulsion of the placenta and the birth of the child, which shows how the matter stands in this respect, viz: in 47 cases, the interval was from 10 hours to 10 minutes; in 24 cases, less than 10 minutes; in 30 cases, the placenta was expelled immediately before the child or both were expelled together; in 40 cases, the interval is not known. In several of the cases ranged under the first division, the interval was only a half hour, during which there could not be any great loss of blood, whilst in the brief, or no interval of the second and third divisions, it is certain that there was no appreciable bleeding. It may, therefore, be reaffirmed that nature does not separate the placenta for the purpose of arresting hemorrhage; still, if this occur incidentally, it is doubtless a benefit, and it is right that art should avail herself of it, only she may need to be cautioned against expecting too much, when her manœuvre is substituted for nature's operation, seeing that they are so unlike.

I am aware that no reasoning, however cogent, ought to set aside the teachings of experience, and it may be that the artificial separation of the placenta is as efficacious as its natural separation, in controlling hemorrhage and rescuing its subjects from the dangers by which they are environed. We will, therefore, dismiss reasoning, and appeal to experience, endeavoring to divest ourselves from any prepossessions. Dr. Trask, in the *Prize Essay* before cited, has collected all the cases published in which the placenta was separated by the hand, and given an abstract of them in his third table. They number 66, from which 6 are deducted for reasons assigned; out of the remainder, there were *forty-seven recoveries* and *thirteen deaths*, or *one in four and six-tenths* (1 in 4.6), as the gross mortality after *artificial* separation—a mortality somewhat less than the general mortality under ordinary modes of treatment; “but very much greater than after *spontaneous expulsion of the placenta*.” These results seem to confirm the forebodings of reasoning, that the artificial separation of the placenta might not prove as salutary as its natural separation in the process of labor; but before such a con-

clusion is adopted, it is obviously proper to institute a comparison between these cases, and those which were subjected to ordinary modes of treatment.

Such a comparison has been made by Dr. Trask, who finds that the cases in which artificial separation was practised, taken as a class, were decidedly of a more severe and dangerous kind than those tabulated by him, as illustrative of the results of turning, &c. There was among them a larger proportion of *complete* presentations of the placenta, of "severe," "very urgent," "profuse" hemorrhages, of extreme and alarming prostration; in a word, they were, "as a whole, previous to the separation of the placenta, suffering apparently from about an equal degree of exhaustion with those patients who, subjected to ordinary treatment, died."

I am not sure that I comprehend Dr. Trask's meaning here; if it be intended to assert that all these patients, or even all the extreme cases, would have died under other modes of management, the assertion is a hazardous one, and will not be borne out by his own statistics, for in speaking of *recoveries*, on the previous page, under ordinary treatment, the same terms are used to describe the *condition* of the patients as are employed to describe the *condition* of such as had the placenta manually separated. Of both classes, it is said there was "alarming prostration or exhaustion;" indeed, it is said only of those who received the ordinary treatment, that they had "syncopes," &c., the least equivocal evidence of really alarming loss of blood.

It does not appear to me that, so far as statistical evidence goes, the success of artificial separation of the placenta, so far as the mother is concerned, is anything like equal to its spontaneous separation, though it be something greater than after ordinary modes of delivery. The proportion of children saved is about the same, according to Dr. Trask's estimate, who tabulates as follows:—

	15 children were saved.
	32 " " lost.
	In 16 result not stated.
	2 not viable.
	1 undelivered.
Total,	66

or a trifle less than one in three saved, which is the proportion,

according to Dr. Simpson's statistics, after spontaneous separation, and differs but little from the foetal issues of the common modes of delivery.

It seems to me, however, that we may safely reckon as dead the children not stated to be alive; and then, deducting three for non-viable and undelivered, *only one in four and one-fifth* was saved.

The statistics of Dr. Trask bear the most unequivocal testimony to the hæmostatic powers of artificial separation of the placenta. In this respect, indeed, it is not inferior to spontaneous separation. Of hemorrhage after detachment of the placenta, it is tabulated:—

- In 35 cases, it ceased *immediately* and *entirely*.
 “ 1 case, no further hemorrhage spoken of.
 “ 1 “ none for several hours; then slight.
 “ 2 cases, it “ceased almost instantly.”
 “ 4 “ “ “ “ entirely.
 “ 1 case, there was not over a teacupful lost afterwards.
 “ 1 “ not over two ounces.
 “ 1 “ “ “ four “
 “ 3 cases, it continued slight, and in 1 after delivery.
 “ 1 case, it continued slight, until part of the placenta
 came away.
 “ 1 “ it continued at intervals.
 “ 1 “ it “was not increased.”
 “ 1 “ “no further danger.”
 “ 1 “ miscarriage; it abated, but ceased only after
 cold water.
 “ 1 “ it continued a “good deal.”
 “ 7 cases, immediate delivery followed.
 “ 4 “ not stated.

—
 Total, 66 cases.

From this inquiry, it appears that, rating it as highly as the facts will warrant, *artificial separation and extraction* of the placenta is far inferior in saving efficacy, so far as the mother is concerned, to its *natural separation and extraction*, and, to say the best of it, not superior as regards the child, yet it is superior to the ordinary modes of delivery for the mother, and but little, if any, inferior for the child. It must, then, be pronounced an improvement on the hitherto established principles of treatment, whilst it falls short of

fulfilling the expectations which its sanguine projector probably entertained.

It is due to Dr. Simpson, however, to say that his proposal has been misapprehended; or, at any rate, it has not been fully acted on. It is brought forward by him, as already stated, as a *substitute* for turning and all other modes of delivery, not necessitated by other complication than hemorrhage. If hemorrhage alone is to be combated, it contemplates its arrestment by the avulsion of the placenta, and the commitment of the expulsion of the child to nature. "Both to detach the placenta and extract the child," he rightly says, "would be hazarding a double instead of a single operation;" and yet, in a considerable number of the cases collected by Dr. Trask, this double operation was performed, the child, in not a few instances, having been delivered by turning, notwithstanding that the head presented. Still, I will not undertake to say that its proportionate success, as compared to nature's, would have been any greater had his proposal been most rigidly adhered to, for there were turnings many in the cases of spontaneous separation of the placenta collected by Dr. Simpson. If this kind of interference had been withheld by the executors of his method, their success *might* have been greater. If, on the other hand, the obstetric ministers of nature, in the cases of spontaneous separation of the placenta, had only been content to leave the expulsion of the child to nature, their success *would certainly* have been greater, for it has been already shown, by Dr. Simpson's statistics, that only 1 out of 33 mothers died, who were naturally delivered.

It would be premature, perhaps, to attempt to decide upon the capabilities of the Simpsonian method, in the absence of sufficient data, seeing that it has not been put fully in practice. But it may be reasonably doubted whether it will ever be reduced to practice, or, if it should be, whether any greater triumph can be achieved by it. The grounds of this doubt may be briefly stated. Against its introduction into practice there lies the formidable objection that so long a period may elapse after the detachment of the placenta before the completion of labor, that the child must inevitably be lost, seeing that it is deprived of its branchial apparatus, and can no more live than a fish out of water. The salvation of the child, though subordinate to that of the mother, must be taken into account in all our obstetric schemes, for it is one of the glories

of our high vocation that two lives are simultaneously intrusted to our charge. Ruthlessly to tear away the quasi-lungs of the child, without a clear conviction that the act is justifiable, as the only means of snatching the mother from the jaws of death, is what no conscientious practitioner will consent to do. But supposing the necessity to be urgent and the path of duty and conscience to be never so clearly marked, nothing but experience can satisfy us that the mother's condition will be materially improved or her chances of escape much enhanced. True, the hemorrhage may be arrested, but what assurance can we have that labor will promptly supervene? And, meanwhile, the detached placenta, divested, of course, of vitality, immersed in fluids and exposed to both heat and air, must take on putrefactive decomposition, and, poisoning the blood of the mother, excite constitutional irritation, which she is ill able to bear in her exhausted condition. I conclude, therefore, that whenever Dr. Simpson's expedient is adopted, it must, of necessity, be supplemented, if need be, by the extraction of the child, and, consequently, that it cannot be accounted an adequate substitute for artificial delivery.

Dr. Simpson indicates numerous circumstances in which, as he thinks, his proposal should supplant artificial delivery, of which the chief are, *rigidity of the os uteri* and *alarming prostration of the vital powers*—the one forbidding artificial delivery for fear of laceration, the other lest the patient be overwhelmed by the shock. In the first strait, I must think that his proposal is inadmissible; but in the second, it is entitled to favorable consideration, as a means of arresting hemorrhage and gaining time to recruit the patient's system, to enable her to bear the operation of delivery, by nature or art, according to the circumstances of each individual case.

Taking natural delivery as an example, our aim has been to find, if possible, some expedient conformable to it, which may supersede the necessity of abstracting the child by manual operation; but failing to find it in Dr. Simpson's proposal, we turn in other directions in pursuit of our object. Our attention is first arrested by the very simple method proposed by M. Gendrin,¹ *which consists in puncturing the membranes through the placenta with a female catheter*

¹ *Traité Philosophique de Médecine Pratique*, tome deuxième, p. 347.

and evacuating the liquor amnii. This expedient is recommended both with the view of putting a stop to the hemorrhage and of leading to the establishment of parturition. The learned and ingenious author prefaces the proposition with the remark that, in cases of *partial* implantation of the placenta over the os uteri, the hemorrhage is suppressed so soon as expulsive contractions of the uterus are established, and that, where the implantation is *central*, the hemorrhage, though augmented by the first contractions, ceases so soon as the liquor amnii is evacuated in the progress of labor, unless inertia of the uterus favors its return. He expresses his surprise that the greater part of writers on midwifery have failed to make this observation, and much more that others, and among them Smellie, should have regarded this cessation of hemorrhage as a rare phenomenon. The suppression of hemorrhage, by regularly established uterine contractions, in *partial* placental presentations, and by the spontaneous evacuation of the liquor amnii, where the placenta presents *centrally*, has been witnessed by him in all the cases that have fallen under his observation.

It does not appear that M. Gendrin, at the date of the publication of his elaborate treatise, had applied his method to more than two cases, in both successfully; and it hardly need be observed that this number is too small to settle the practice on a firm foundation. It may, nevertheless, be instructive to give an abstract of one of these cases, that of a woman, who had a slight hemorrhage towards the sixth month of pregnancy, which lasted only a few hours, and was unattended by pain. Bleeding in the arm and repose were ordered by the accoucheur. The hemorrhage returned three times in increasing abundance, at irregular intervals, during the seventh month, and each time she was bled. She fell into a state of great debility (did the venesections contribute to it?), and had another profuse hemorrhage at the commencement of the eighth month, when Gendrin was called to her, who found that she had no uterine pain, and that the os uteri, slightly opened, was occupied by a clot of blood with the placenta implanted over it. The patient was so feeble that she could not sit up in bed without fainting; the uterine globe was of normal size, and the child continued to move. Ice was applied to the abdomen, but the hemorrhage reappearing notwithstanding, and her condition being very alarming, M. Gendrin instantly passed his hand into the vagina

with the intention to deliver immediately, thinking the danger to be too imminent to trust to the evacuation of the liquor amnii, but finding the os uteri resistive, he concluded to puncture the placenta with a female catheter, by which the waters were discharged, whereupon the volume of the uterus became slowly diminished, and the hemorrhage immediately ceased. In three hours labor began, which gradually increased, and in four hours more, she was delivered of a living child, with the placenta upon its head and face. There were several returns of post-partum hemorrhage during the evening; the patient was greatly enfeebled, and suffered from many of the morbid effects of loss of blood, but, after a protracted confinement to the bed, recovered and suckled her child.

This case was evidently an extreme one, and shows to advantage the power of the treatment pursued. In the absence of corroborating testimony, derived from a sufficient number of other like cases, it would not be proper either to indorse or to repudiate it. Meanwhile, it is permissible to offer a few reflections concerning it. It does not appear to me that the premiss of M. Gendrin is tenable. Granting it to be true, to the fullest extent, asserted by him, that the evacuation of the liquor amnii, taking place at the usual period of labor, never fails to suppress flooding, even in complete placental presentations, it does not follow that the evacuation by puncture, in the absence of labor, will be productive of the same effect, because the conditions are totally different; in the one case, there is uterine contraction, and labor exists; in the other, the uterus is quiescent, and, it may be, indisposed to action.

The futility of puncturing the membranes in cases of *accidental* flooding, where there is no parturient action, has been already pointed out; but whether or not the expedient be equally futile in *unavoidable* flooding, I will not venture to decide, for it may be that, when the placenta is over the os uteri, the liquor amnii being evacuated, the gravitation of the child upon the inferior segment of the womb might exert control over the bleeding, or the flaccidity itself of the fundus uteri might arrest the flow by taking off the resistance to the return of venous blood from the cervical region of the uterus. In one or the other of these ways, or in a way which we cannot conjecture, it is possible that the evacuation of the liquor amnii, so impotent where the placenta has its usual

attachment to the uterus, may be remarkable for its potency where the placenta is abnormally attached. Experience alone can decide.

The *substitute for turning*, which I will venture to propose, is a modification of the method of M. Puzos, and consists in originating expulsive contraction of the uterus by the tampon or plug and then puncturing the membranes, relying on the tampon to control the flooding until the liquor amnii is evacuated. This is the only method of treatment, of which I have any experience, and I have employed it with uniform success, so far as the mother is concerned. This is strong testimony, but it must be mollified by the confession that my experience, in placenta prævia cases, has not been large: yet I have encountered them sufficiently often to have acquired some acquaintanceship.

To expound this method of treatment and at the same time vindicate it, it must be observed that the tampon is preferable to manual dilatation, as an oxytocic, in placental presentations, because forced dilation could not be practised without necessarily still further detaching the placenta, giving rise to additional hemorrhage, all the more profuse on account of the non-parturient state of the uterus. Then, again, such manipulations would be objectionable because of the greatly more vascular and sensitive condition of the portion of the uterus contiguous to the os, which has already been mentioned as a reason why delivery by turning ought to be refrained from.

In arousing the uterus to expulsive contraction, the tampon acts, I suppose, through the channel that has been more than once indicated in the previous pages of this work, viz: irritation of the incident nerves of the cervix, leading to reflex action of the fibres of the fundus and body. Explain as we will, however, the fact is generally admitted that the tampon is competent to excite uterine contraction and bring on labor. Should it fail (and what may not?) it may be reinforced by the puncture of the placenta, as recommended by M. Gendrin, which, considered merely as a means of bringing on labor, is excellent and wholly unexceptionable, and it will be observed that I am not, just now, speaking of the restraint of hemorrhage but of the excitement of labor. No case can occur, I think, in which the tampon, aided, if necessary, by puncture of the placenta, will fail to bring on labor, in a longer or shorter time, and where the tampon alone is sufficient, and labor is regularly established by its instrumentality, either the placenta

must be punctured to evacuate the liquor amnii, or the finger must be pushed up beyond its margin to rupture the membranes during a uterine pain. I have myself usually practised the latter alternative, and always felt that my patient was safe, when advanced thus far on the road to recovery.

The supervention of labor—the evacuation of the liquor amnii—these, in their order, are the great bulwarks of a flooding woman, no matter where the placenta is implanted. It is a maxim in obstetrics that a *contracted* uterus cannot bleed; it might, I think, be amended and enlarged, by adding that neither can a *contracting* uterus bleed when it is emptied of its waters, or at any rate, if it bleed, the hemorrhage is no longer dangerous.

As an *hæmostatic*, the tampon is, I believe, the most reliable of all the means that can be resorted to in these cases, not even excepting the manual detachment of the placenta. But it is obvious that in order to derive any benefit from it, it must be fully used, according to the directions given in the previous chapter. It would be ineffably ridiculous to launch a bit of sponge into the sanguineous flood, rushing from the vagina; the gates must be effectually closed to arrest its flow and compel it to coagulate near its source. As there is a difference of opinion among eminent obstetric practitioners in regard to the eligibleness and even the safety of the plug, and as my own experience in unavoidable flooding is not large enough to give it the sanction, which, I believe, it deserves, I shall appeal to the experience of others, embodied in the first of Dr. Trask's statistical tables. It will not be necessary to go into details; we will look only at the results, as they are summed up by him, observing, however, that the plug was employed in these cases chiefly as an hæmostatic. The use of the tampon is noted in *twenty-eight* cases, mostly of *complete* placental presentation. In *five*, the effect in suppressing hemorrhage is not stated; in *thirteen*, hemorrhage was suppressed for a longer or shorter time, generally for several hours; in *five*, pains came on after its introduction; in *two*, the pains and hemorrhage were increased by the tampon; in *two*, hemorrhage came on while the tampon was in the vagina; in *one*, the tampon was saturated and a copious flow from the vagina ensued, after bleeding had been once arrested. In five only of the twenty-eight cases did the tampon fail to arrest the hemorrhage, which justifies the suspicion, if not the belief, that it was imperfectly used. It is

difficult, except on this supposition, to understand how the same expedient should prove effectual in twenty-three instances of so formidable an accident and inefficacious in five.

Although I have deemed it unnecessary to enter into the details of these cases, I may yet be permitted to allude to the principal features of one of them, which affords, as I think, a good illustration of the efficacy of the plug. The case is the first in the table referred to, and occurred in the practice of the late Professor Dewees. A synopsis of it is as follows: Complete presentation of the placenta; hemorrhage sudden and profuse, amounting to more than half a gallon before the doctor reached the patient, though near at hand; the os uteri rigid and high up; plugging arrested the hemorrhage for six hours, when there was sufficient dilatation to admit of delivery; delivered by turning, pains having come on four hours after plugging; mother recovered, and child alive. Since the tampon, in this case, arrested the hemorrhage and brought on labor, why was not the expulsion of the child intrusted to nature? True, the issue of the case was perfectly satisfactory in the skilful hands of Dr. Dewees. But would it have been so in general practice? And seeing that the tampon both controlled the bleeding and excited labor, where was the necessity for turning? Can it be doubted that, had the membranes been simply ruptured, the result would have been just as favorable? But the obstetric rule, in Dr. Dewees' day, required artificial delivery, and its behest was obeyed.

Notwithstanding that the tampon may be generally depended on to restrain hemorrhage, it is certainly possible that it might disappoint our expectations, and then the evacuation of the amniotic fluid by placental puncture may be had recourse to, as an auxiliary, on the authority of M. Gendrin. Should this fail, and the hemorrhage threaten to destroy the mother ere uterine contraction can be excited, there can be no doubt of the propriety of separating and extracting the placenta, according to the letter of Dr. Simpson's proposal, viz: solely with a view to the safety of the mother, losing sight of the child, whose interests are altogether subordinate. Such a procedure excludes, of course, delivery by turning, by which, as it has been shown, many maternal lives have been sacrificed that might have been saved, had the expulsion of the child been left to nature.

Thus have I endeavored to show that a modification of the Pu-

zosian method is as well adapted to *unavoidable* as to *accidental* hemorrhage, and that it may be made to supersede forced delivery in all cases, except where malposition of the fœtus exists, and demands turning on its own account. However confident I may be of the correctness of the views here set forth, I do not expect them to be speedily adopted. Whatever appearance of precipitancy they may have, all great revolutions are really slow in their progress; still, it cannot be doubted that forced delivery will be ultimately abolished, and remembered only as the first crude device of art to supply the deficit of nature, in a great and perilous emergency.

CHAPTER VII.

ON THE CAUSES OF LABOR.

FOR human parturition the term "labor" is a very appropriate cognomen, because seldom does woman bring forth except "in the sweat of her face;" and the most excruciating sufferings are fitly compared to the pangs of childbirth, because none can be imagined greater. The word labor, whose original meaning is fatiguing or painful exertion of any kind, is, therefore, more significant than "parturition," which expresses the act, but none of the concomitants, of child-bearing. I shall accordingly employ the term, not, however, to the exclusion of that of "parturition," but convertibly.

SECTION I.

THE EFFICIENT CAUSE OF LABOR.

Labor was formerly regarded as the result of the active efforts of the foetus itself, instinctively exerted to procure its release from confinement. It is strange that such a crude notion received the sanction of even the illustrious Harvey, whose incidental allusions to it show plainly that he no more questioned its truth, than that of the discovery which has immortalized his name. In his description, for example, of the case of a lady, the mother of several children, who became pregnant again, notwithstanding extensive adhesion of the walls of the vagina (insomuch that a probe could scarcely be passed from the vulva to the uterus), resulting from injury in her last confinement, he relates her despair, when the time of her delivery arrived, and expresses his own astonishment at *the unexpected and powerful effort*, by which a very robust child broke through the vaginal adhesion, making his triumphant entrance into the world, and leaving the way open for others who might follow.¹

¹ Opera Omnia, de Partu Exercitatio.

This notion, so repugnant to reason and observation, is no longer defended by any one; and it is now well ascertained, that contraction of the uterus, aided by that of the diaphragm and abdominal muscles, is the *efficient cause* of the child's release from the womb. Of these agencies uterine contraction is the principal, as every one must be convinced, who has felt its power exerted upon his hand in a difficult case of turning. It alone performs the first stage of labor, which consists in the dilatation of the os uteri, preparatory to the passage of the child; and may, also, suffice for its expulsion, which has been seen to take place in cases of procidentia of the uterus, wherein the organ being entirely external, forming a large tumor between the thighs, could not receive the aid of the diaphragm and abdominal muscles.¹ That the chief expulsive force resides in the uterus is furthermore proved by the number of instances in which the child has been born, and sometimes alive too, shortly after the sudden death of the mother from violence or spasmodic affection. Nieth² has collected a series of cases of this kind.

It cannot be doubted, nevertheless, that the abdominal muscles and diaphragm co-operate in the expulsion of the contents of the gravid uterus, in a subordinate manner. The learned Haller doubtless erred in ascribing to these secondary agents the principal, if not exclusive office, in expelling the fœtus.³ To him it appeared that the fibres of the uterus are too feeble to produce the effects required of them, viz: to propel the fœtus against considerable resistance, to compress its head into a long cone, to repel the os coccygis, &c., much more, to cause disruption of the joints of the pelvis, which sometimes happens in labor. With these he strongly contrasts the abdominal muscles and diaphragm in the throes of labor, and is scarcely able to conceive how the delicate fibres of the uterus can act at all, under their overpowering compression. He concludes, therefore, that the uterus performs but a subordinate and indirect part in labor—a conclusion at which he could not have arrived, had his practical knowledge of obstetrics

¹ "Wimmer a vu l'accouchement se faire d'une manière régulière dans un cas où la matrice formait entre les cuisses une tumeur longue de dix pouces et demi et large de six et demi, dont l'ouverture était dirigée en bas."—Burdach, *Traité de Physiologie, traduit de l'Allemand, par A. J. L. Jourdan*, tome iv. p. 204.

² *Diss. de partu post mortem*, Berlin, 1827; quoted by Burdach, *loc. cit.*

³ *Elementa Physiologiæ*, tom. viii. lib. xxix. sect. 5; *causæ partum efficientes*.

been equal to his profound erudition. We may consider these parturient powers separately.

1. OF UTERINE CONTRACTIONS AS THE CHIEF EFFICIENT CAUSE OF LABOR.

The uterus displays two distinct modes of contraction during labor; one being intermittent and attended with pain, the other permanent and free from pain. The former consists in action of the muscular fibres of the uterus, analogous to that of muscular fibres in other parts of the body, which is always alternated with intervals of repose, during which the fibres are in a state of relaxation; we may, therefore, denominate it the *muscular contraction* of the uterus, which seems to me more appropriate than "paroxysmal" or "spasmodic," by which it is commonly distinguished. The latter, viz., the permanent contraction, results from contractility of tissue; a vital property that pervades all animal textures, and it, as well as the former, occurs in the muscular tissue of the uterus. This is denominated the *tonic contraction*, and we may conceive that it is exerted chiefly in the intricate fibrous web that pervades all parts of the uterus, while the muscular contraction is performed by the several orders of fibres, whose arrangement has been described.

These two modes of contraction are equally essential, and each is worthy of our careful study.

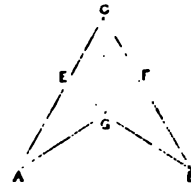
1. *Of the Muscular Contraction.*—This may be studied analytically and synthetically, that is, we may first consider the effect produced by the contraction of each order of fibres separately, and then the effect of their simultaneous contraction, as is known to occur in labor.

In pursuance of this method, it is to be observed, in the first place, that contraction of the *oblique fibres* draws the fundus towards the os uteri, or, in other words, shortens the axis of the uterus, and that in a more considerable degree than, supposing them to exist, longitudinal fibres could. To demonstrate the truth of this statement, let us take those fibres on one surface of the uterus, the anterior, for example. The fibres from both sides of the organ, running obliquely upwards and meeting on the median line, compose but a single muscle, of the penniform kind, with the round ligaments for its fixed points. These ligaments are to be regarded as its fixed points, in consequence of the connection of their lower extremities with the tendinous insertions of the abdominal muscles.

J. Hunter, in his second Croonian Lecture on muscular motion, observes "that there are many half-penniform and complex muscles in the human body, but hardly one instance of a distinct complete-penniform muscle." Ever since I have known the arrangement of the oblique fibres of the uterus, it has appeared to me that they constitute as perfect a specimen of such a muscle as anatomy has yet revealed; and I shall explain its action according to this view of its construction, making use of Mr. Hunter's diagram, intended to illustrate the principle of the action of this kind of muscles generally.

Let $A C$ and $B C$ represent two fibres of a penniform muscle in their extended state, A and B being their origins, and C the point of their insertion. Suppose these fibres contracted to the points E and F , it is evident that such contraction will bring the point of insertion from C to G , and that the motion of the point of insertion will be to the contraction of the muscle as $C G$ is to $C F$ or $C E$; for $A G$ is equal to $A E$, and $B G$ is equal to $B F$, or A and B are the centres of the circles $A G E$ and $B G F$.

Fig. 59.



From this demonstration, it is plain that the oblique fibres shorten the axis of the uterus more than any other disposition that could have been devised, and that the advantage gained is in proportion to their obliquity.

Sir Charles Bell¹ observes that "this layer of muscular substance operating on the round ligaments, is well calculated to assist in expelling the foetus;" but he does not enter into any explanation of its action, unless it be included in his remarks on longitudinal fibres, and assigns to it other offices, which, he appears to think, more peculiarly belong to it. These offices are, to bring down the womb in the first stage of labor, and to give the uterus and the head of the child the right position with regard to the axis of the pelvis; for, without its aid, he is at a loss to conceive how the uterus, by its own action, could adjust the position of the orifice for the delivery of the child.

In the second place, the contraction of the *concentric circles* of the

¹ Complete Works, edited by James F. Palmer; vol. iv., Amer. edition, 1841.

² Op. cit.

body must cause the walls of this part of the uterus to approximate so as to diminish its cavity in every direction. The fundus of the uterus must at the same time be depressed by them, so that they assist the oblique fibres in diminishing the length of the uterus.

In the third place, contraction of the *circular fibres* of the neck diminishes its calibre, and closes or diminishes its vaginal orifice. The bands of fibres mentioned by Sir Charles Bell, as running upon the internal surface of the uterus from about the mouths of the Fallopian tubes to the os uteri, may (if they exist) perform the office ascribed to them by him, viz., that of drawing the lower segment of the womb over the child's head; but their existence, or that of any other fibres, having such an office, is doubtful.

Before we proceed to investigate the effect of the combined action of these several orders of fibres, it is necessary to prove that they are all excited to contraction at the same time, as it has been denied by some, who contend that while the fibres of the body contract, those of the neck are in a state of repose.

That true parturient contraction of the uterus is general, is proved by observation, as any one may satisfy himself by placing his hand on the abdomen during a pain, when the organ will be felt everywhere hard and resisting; and if, now, the finger be introduced within the os uteri, the orifice will be found contracted at the same time. In the intervals of the pains, relaxation having succeeded to contraction, no such hardness is to be felt over the uterus, and its orifice may be easily dilated, to a certain degree, by the finger. When it becomes necessary to introduce the hand into the cavity of the uterus, additional evidence is obtained, which makes the proof as conclusive as can be desired;—while the hand is, during the pain, benumbed by the contraction of the body, the orifice contracts, also, and acts as a strong ligature round the wrist.

The tendency of the simultaneous contraction of the fibres belonging to the body of the uterus, evidently is to cause the foetus to move in the direction of the os uteri. Proceeding from the round ligaments, and dividing into two layers that spread over the anterior and posterior surfaces of the fundus uteri, the *oblique fibres* of each side grasp the organ like a pair of hands, and as the round ligaments are their *points d'appui*, they push down the foetus, while the *concentric fibres* prevent it from diverging in any direction. Could we imagine a section made across the body, at its junction with the neck, and the resistance of the bony pelvis to be removed,

it is obvious that the foetus would by their combined action be immediately expelled from its cavity.

But the neck *resists*, and resistance to the escape of the foetus is the only effect of the contraction of its fibres; it is this that makes parturition necessarily *laborious*—*hoc opus, hic labor est*.

Labor, then, according to our view of it, is a contest between the body and neck of the uterus—the former aiming to expel the foetus, and the latter to retain it. This is no novel doctrine; it was distinctly taught by the celebrated Levret,¹ who maintained that, as the neck of the uterus is the antagonist of the body, during pregnancy, and serves to hinder the product of conception from being expelled, so the body is the antagonist of the neck, during labor, else the foetus could never escape; and if the neck prove too strong for the body, one of them must necessarily be ruptured. I shall hereafter attempt to explain how the battle is lost and won.

2. *Of the Tonic Contraction.*—The term by which Baudelocque designated this action of the uterus, *action de ressort*, or elasticity, is expressive of its character and uses. In virtue of this contraction, the uterus, in fact, constantly tends to resume its unimpregnated volume, whenever the cause that distends it is removed.

It has been much disputed whether the gravid uterus really suffers itself to be distended by its contents, or enlarges with their growth, by a sort of *active dilatation*, so as to remain free from anything like mechanical distension during the entire term of pregnancy.

Declining to enter into the discussion, I will merely observe that pregnancy establishes a genuine hypertrophy in the uterus, affecting all its tissues, and thus fits it for undergoing the degree of distension required by the ovum—this distension taking place according to its requirements, and therefore under a sort of coercion, not, as it appears to me, by any imaginary faculty of active expansion.

Be this as it may, the uterus, in the exercise of its tonic contraction, acts as though it had been distended; for in proportion as the foetus is expelled, its tissue is permanently condensed, and its cavity diminished, until but little of it remains after its depletion. Nor is this all. Even before the foetus begins to be expelled, the tonic contraction is brought into operation. The muscular contractions, it is true, cannot, before the rupture of the membranes, reduce the

¹ L'Art des Accouchemens, troisième edit., Paris, 1796, p. 29.

volume of the uterus in any considerable degree, on account of its contents being nearly incompressible; but to whatever degree this reduction may be carried, when the muscular contraction subsides, the tonic interposes and prevents the organ from relapsing to its former dimensions. Some permanent advance is thus made towards diminishing the size of the organ.

After the rupture of the membranes and escape of a portion of the waters, the tonic contraction has a fairer chance, if we may so express it, to display itself. The cavity of the uterus is not then filled by the foetus, and its walls would hang flabby and relaxed about it but for the tonic contraction, which tightens and brings them into contact with the foetus, and succors the muscular in expelling it. This succor is rendered by maintaining the ground gained by each successive muscular contraction, without which it is difficult to conceive how the expulsion could be achieved at all. In truth, it could not be, unless a single muscular contraction were sufficient; for, upon its subsidence, the uterus would relapse to its former dimensions, and the foetus recede. In order that any number of muscular contractions may expel the foetus, it is, therefore, necessary that some means be devised to secure the advance made by each, and the tonic contraction is the means appointed for this purpose, which, besides rendering this indispensable aid, protects the woman against hemorrhage afterwards, by diminishing the caliber of the utero-placental vessels.

2. OF THE CONTRACTIONS OF THE DIAPHRAGM AND ABDOMINAL MUSCLES, AS ACCESSORIES TO LABOR.

Although the diaphragm and abdominal muscles are but auxiliary forces during labor, yet they render very efficient service, especially in the second stage, when the foetus comes to distend the os uteri and vagina, and, by its pressure, excites sensations comparable to those preceding the evacuation of the rectum and bladder, called by Baudelocque "*le besoin de se délivrer.*" A glance at the physiology of the effort, which they make, will be sufficient to convince us of its utility.

The diaphragm is the principal muscle of respiration. In its quiescent state it is arched above, but in contracting it becomes more plane, and the longitudinal capacity of the chest is increased, while that of the abdomen is diminished, and consequently its viscera are pressed downwards.

The abdominal muscles are chiefly concerned in expiration, being in a state of relaxation while the diaphragm is contracting, and by yielding they make room for the viscera pressed upon by the diaphragm. But when they contract, the diaphragm relaxes, and, yielding in its turn, is pushed upwards into the cavity of the thorax.

Thus we see that in respiration the abdominal viscera are not forcibly pressed upon, the alternate contraction and relaxation of these two sets of muscles securing the cavity, that contains them, from any material variation of its capacity. But in labor, both sets of muscles are called into action at the same time: first, the diaphragm contracts, causing a full inspiration; before it relaxes, the abdominal muscles contract, and, the exit of the air from the lungs being prevented by the closure of the glottis, the abdominal viscera are subjected to the pressure of their joint forces. This compound pressure, acting upon the uterus, propels the fœtus in the direction of the pelvic outlet, because such is the *resultant* of the forces producing it.¹

Writers are generally agreed as to the instrumentality of the diaphragm and abdominal muscles during labor; but according to the researches of MM. Cloquet and Bourdon, as we learn from M. Cazeaux,² the diaphragm does not exert any *active* pressure upon the superior part of the uterus, but, sustained by the resistance of the air in the lungs, its contraction fixes the base of the chest, and thus affords solid "points d'appui" to the insertions of the abdominal muscles, which alone are active in expelling the fœtus.

The fixedness of the thoracic parietes gives, doubtless, greater efficacy to the contraction of the abdominal muscles, as their whole force is expended in pressing upon the uterus, instead of drawing down the ribs, as in expiration; but I am not able to understand on what grounds an *active* agency can be denied to the diaphragm. If it be admitted that its contraction is simultaneous with that of the abdominal muscles, it must press downwards, or at right angles with those muscles, and thus cause the fœtus to move in the diagonal of the two forces, which, as already stated, is in the direction of the inferior aperture of the pelvis.

But, besides this propelling agency, the abdominal muscles and diaphragm are subservient to labor, by embracing and supporting

¹ Gardien, *Traité Complet d'Accouchements*, tom. ii. p. 216.

² *Traité Théorique et Pratique de l'Art des Accouchements*, p. 265.

the uterus while it is in action. The support, thus rendered, is a great protection against ruptures, while it excites the organ to increased energy of parturient contraction. Who does not know that firm pressure upon the uterus, through the abdominal walls, is our main reliance to excite its contraction, in cases of hemorrhage from inertia after delivery?

SECTION II.

THE DETERMINATIVE CAUSE OF LABOR.

The determinative cause of labor is that which brings into operation the expulsive contractions of the uterus and its auxiliaries; it may, therefore, be properly denominated the "exciting" cause of labor, and I shall accordingly designate it by this epithet as well as by the other.

What is it that excites the uterine contractions, when gestation arrives at its term? The inquiry has been considered as impracticable, if not impious: thus, one of the latest French writers, M. Chailly, after alluding to the views of various authors, says, "I do not insist upon these various causes; for none of the theories advanced is entirely satisfactory, and we are compelled to return, with M. Velpeau, to the opinion of Avicenna: 'At the proper time, delivery takes place by the grace of God.'"¹ Dr. Dewees, too, commences his chapter on the "Cause of Labor," in the same strain: "Avicenna, centuries ago, declared that labor was a law of God, and that it came on at the appointed time. I would ask, has any hypothesis since that period, enlightened us more upon this subject than the humble confession of this good old man?"

Labor does, indeed, take place by the divine appointment; but this is carried into effect by the operation of secondary causes, and it is not more presumptuous to inquire into these than into the causes of the numerous other phenomena by which we are surrounded. We cannot but think, therefore, that there is more piety than philosophy in Avicenna's hackneyed apothegm, and more indolence than learning in quoting it.

The theory of the celebrated Baudelocque has found most favor with obstetric writers. It has been already alluded to in the

¹ Practical Treatise on Midwifery, translated by G. S. Bedford, M. D.; New York, 1844, p. 168.

chapter on pregnancy, where it obtruded itself on our attention when the phenomena of utero-gestation were under consideration.

According to this theory, as we have seen, a woman might be truly said to be in labor, from the moment that gestation begins, for the uterus is represented as incessantly striving to expel its contents, and nothing hinders it but the stubborn resistance at the portal, offered by the undeveloped and *undevelopable* cervix.

The reasons for rejecting this theory, considered as an explanation of the development of the gravid uterus, have been assigned in the chapter referred to; and if it be untenable in its application to pregnancy, it is equally so when applied to parturition. If there be no perpetual expulsive nisus throughout pregnancy, but, on the contrary, the uterus be quiescent and tolerant of its so-called burden, the expulsive contractions of labor cannot be accounted for by ascribing them to what has no existence, but must be owing to an anatomical or physiological state of the uterus, peculiar to the close of gestation, for had even this *state* existed from the beginning, gestation could not have been preserved. I shall presently endeavor to point out in what this peculiar state consists. Meanwhile, it may be worth while to consider whether it has been found by the great French physiologist, M. Adelon,¹ in the ingenious patchwork he offers us:—

“The mode in which the uterus is developed,” he observes, “must necessarily bring on labor. In fact, only the fundus and body enlarge at first; the cervix is the last to become dilated in its turn, its dilatation being such that it becomes as thin as a sheet of paper: henceforth, the equilibrium between the fundus and cervix is completely broken, and the continual retraction of the uterus irresistibly pushes the ovum against the cervix, opens the orifice, and engages the child in it.” But, as if sensible of the insufficiency of this *irresistible* cause of labor, he seeks for adjuvants in the vital properties of the uterus, and in certain changes that take place in the placenta, the organ of attachment of the fœtus. With regard to the first, he alleges that the susceptibility of contraction gradually augments during pregnancy, until, in the end, the slightest irritation is sufficient to excite it into action. As to the second, he asserts that the placenta receives at first, with great facility, the blood both of the umbilical and uterine arteries; but that, in the progress of gestation, some of its vessels are obliterated, and it becomes less acces-

¹ *Physiologie de l'Homme*, seconde édit., tome iv. p. 123.

sible to the blood that flows towards it: a congestion of blood consequently takes place, particularly in the uterus, which proves a sufficient stimulus to excite its contractions. The congestion, according to M. Adelon, is slight at first, and the uterine contraction that it provokes, dissipates it by forcing the surplus blood into the collateral vessels; but recurring incessantly, and increasing on account of the gradual maturation of the placenta (that is, obliteration of its vessels), the uterine contractions are also incessantly renewed, until at last they are so multiplied that labor is established.

To prove that the congestion, which is asserted to exist, is capable of producing the effects ascribed to it, M. Adelon refers to the efficacy of even small abstractions of blood, in preventing habitual abortion, to the enfeebling influence of large hemorrhages over the uterine contractions, and to the continuance of contractions after delivery, until the uterus is disgorged of blood.

It will not be denied that the vital properties of the uterus, its sensibility and contractility, are highly exalted by pregnancy; nevertheless, it would remain in a state of inertia, unless it be aroused to action by some appropriate stimulus. This is admitted by M. Adelon, who thinks he finds an appropriate stimulus in the blood, by which, he supposes, the organ is surcharged in consequence of an interruption to its free circulation through the placenta. The assertion, however, that a part of the vessels of the placenta become impermeable, as the time of its separation draws nigh, is altogether gratuitous. M. Adelon has not stated the evidence on which it rests, and I know not that any one pretends to have discovered obliterated vessels in the placenta; but I do know that, when cast off at the period of delivery, it is abundantly vascular, and that every part of it is penetrated and distended by injections thrown into it. But supposing that some of its vessels are obliterated, this must take place *gradually*, and could not the blood that had circulated through them, be passed off by the collateral vessels, without the intermediate agency of uterine contractions? When the course of the blood in a large vessel, in other parts of the body, is *suddenly* interrupted by a ligature, it flows into collateral channels without any extrinsic help. Is the uterus less able to protect itself against contingencies than other organs? It ought to be more able, if its office necessarily exposes its circulation to the interruptions supposed, for, in that case, the interruption is not accidental but natural, and nature qualifies an organ for the office she commits to it.

Let it be conceded, finally, that some of the placental vessels do become impervious, and that the uterine tissues are surcharged with blood, because the collateral vessels here cannot aid, as they do in other parts of the body. what proof have we that a mere redundancy of blood can excite the uterine fibres to contraction? It is true, that when the uterus is excited to action, an afflux of blood is invited to it, and its vascular activity is increased. But here increased vital action precedes the congestion, and is not produced by it. We cannot conceive, indeed, how a mere surplus of blood from remora can have any other effect than to oppress the vessels that are overloaded by it.

Without consuming more time with learned and ingenious speculations, I proceed to state what I believe to be the real exciting cause of labor, at the completion of uterine and foetal development, namely, irritation of the cervix, and especially of the os uteri, arising from the contact of the ovum with it. Dr. John Power,¹ the author of this theory, proposes to distinguish, by the phrase "orificial irritation," that state of the cervix which first awakens the parturient contractions of the uterus, and I shall adopt the term, for the sake of its convenience. To show that the uterus is not singular in being aroused to action in this manner, Dr. Power observes, that "every organ of the body is excited into proper action by a stimulus or exciting cause: the eye by the irritation of light: the ear by the impulse of sound; the voluntary muscles by mental stimuli: and the involuntary organs by their peculiar stimuli, as, for instance, the heart by the irritation of the circulating blood; the rectum by feces: the bladder by urine, and the uterus by the stimulus of its contents." He remarks, furthermore, that "all organs which are intended to retain, for a time, and afterwards expel, their peculiar contents, are furnished with sphincters placed at their evacuating orifices. The most remarkable of these are the rectum, the bladder, and the uterus."

Having proposed and illustrated our doctrine of the determinative cause of labor, I proceed to prove it, or, at least, to adduce such facts and arguments in its support as render it much more credible than the theories we have examined, or any others that have been suggested. Some considerations may first be mentioned which create a strong *presumption* that it is in this way that the uterus is excited to parturient contraction.

¹ Midwifery, second edit., London, 1823.

1. *The peculiar manner in which the uterine neck is unfolded during pregnancy.* It has been shown, in a previous chapter, that the neck of the uterus does not participate in the changes going on in the body, having for their object the amplification of the cavity, but remains quiescent for a considerable time, and then undergoes changes peculiar to itself; that its unfolding, so as to admit the ovum into contact with it, is deferred to a very late period of pregnancy, until, in fact, a short time before labor sets in. What other use can be assigned for this singular deportment than that of guarding the neck from premature irritation, which might endanger the premature expulsion of the ovum? If it be objected that such a peculiar mode of development of the cervix is not established by sufficient observation, and the account formerly given of the matter be preferred, still the order in which the uterus is developed, even according to that account, viz., the body expanding for the first six months, and the neck, during the last three months, from above downwards, would appear to have no other object than to screen the entire neck from the ovum for two-thirds of the period of pregnancy, and the os uteri until a short time previous to its full term. If the neck have no special offices to perform, and is only required to contribute its quota to the aggrandizement of the uterine cavity, why is it, or why should it be, so tardy in complying with the requirement? He must be puzzled to answer this question, who denies that the cervix has any special offices to perform, and the particular one, too, which our doctrine ascribes to it.

The force of the inference in favor of the doctrine of "orificial irritation," deduced from the peculiar mode in which the neck is developed, is corroborated by the consequences resulting from a deviation from it. Should it begin to be developed too soon, or progress too rapidly, there will be just ground for the apprehension that premature expulsion of the ovum may take place. Baudelocque was fully persuaded that this is a frequent cause of abortion; he avers¹ that he has met with a number of cases wherein premature expulsion was attributable solely to the organic feebleness, natural or acquired, of the cervix uteri; and in watching the development of this part, he has confidently predicted that miscarriage would take place at the fifth, sixth, or seventh month, according to the degree of development at the time of examining,

¹ L'Art des Accouchements, tom. i. p. 112.

and the event uniformly verified the prediction. M. Gardien¹ confirms the truth of Baudelocque's statements: "There is no doubt," says he, "but premature labor is often the consequence of the slight resistance, natural or accidental, of the cervix uteri; and by touching a woman we may, as I have often shown the pupils assisting my practical courses, predict that labor will come on at the sixth, seventh, or eighth month, forming our judgment upon the changes which the cervix has undergone in its length and density." Levret had, indeed, made the same observation before Baudelocque or Gardien; for without the antagonism of the cervix (reiterating his cherished idea that the cervix opposes an active resistance), he declares that the product of conception would entirely escape before term, and that, in the majority of cases, this accident is to be ascribed to default of this "mechanical action," as he terms it.²

2. *The rectum and bladder being excited to expel their contents by irritation of their orifices, affords strong ground of presumption that the uterus is excited to action on the same principle.* It is hardly necessary to prove that the feces and urine are expelled in consequence of the irritation their accumulation produces at the anal and urethral orifices of the rectum and bladder. The reality of such irritation is certified to every individual, by the internal or organic sensation that accompanies it, which, like all other organic sensations, it is difficult to describe or even accurately to locate. We are, nevertheless, conscious of its existence, and may satisfy ourselves, by attending to it, that it is seated in the lower part of the rectum or bladder. When this irritation acquires a certain degree of intensity, it irresistibly provokes expulsive contractions of the muscular fibres of the rectum or bladder.

The uterus may, I had almost said *must*, be presumed to be excited to expel the fœtus on the same principle, because it is intimately associated with the rectum and bladder, and receives its nerves, in part, from the same sources. It will be remembered that it was stated, on the authority of Dr. Lee (whose observations on this point only confirm those of Tiedemann and others), that the ganglia upon the cervix uteri, composed of spinal and sympa-

¹ *Traité Complet d'Accouchements*, tom. i. p. 162, troisième edit., Paris, 1824.

² *L'Art des Accouchements, démontré par des Principes de Physique et de Mécanique*. Paris, 1766, p. 89.

thetic nerves, distribute branches equally to the uterus, vagina, bladder and rectum. It is difficult to resist the conclusion that organs which receive their nerves from the same source have an essential identity of functions to perform. Like the rectum and bladder, the uterus is moreover constrained to call in extraneous aid at a certain period of parturition, and this aid is afforded it by the same powers which the rectum and bladder invoke, viz., the diaphragm and abdominal muscles, which render like efficient service in defecation, micturition, and parturition.

Whether the uterine orificial irritation that excites parturient contractions is attended with *sensation*, analogous to that of the rectum or bladder, it may be difficult to determine. I strongly suspect that it is; but this, like its kindred sensations, is so exceedingly vague that it can hardly be defined by those who are the subjects of it. Females will not be apt to speak of it, unless closely questioned; and even then all they could say would be that *uneasiness* is experienced in the region of the uterine neck. Is not such uneasiness sometimes complained of among other premonitory indications of the approach of labor? Be this as it may, however, sensation cannot be considered as essential to the existence of such orificial irritation as may serve to stimulate the uterus to action.

We need not dwell longer on presumptive evidence when demonstrative proof of the truth of our doctrine is within reach. Here it is: *The uterus can be excited to expulsive contractions, especially in the latter months of pregnancy, by artificial irritation of its orifice.* This artificial irritation may be established by the introduction of a finger within the orifice, and pressing upon its circle to dilate it, or by the prolonged contact of a foreign body, the tampon, for example. The knowledge of this fact led M. Puzos, a century ago, to propose his memorable innovation upon the previously-established practice in cases of flooding occurring in the latter months of pregnancy, which has been fully explained in the previous chapter.

But not only may parturition be *induced* by orificial irritation artificially excited, but, when labor has commenced naturally, if the uterine contractions be languid and inefficient, they may be made stronger and more effective in the same way. The principle is, therefore, susceptible of useful practical application in the management of lingering labors, occurring under certain well-defined

circumstances, which it will be my duty to point out hereafter. Nor is this all. Many interesting phenomena are occasionally observed in the progress of labors, which serve to confirm our doctrine, and can be explained on no other principle. These will be noticed as they come up in the course of this volume, and I shall not fail to derive from them whatever support they are fairly entitled to yield.

Notwithstanding the weight and, to my own mind, conclusiveness, of the testimony that has now been adduced in support of the doctrine of official irritation, objections have been raised against it, as they may easily be against any doctrine, or even the plainest matter of fact. Dr. Dewees criticizes it at considerable length in his chapter on the Cause of Labor; but his criticism is more plausible than profound, and derives much of its edge from mistaken notions and gratuitous assertions concerning the economy of the gravid uterus. Asserting, for example, the existence of an expulsive nismus in the body and fundus of the uterus during pregnancy as an undeniable and admitted fact, and holding the commonly received opinion that the cervix begins to expand at the sixth month to make room for the ovum, he objects that the propulsion of the ovum against the sensitive cervix, by the contractions of the fundus and body, ought to produce premature expulsion much more frequently than it actually occurs, if the doctrine in question be true. And so it ought, if this nismus were not itself a chimera, and the account which he gives of the development of the cervix fallacious.

But there is one objection urged by Dr. Dewees which merits a moment's consideration, because it presents a seeming difficulty that might prove embarrassing to some. It is thus stated by him: "Labor ensues sometimes before the entire obliteration of the neck takes place, and does not necessarily ensue immediately after it is completely effaced; nay, the mouth of the uterus will sometimes be opened to some extent for days, now and then even for weeks, without the parturient effort declaring itself." Let us examine the positive and negative poles of this objection, and try whether it be as *shocking* as the doctor imagined.

First. It is certainly true, as he alleges, that various causes, such as the death of the fœtus, blows, falls, ergot, drastic purgatives, etc., may excite premature expulsion of the ovum without acting directly upon the sensitive os uteri; nay, abortion is so much more

painful and difficult than labor at term, partly because the cervix must first be developed, and then its resistance overcome by the expulsive contractions. The exciting causes appear to act by producing morbid irritability of the muscular fibres of the uterus, in consequence of which they are aroused to contraction by the mere presence of the ovum, even if the fœtus be alive, much more if it be dead, because it then acts as an extraneous body. This only proves, however, that the uterus may be excited to expel its contents in another mode besides the normal one; nor is it at all singular in this respect. The intestines and urinary bladder are ordinarily excited to expel their contents by sensible irritation referred to their orifices respectively; but in morbid states, as, for instance, when their mucous membranes are irritated or inflamed, they are thrown into contraction by the direct stimulus of the feces and urine, and diarrhœa, or strangury is the consequence. Abortion may be said to be strangury of the uterus; its occurrence proves, at any rate, that the uterus is in a morbidly irritable condition. As well, therefore, might it be argued that irritation of the orifices of their emunctories is not necessary for the evacuation of the feces and urine, in a healthy state, because they are otherwise ejected in diarrhœa and strangury, as that orificial irritation is not the usual medium through which the uterus expels the fœtus, because it is otherwise expelled in abortion.

Secondly. It must likewise be admitted, that parturient contractions are not always, or even generally, excited, immediately after the cervix uteri is fully expanded and the ovum brought into contact with the os tincæ. Our own experience testifies to the fact that several days may elapse before the occurrence of labor, although the cervix may be obliterated and its orifice be somewhat open. But it does not follow, in any case, that a cause is inoperative because its effect is not *immediately* produced: on the contrary, a longer, or shorter interval, according to the nature of the cause, must be allowed, in most cases, before the effect ensues. To borrow an illustration from medicine: Tartar emetic, introduced into the stomach, will excite vomiting in *fifteen or twenty minutes*, Epsom salts will purge in *two or three hours*, and calomel in *ten or twelve*. The same cause, moreover may require different periods of time to produce its peculiar effects on different individuals, as is notorious with regard to miasmata and animal poisons. When therapeutists shall discover why tartar emetic, salts, and calomel, do not operate

instantly, and pathologists explain why the same causes of disease have different periods of incubation in different individuals, obstetricians should bestir themselves to discover why a longer or shorter contact of the ovum with the os uteri is required in different individuals to excite labor.

There is another objection, offered by Dr. Dewees, which ought not to be passed over in silence, lest it should be taken for granted that it is entitled to the stress which he has laid upon it. He affirms that, in cases of extra-uterine pregnancy, the uterus takes on regular parturient action, at the period when gestation naturally ceases, because the deciduous membrane, which lines the uterus in these cases, as well as in uterine gestation, loses its vitality at this time, by a law of nature, and must be expelled as a foreign body. From the tenor of his remarks, the reader is left to infer that well-marked labor comes on at about the regular time, in extra-uterine, as in normal pregnancy. Admitting, for argument's sake, that this statement is correct, it only proves that the uterus may be excited to contract, by the direct irritation resulting from the presence of a foreign body in its cavity.

But the uterus is not always provided with decidua, in extra-uterine pregnancy; nor, in a large number of cases, does any pain occur that can be referred to the uterus. It is well known that if the foetus be lodged in one of the Fallopian tubes, the cyst containing it is ruptured at an early period of pregnancy, the foetus escapes into the abdominal cavity, and the woman dies of internal hemorrhage, to which is superadded peritonitis, if the accident be not speedily fatal. Before this catastrophe takes place, she may have frequent attacks of violent pain; but the pain is the consequence of disease, not of labor, and uterine contraction has no share in producing it. When gestation is protracted to the ninth month, or later, as it may be in the ventral species of extra-uterine foetation, pains occur resembling labor, which may be partly uterine, as they are accompanied with a sanguineous discharge from the genital organs; but much of the tenesmus and bearing down complained of, is undoubtedly produced by the pressure of the cyst upon the pelvic viscera. In other instances, the pain is referable to the cyst itself, which alternately contracts and relaxes like the uterus, whose functions in some respects it provisionally performs. This is doubted or denied by Dr. Dewees; but he ought to have remembered that Baudelocque, to whom he professes so much

indebtedness, and from whom to differ he declares to be so very unsafe, verified this fact beyond all doubt in one of the cases recorded by him.¹

¹ "Le kyste renfermant le fœtus se contractoit comme le fait la matrice ; il s'arrondissoit et se durcissoit pendant ces douleurs, puis il se détendoit et se relâchoit. On pouvoit, en l'observant attentivement, d'une main placée sur le ventre, annoncer le douleur qui alloit se faire sentir, sa force et son déclin. Malgré leur récidence assez fréquente, durant plusieurs jours, l'état du col de la matrice ne changea point. L'orifice externe ou vaginal ne s'ouvrit pas au delà de ce qu'il étoit d'abord, et l'interne demeura constamment trop étroit pour admettre le doigt. Il n'y eut aucune espèce d'écoulement, d'exsudation, ni de sang ni d'eau, ni de mucosités ; toutes ces parties restèrent sèches."—*L'Art des Accouchements*, par. 2235.

CHAPTER VIII.

THE PHENOMENA OF LABOR.

THE phenomena of labor are the sequences of the causes which we have been considering. For the purpose of classifying these sequences, as well as with a view to practical utility, labor is usually divided into several stages. I prefer the division into *three stages*, which will be adopted without criticizing the merits of other classifications which have been proposed. The first stage extends from the commencement of labor to the sufficient dilatation of the os uteri; the second stage embraces the expulsion of the fœtus; the third, the detachment and expulsion of the secundines.

The division of labor into three stages has been adopted by all British writers, so far as I remember, and by many on the continent of Europe; but it is deeply to be regretted that there is a want of agreement among them in relation to the work of the first and second stages.

Dr. Denman, for example, includes in the first stage, "all the circumstances which occur, and all the changes made, from the commencement of the labor to the complete dilatation of the os uteri, the rupture of the membranes, and the discharge of the waters;"¹ and this apportionment has been acquiesced in by many authors, by Dr. Blundell among others, who says: "The first stage terminates with the complete expansion of the os uteri, the rupture of the membranes, and the discharge of the liquor amnii."²

Dr. Churchill, contemplating parturition with reference to the *obstacles* to be overcome by the head of the child, as it is moved along the maternal passages, makes the first stage terminate "when the os uteri ceases to impede the descent of the head."³ The obstacles alluded to are found, first, at the cervix uteri; secondly, at

¹ Introduction to the Practice of Midwifery, Chap. VIII. Sect. vi.

² Principles and Practice of Obstetric Medicine, London.

³ Theory and Practice of Midwifery; Mechanism of Parturition.

the bony circle of the brim of the pelvis, and, thirdly, at the lower outlet of the pelvis.

Dr. Burns, looking only at the *intention* of labor, which is to expel the child and secundines, and finding that the first thing to be done is "to dilate, to a sufficient degree, the os uteri, so that the child may pass through it," considers this necessary preparation the appropriate work of the first stage,¹ and this is, also, the view of Dr. Hamilton.²

Dr. Denman's definition is obviously faulty, and cannot fail to introduce confusion and perplexity, by merging the first in the second stage, in such a manner as makes it impossible to say where one ends and the other begins. The liquor amnii being as much a part of the contents of the gravid uterus as the fœtus itself, to assign its discharge to the first stage is evidently to divide with it the work of the second stage. The first stage expels the waters, the second, the fœtus. Dr. Churchill's definition is still more exceptionable; indeed, it obliterates every vestige of distinction between the first and second stages, by assigning to the first stage the complete subjugation of two out of the three *obstacles* that impede childbirth. By the force of the uterine contractions, the head of the child must, during the first stage, not only pass the brim of the pelvis, with all the delay that may attend its being moulded to it, but also pass the os uteri, at which time it is evident that its passage into the world will be well-nigh effected. All this cannot be accomplished without strong *bearing* pains, which belong to the second stage. Indeed, such pains are the characteristic of the second stage, as *cutting* pains are of the first stage.

The work assigned the first stage by Dr. Burns is obviously its proper work, namely, the opening of the os uteri to a sufficient degree to allow the child to pass, under the impulsion of the uterine contractions. The first stage is *preparatory* to the second, and consists in the removal of the only serious obstacle that naturally exists in all cases of labor, without a single exception, namely, the strong partition thrown across the parturient passage (reckoning the uterus to belong to it, as Dr. Churchill very properly does), at the os uteri, by the contracted and resisting state of the uterine orifice. When this partition is so far weakened, and the orifice so much opened as to permit the fœtal head to be forced into it, by the parturient *vis a tergo*, then the work of the first stage is accomplished, and that of the second stage commences. It may yet be

¹ Principles of Midwifery.

² Pract. Observations.

long ere the resistance of the os is completely subdued, nay, it may not be completely subdued at all; but when no more resistance is made here than at other points of the parturient passage, then the first stage is ended; preparation is made, and expulsion, first of the waters and next of the foetus, may take place.

SECTION I.

PHENOMENA OF THE FIRST STAGE OF LABOR.

The first stage of labor is characterized by four principal phenomena:—

1. PAINS.

The muscular contractions of the uterus are so invariably accompanied with pain, that it is not surprising that the effect has been confounded with its cause, and has received credit for all the efficiency exerted in labor. Hence, the terms *pains*, *labor pains*, *uterine contractions*, are used metonymically by obstetrical writers and practitioners—a usage which I shall respect, because it is often convenient, and cannot mislead, if it be remembered that, when used in this sense, the term *pains* has no reference to the sufferings of the patient, which may be excruciating, in nervous or susceptible individuals, although the pains are trifling, that is, inefficient.

The uterine contractions are not accompanied with pain in the first stage of labor only, but also in the subsequent stages; it is, nevertheless, to be observed that the character of the pain is different in the different stages. In the first stage (with which alone we are concerned at present) it is described as *cutting* or *grinding*, and as not unfrequently continuing, during the intervals of the contractions, in a sufficient degree to worry the patient. From this cause, together with the absence of consciousness that these pains are accomplishing anything, she is fretful, impatient, agitated, and desponding; and from her behavior, the experienced accoucher may form a probable judgment of the stage of labor under which she is suffering.

We are not to imagine that the uterine contraction, in any of the stages of labor, is in itself any more painful than muscular contraction in other parts, for example, in the abdominal muscles, bladder, or rectum.

In the first stage, the pain appears to be seated in the cervix uteri,

and is owing to the resistance it opposes to the contractions of the body, which, notwithstanding, are powerful enough to distend and stretch it. Such is the explanation given by Madame Boivin, whose opinion on a point at once so delicate and vague is entitled to great deference, considering that she was both an accomplished *sage femme* and a fruitful mother. Madame Boivin says: "We dare affirm, and our sensations have not deceived us, that, when the contraction begins and while it lasts, the woman experiences only a *pressing* sensation, more or less strong, which seems to originate along the mesial line of the posterior wall of the uterus, and extend round its sides to the anterior mesial line, which rises, becomes hard, and distends the middle of the abdominal walls. This uniform pressure throughout the whole fundus and body of the organ is accompanied with a feeling of numbness, which is propagated to the internal orifice. To this numbness succeeds a *painful stretching*, which begins along the posterior wall of the neck, towards the base of the sacrum, descends obliquely around the sides, in the direction of the internal orifice, and terminates at the os tincæ, profoundly in the vagina, where the pain is most severe."¹

In the commencement of the first stage of labor, the pains are slight, both as to force and duration, and the intervals between them are considerable. But in its progress, they increase in frequency, duration, and intensity, until they are gradually merged in the stronger throes of the second stage. A satisfactory reason may, perhaps, be assigned for their gradual augmentation; it accords, at all events, with our theory of labor, and may be received for what it is worth. It is this: the mere contact of the ovum, aided by its gravity, is sufficient, after a longer or shorter time, to produce such a degree of *orificial irritation* as serves to awaken the parturient contraction of the womb. Labor being thus started, the pressure of the ovum against the neck, during the pains, increases the *orificial irritation*, which, in its turn, excites stronger contractions, and by the continuance of this action and reaction, labor is quickened until it acquires its greatest intensity.

2. "THE SHOW" OF NURSES, "GLAIRES" OF FRENCH WRITERS.

This may commonly be regarded as a certain indication of labor, or, at least, of its near approach. It is a transparent, ropy mucus,

¹ Mémorial de l'Art des Accouchements, p. 206.

escaping from the vagina, secreted chiefly by the follicles of the neck, one of whose offices it is to furnish this albuminous fluid to lubricate the parts, preparatory to the passage of the child. The immediate cause of this increased secretion appears to be the irritation resulting from the distension of the cervix uteri, which may exist, in a slight degree, several days before labor, properly so called, is established. In fact, slight contractions of the fundus, for a week or two previously, is no unusual prelude to labor; and in consequence of these, the uterus subsides in the abdomen, giving greater liberty in the epigastric region, but encroaching on the pelvis, and embarrassing the functions of the bladder and rectum.

When labor has commenced, if not before, this mucous discharge is very apt to be streaked with blood, effused from ruptured decidual vessels about the cervix uteri. Sometimes the effusion is considerable without amounting to hemorrhage, properly so called. If there is default of mucous secretion, the woman is said to have a "dry" labor; more commonly, however, she is not, according to my experience, in labor at all, this dryness being quite characteristic of what are called "false pains."

3. DILATATION OF THE OS UTERI.

At the commencement of labor, the uterine orifice may be felt as a circular aperture, of small size—at most barely receiving the point of the finger—whose margin is commonly thinner in primiparæ than in women who have borne children. Under the influence of the uterine contractions, its circle is gradually widened, and its margin rendered thinner, until it is fully expanded. Although the effect of every pain is some increase of its dilatation, it is to be observed that during the pain the orifice is more contracted than just previous to it, and its margin feels firm and rigid. The actual successive yielding, then, immediately follows each pain; and during the intervals, the os uteri is more and more disposed to yield. From this we should expect what all writers have taken notice of, and which cannot have escaped the observation of any one engaged in practice, viz., the greater rapidity of dilatation as it draws towards its completion, so that although it may have required many hours of severe suffering to dilate the orifice to the size of a silver dollar, a few more pains, nay, sometimes a single pain, may finish its dilatation.

4. FORMATION OF THE MEMBRANOUS POUCH.

That portion of the membranes which is denuded by the opening of the os uteri, yielding to the pressure of the uterine contraction, is forced through the orifice, and projects into the vagina as a tense tumor during the pains, but is retracted and flaccid in the interval. This is known by the name of the "membranous pouch," the "aqueous cyst," or the "aqueous pouch," because it contains, of course, a portion of the waters of the ovum. The form of this pouch varies according to that of the orifice, being most frequently round and hemispherical; sometimes ovoidal, when the neck dilates more in one direction than in another. When the membranes are unusually extensive, and contain but little water, they may project into the vagina, even as far as to the vulva, in the form of a cylindrical purse. The pouch is generally less voluminous in vertex presentations than in any others, being sometimes flat and scarcely recognizable, whereas, in less favorable presentations, as, for example, the nates, it forms a remarkably large projection, and may effectually hinder us from ascertaining what part of the child lies above it.

Connected with the membranous pouch there is a phenomenon which has given rise to what I consider a singular mistake or delusion; I allude to the apparent elevation of the presenting part of the child at the beginning of each pain, and its depression before the pain goes off. In view of this, Müller declares that "the uterine contractions appear to commence at the os uteri, to be propagated towards the fundus, and again to return thence towards the mouth of the uterus. By this succession of muscular contractions, the fœtus is first raised and then propelled downwards towards the os uteri, when the lips or sphincter of the latter part become thinned and dilated."¹ Dr. Churchill adopts this idea: "The pains, as I have already said," he remarks, "commence in the cervix, and gradually involve both the body and fundus; their first effect, as Wigand has observed, being to elevate, as it were, the presenting part, and then to force it down."² Such a mode of uterine action is not more repugnant to Madame Boivin's *sensible* description of it than to reason and common sense. The truth appears to be that as the pouch fills with the water of the amnion, during the pains,

¹ Elements of Physiology, translated by Dr. Baly, and arranged by Dr. Bell, Philadelphia, 1843, p. 849.

² Theory and Practice of Midwifery, second American edit., 1846, p. 192.

it withdraws from the presenting part, which makes this appear to rise up; or, if there be actual elevation, it may be owing to the reflux of the waters from the pouch until their equilibrium is re-established by the steady persistence of the pain, when this part descends again. Be the matter as it will, there is surely no such inverted action of the uterus as the theory of Wigand alleges. The *formation* of the pouch closes the first, and introduces the second, stage of labor.

Among the phenomena which have now been enumerated as belonging to the first stage of labor, dilatation of the uterine orifice is the most important, it alone, indeed, constituting the end and aim of this stage. There has been much speculation, and not a little controversy, as to the means employed by nature to attain this end; and as the inquiry is interesting, on account of its practical bearings, I shall not shun it. It has been already proved (chapter on the Causes of Labor) that the body and neck of the uterus are antagonistic in labor—the tendency of the contractions of the former being to expel the ovum, while the contractions of the latter tend to retain it. Now, it is evident that were these antagonists endowed with equal strength, labor would be an interminable contest; but, in point of fact, they are unequal—the body being much thicker, and possessing two well-developed layers of muscular fibres, instead of one only, which belongs to the neck—the preponderance of strength is, therefore, in favor of the body; but, as the battle is not always to the strong, let us inquire how its forces operate to achieve victory and open the os uteri.

It must be remembered, then, that the gravid uterus at term is of an ovoidal figure, the fundus being its large, and the cervix its small, extremity, and that it is completely filled and distended by the foetus, with the waters surrounding and the membranes inclosing it, which together constitute the ovum. This ovum possesses, of course, the same figure as the gravid uterus; and is nearly, if not quite, incompressible by any force that is brought to bear upon it. The force of the body, which I shall call its *propelling force*, may be represented by lines drawn from every point of its surface covered by the oblique and concentric fibres, towards the centre of the organ—for the pressure exerted, by the contraction of these fibres, on every point acts in that direction. The force, for example, exerted at the centre of the fundus is in the direction towards the

os uteri; that at either extremity of the transverse diameter of the uterus is in a direction at right angles with the first; and that at a point midway between these is in a diagonal direction. As the ovum cannot obey all these forces, it is moved in what is called their *resulting direction*, which, it is obvious to those in the least conversant with physics, is in a straight line from the centre of the fundus to the os uteri; in other words, in the direction of the axis of the uterus. The scattering rays of propelling force are thus brought to a focus upon the os uteri, and the efficiency of this force is evidently increased by its concentration upon the point to be assailed.

But the propulsion of the ovum against the os uteri is not the only effect produced by the operation of this force. During every parturient contraction the ovum is subjected to pressure at every point of its surface, not excepting the inferior segment of it, in contact with the cervix uteri. Were this pressure everywhere equal, it is evident that the ovum would be condensed towards its centre, to the extent allowed by its slight compressibility; and it would undergo no change of figure whatever. But this pressure is not, in fact, equal—that of the fundus being by far the most powerful—hence, during every pain, the inferior segment of the ovum is expanded by the more forcible compression to which the superior segment is subjected, and its figure, together with that of the uterus, is altered—it is less acuminate towards the cervix. The expansion of the inferior segment of the ovum distends the cervix uteri in such a manner as is tantamount to pulling asunder its parietes and stretching its vaginal orifice. I will try to illustrate this idea. The first effect of each uterine contraction is to propel the ovum towards the os uteri; but this being resisted by the os, the inferior segment of the ovum begins to expand, and the starting point of this expansion is at the os uteri, from which it spreads in all directions, operating as a great number of cords pulling from the os towards the circumference of the cervix. The tonic contraction assists the muscular, in this dilating operation, by giving permanency, in some degree, to the altered figure of the ovum; for, although in the intervals of the pains the membranes are not as tense as during their continuance, yet it would be contrary to its nature to suppose that the tonic contraction will fail to preserve, in a good degree, the ground gained by the muscular; and this it is, perhaps, which gives rise to the uneasy sensations, which, as I have stated, women often experience in the intervals of the pains.

When the resistance of the cervix is considerably subdued, and the external orifice is opened to some extent, a portion of the membranes becomes insinuated within it, and the pouch thus formed contributes materially to complete its dilatation. The agency of this pouch has not, however, been properly understood by authors, and their erroneous appreciation of it has led to mischievous practice. Dr. Denman asserts that "it forms a soft pillow, which, at the time of every pain, acting upon the principle of a wedge, operates with increasing force according to the size it acquires; in consequence of which the latter part of the dilatation usually proceeds with more expedition than the former, unless the membrane containing the waters be previously ruptured."¹ British writers, since the time of Denman, have cleaved to the wedge-like operation of the pouch with peculiar pertinacity. It is, notwithstanding, obnoxious to the very serious objection that the membranes do not, as we have seen, enter the os uteri until the resistance of the cervix is so far overcome that it is disposed to dilate, when there is no need of a power that acts upon the principle of a wedge. This dilatability of the os uteri results from, and is evidence of, the declining energy of contraction in the cervical fibres, which have been partially paralyzed by the propelling force.

The formation of the pouch, then, is the consequence, not the cause, of the dilatation, or, at least, of the dilatability of the os uteri. But supposing the order to be reversed, and that the pouch is formed first, to be the instrument to overcome the resistance of the cervix, could it procure the dilatability of the os uteri as efficiently and kindly as the method ordained by nature? No one who has made the attempt to introduce his hand into the uterine cavity prematurely, that is to say, before the os uteri is easily dilatable, will answer this question in the affirmative, for it is found that the os uteri could sooner be lacerated than forced to open in this way. The reason is very obvious; the hand, acting in this manner, operates at first only on the circle of fibres immediately surrounding the orifice, and then on the next, and so on until the whole series is reached in detail; whereas nature, wiser than art, brings her force to bear simultaneously on the whole extent of the cervix. Hence, we are at no loss to understand why the dilatation of the os uteri proceeds so much more rapidly towards its completion than in the commencement. It is not, as Dr. Denman suggests, because the

¹ Introduction to Midwifery, chap. ix. sect. vi.

pouch "operates with increasing force according to the size it acquires," but because the cervix having been conquered, the inferior part of the ovum has only to take possession of its orifice.

Dr. Dewees is entitled to much credit for his satisfactory refutation of the doctrine against which we are contending; but it is to be regretted that in his zeal to demolish it he lost sight of the real utility of the membranes, both before and after the protrusion of a portion of them at the uterine orifice. The premature rupture of the membranes and discharge of the waters will not, he thinks, retard labor or render it more painful, except this occurs under one special condition, viz., before genuine expulsive action of the uterus has commenced, and where uterine contractions speedily follow the accident. If labor have commenced, no matter how slight may be its progress, or if the uterus be not "surprised into contraction" by the accidental rupture of the membranes, before it is "prepared for the regular routine of labor," dilatation will take place as rapidly and favorably as if nothing had happened.¹ These assertions contradict the experience of the profession, as far as I know, in all ages and countries; and I cannot, therefore, help suspecting that there is some fallacy in the observations on which they are founded. They are no less at variance with the explanation of the process of labor which I have given, as the following considerations will show.

First. The integrity of the membranes before the pouch is formed is valuable, because the propelling force has then a more suitable medium wherewith to act on the cervix than any part of the fœtus would be. This medium is the waters inclosed by the membranes, which, adapting themselves to the shape and inequalities of the cervix, make more equable pressure on its fibres, and consequently subdue their resistance more equally; whereas, any part of the child that can present is not so well adapted to distend the cervix equally, and hence, while some of its fibres may be benumbed by pressure, others are not conquered, but provoked to inordinate resistance, thus retarding labor by the irregular contraction which is excited.

Secondly. The integrity of the membranes, after the pouch is formed, is beneficial until the dilatation of the os uteri is considerably advanced, if not completed; because the pouch, though it does

¹ See his chapter "On the Manner in which the Os Uteri is Opened," *Midwifery*, p. 180, fifth edition.

not cleave like a wedge, opens the portals for the egress of the child in the gentlest manner. Should it rupture before the orifice is prepared to allow the presenting part of the child to take its place, the ruder contact that ensues not unfrequently irritates the cervix to a renewal of its opposition, and labor is thus protracted and rendered more painful.

Thirdly. The pouch serves, by its presence in the uterine orifice, the most sensitive portion of the neck, to sustain and enliven the propelling contractions, upon the principle of orificial irritation. By its agency, these contractions are, in proper time, rendered truly *expulsive*, and the auxiliary forces of the diaphragm and abdominal muscles called into action. When the pouch ruptures, the presenting part of the child takes its place, and keeps up the requisite grade of irritation until the labor is completed. That this is no fancy sketch, the phenomena of shoulder presentations will abundantly prove. In these cases, the membranes frequently protrude in the form of a long, cylindrical purse, which inadequately stimulates the os uteri, and consequently the pains are feeble for an unusual length of time; and when at length they rupture, if the shoulder is not ready to occupy the orifice, as often happens, there is an *entire suspension of the pains for several hours.*

SECTION II.

PHENOMENA OF THE SECOND STAGE OF LABOR.

The phenomena of the second stage of labor are more numerous and diversified than in the first stage, because the manner in which the fœtus is transmitted through the pelvis must be varied according to the circumstances of its presentation and position. The phenomena connected with these circumstances are strictly mechanical in their nature, and constitute what is commonly called the *mechanism of labor*: an extensive subject, and of which none can be ignorant and yet fit to practise midwifery.

In considering the phenomena of the second stage, I shall divide them into the *common* and the *special*; the common phenomena being such as belong to all labors, irrespective of the situation of the fœtus in utero; the special, such as belong to, and grow out of, the different presentations and positions.

SUB-SECTION I.

COMMON PHENOMENA OF THE SECOND STAGE OF LABOR.

The common phenomena of the second stage are the spontaneous rupture of the membranes and the ejection of the foetus, which must be separately considered.

I. SPONTANEOUS RUPTURE OF THE MEMBRANES.

The more vigorous contractions of the uterus, excited by the presence of the membranous pouch within the circle of the dilated orifice, soon rupture the membranes composing the pouch, which are no longer supported by the uterus.

The rupture takes place during the acme of a pain, and with an audible noise, if the pouch contains much water; otherwise without the observation of the patient or those about her. A more or less considerable discharge of liquor amnii, according as the pouch is prominent or flat, immediately follows the rupture, but this is soon arrested by the presenting part of the child being pressed against the orifice. As the pain goes off, the discharge is resumed, but ceases again when the pain entirely subsides. During the subsequent pains, a small portion of liquor amnii escapes at their commencement and decline, being arrested during their acme, until the presenting part occupies the orifice, when its further discharge is prevented, and thus a remnant of it is retained.

The retention of a portion of the liquor amnii until the foetus is expelled, serves to maintain more efficient contractions of the uterus and shields the child from the dangerous compression to which it would be exposed, were the uterine parietes in direct contact with the surface of its body. Some explanation of this proposition may be desirable.

In proportion as the liquor amnii escapes, the cavity of the uterus is diminished in size, by the tonic contraction of its parietes, which constantly, in a healthy state, tightly embrace the uterine contents. The fibres of the uterus are necessarily shortened by this process, and like all other muscular fibres, their power of contraction diminishes in proportion as they are shortened.

The actual force which these fibres are capable of exerting is,

therefore, greater in consequence of a portion of the amniotic fluid being retained. But this not all: were the whole of this fluid evacuated, the uterine parietes would close in upon the fœtus and become moulded to the inequalities of its body, and thus the equilibrium of the parturient force would be broken, for the fibres not being all equally shortened, the contractile power of all is not equally diminished. The remnant of fluid serves to keep up uniform distension of the uterus, and preserves that equability of action among its expulsive fibres, which renders their joint force most effective.

2. EJECTION OF THE FŒTUS.

The pains of the second stage are, it has been already stated, stronger than those of the first; they have, moreover, a peculiar character or expression, and are described as *bearing-down* or *expulsive*, in distinction from the *cutting* or *grinding* pains of the first stage. They are not unfrequently suspended for a short time after the rupture of the membranes, until the tonic contraction brings the uterine walls in close contact with the ovum, and then they return with augmented force. We are not to imagine that the uterus is really capable of acting with greater force after the rupture of the membranes than before, as is commonly intimated by authors, for it is in fact less capable as I have just shown. The only exception to this (if indeed there be any) is where the uterus is so enormously distended with liquor amnii that its fibres are partially paralyzed by their extreme extension, but even then the apparent proof of their disability, viz: the coming on of brisker action after the artificial evacuation of the liquor amnii, may be otherwise explained. Whether the membranes be ruptured spontaneously or artificially, and whether much or little liquor amnii be discharged, the more powerful stimulation of the os uteri, resulting from the direct approach and entrance of the head or other presenting part of the child, is the cause of the more forcible parturient contractions.

Under the influence of these expulsive contractions, the presenting part of the fœtus engages in the *uterine orifice*, which is now much more widely dilated than before, and is sometimes slightly lacerated at one of its sides, most usually the left, in consequence of the greater frequency of right obliquity of the uterus.

The *vagina* receives this presenting part, as it is protruded through the os uteri, and is so distended, in all directions, as to have its

rugæ effaced. As it engages in the vagina, the foetus enters, of course, the pelvic excavation, and the os uteri, pressed against the walls of the vagina, may not be perceptible when this canal is fully occupied. But it must not be forgotten that the presenting part of the child may be deeply engaged in the excavation, and yet be contained entirely in the uterus, the os uteri advancing before it, and this is, according to my observation, a very common case. The *vulva* is next reached by the presenting part, and begins to be distended. The perineum loses its thickness and becomes more and more prominent; the genital fissure is carried forwards in the direction of the axis of the inferior strait, its opening appearing small in comparison with the large tumor of the perineum, while the anus is dilated; the labia are unfolded, and the clitoris, vestibule, and meatus urinarius are pushed before the pubic arch: in a word, the soft parts that eke out the parturient canal, are developed to the utmost degree of which they are capable, as an inspection of Fig. 24 will show. In this distended state, the fourchette, as M. Dugès remarks, is found three or four inches from the margin of the anus, and five and a half inches from the point of the os coccygis, instead of being, as ordinarily, about fifteen lines from the former and three inches from the latter. The pains at this time are *rending* or *tearing*, described by the French writers as *conquassantes*, and irresistible requisition is now made upon the diaphragm and abdominal muscles; the patient is tormented with tenesmus, frequently the contents of the rectum are evacuated; and cramps of the muscles of the lower extremities are excited by the compression of the nerves passing to them through the pelvis.

The vulva is finally opened to a sufficient extent to allow the child to pass, not, however, without a slight laceration involving the fourchette in most first labors; in such cases, also, greater resistance is made to its opening by the perineum, which suffers itself to be greatly distended during the pains, giving promise of a speedy termination of the labor, but reacts as soon as the pains go off, and pushes back the child. This bandying may last for some hours (as I know to my cost), but the perineum becoming tired at last, allows the presenting part to pass, and this is usually soon followed by the remainder.

Such is a rapid sketch of the more palpable common phenomena of the second stage of labor, which any one may easily observe for

himself; but besides these, there are others of a more recondite nature, which do not the less deserve the study of the accoucheur because they are concealed from his superficial examination; on the contrary, they must be acknowledged to be of the utmost practical importance. I allude to the changes which the circulation of the blood in the uterus undergoes during the progress of labor. These changes are not, indeed, peculiar to the second stage, being observable in the first also; but as they are more considerable in the second stage, and are then alone capable of becoming mischievous, this is their proper collocation.

The circulation of the blood, in all muscular parts, is necessarily affected by the condition of the muscular tissue composing them. While this is in a state of repose, the arteries penetrating it are freely permeated by blood, which is not returned by the veins, at a more rapid rate than that which regulates the balance between these two orders of vessels, in other parts of the system. But when the muscular tissue is in a state of contraction, it is condensed—its molecules are approximated, and it becomes harder and more resisting than it was while in a state of relaxation. The calibre of its bloodvessels is necessarily diminished, during the continuance of its condensation, and an impediment is offered to the flow of blood into it through the arteries, while the exit through the veins, of what was circulating in it at the moment of condensation, is hastened.

This is familiarly exemplified by what occurs, every day, in the operation of venesection. The flow of blood can be augmented at pleasure, by directing the patient to vigorously contract the muscles of the arm, by grasping a cane. The accelerated flow of blood from the orifice is, doubtless, to be ascribed partly to the aid received by the venous circulation from muscular action; but it is caused chiefly by the streams of blood that are pressed out of the muscles, swelled by those which are turned towards the cutaneous veins, because they are debarred from entering the muscles. These effects of muscular contraction will be more considerable, and may amount to a total suspension of the circulation, if the muscular fibres are so interwoven with each other as to constitute a dense network, through whose interstices the capillaries are distributed, while these fibres are so arranged as to form circles around the larger branches.

Now, such precisely is the texture of the muscular coat of the uterus, and such the arrangement of its fibres. We are, therefore,

tighter while in the act of vibrating. The whole tone of the uterine circulation rises in point of pitch. Shortly after this, viz: as the pain becomes stronger and more general, the uterine sound seems, as it were, to become more and more distant, until at length it becomes very dull, or altogether inaudible. But as soon as the pain has reached its height, and gradually declines, the sound is again heard as full as at the beginning of the pain, and resumes its former tone, which, in the intervals between the pains, is as it was during pregnancy, except somewhat louder."

We have next to inquire into the effects of this interruption of the uterine circulation upon the foetus. To comprehend these, we have only to recur to the nature of the vital connection subsisting between the foetus and mother. We have seen that a function equivalent to respiration is performed for the foetus in the placenta, for its blood is arterialized by its proximity, in the umbilical capillaries, to the blood of the mother, flowing through the maternal portion of the placenta. Hence, it may be inferred that, if the intromission of fresh arterial maternal blood into the placental cells be interrupted, foetal respiration must be suspended, and that this interruption cannot, therefore, be borne by the foetus any longer than a breathing animal can bear the suspension of its respiration. Such an interruption occurs during at least the greatest intensity of every labor pain. It must, however, be observed that the disturbance of the uterine circulation is more considerable in the second than in the first stage of labor, because the parturient contractions are more forcible, and of longer duration, and, a portion of the liquor amnii having escaped, the uterus is reduced in size by its tonic contraction, which permanently diminishes the calibre of the vessels. We ought not, therefore, to be surprised at the death of the foetus, if the second stage of labor be protracted by any obstacle requiring unusually powerful efforts on the part of the uterus to overcome it. In such cases, not only is there extraordinary resistance to the entrance of the blood of the mother into the placental cells, but these cells are probably flattened, or effaced, as Baudelocque suggests,¹ by the compression to which the placenta

¹ On this whole subject, consult his admirable section—"Des Changemens que Produit le travail de l'Accouchements dans la circulation qui se fait reciproquement de la mere à l'enfant, etc."—*L'Art des Accouchements*, tom. i. p. 226.

As the title of this section declares, Baudelocque entertained the notion that there is a reciprocal interchange of blood between the foetus and mother, through

is subjected between the walls of the uterus and the child's body. Nay, the umbilical cord is liable to suffer from this compression, and thus even the imperfect arterialization of the blood which the placenta is capable of performing may be intercepted.

SUB-SECTION II.

SPECIAL PHENOMENA OF THE SECOND STAGE OF LABOR.

The special phenomena of the second stage of labor are purely mechanical in their nature; they relate to the manner in which the foetus is transmitted through the pelvis, under the impulsion of the uterine contractions. They constitute, therefore, collectively the *mechanism of labor*, than which there is nothing of greater importance in midwifery; indeed, it is the basis of all scientific knowledge of the subject.

Inasmuch as the foetus may be differently situated in the uterine cavity and must, of course, be variously presented to the pelvic canal at the time of parturition, the study of the foetal presentations is an indispensable prerequisite to that of the mechanism of labor. This will, therefore, first occupy our attention.

1. PRESENTATIONS AND POSITIONS.

Most recent writers on obstetrics employ the terms *presentation* and *position* in reference to the situation of the foetus at the time of labor; meaning by the former the part which offers at the superior strait, by the latter, the relation of this part to different points of the strait. I shall use these terms in accordance with this definition; but shall also take the liberty to consider presentations as

the uterine sinuses, which differ, as he supposed, from both arteries and veins. They are, according to him, a species of reservoirs, into which the uterine and umbilical arteries pour blood, and from which the veins of the same name take it, the one to convey the foetal blood into the system of the mother—the other to convey maternal blood to the foetus.

But although the proofs of this doctrine (which he does not adduce in his immortal work) appeared very conclusive to him, there does not seem to be any foundation for it. This error does not, however, affect the justness of his views in regard to the influence of labor over the maternal and foetal circulation of the blood.

genera, and positions as species, in any systematic classification of them.

The celebrated Baudelocque is, perhaps, to be regarded as the first obstetrical writer who attempted to collect and classify every kind and species of presentation which either his own experience or a perusal of the cases of his predecessors furnished him. His elaborate researches resulted in the establishment of such a multitude of presentations and positions as is truly appalling, and calculated to perplex, if not to disgust, the most zealous pupil in this branch of his studies. Not that M. Baudelocque did not arrange the mass of materials which his industry collected as judiciously as was, perhaps, possible, allowing that they were all equally essential to the edifice he was laboring to construct; but if such be really the complexity existing in nature, the student might well despair of mastering it, and the practitioner tremble at the idea of encountering it.

M. Baudelocque's classification embraced *twenty-three genera* of presentations, consisting of as many distinct regions of the foetal body, which he supposed might offer at the superior strait. Four of these genera he found at the cephalic and pelvic extremities of the fœtus, viz., presentations of the *vertex*, of the *feet*, *knees*, and *nates*, while the four planes of the body between these extremities furnished him—the anterior plane, with the *face*, the *fore part of the neck*, the *breast*, *abdomen*, and *thighs* (five genera); the posterior plane, with the *occiput*, *nape of the neck*, the *back*, and *loins* (four genera); and each of the two lateral planes, with the *side of the head*, *side of neck*, the *shoulder*, *side of thorax*, and the *hip* (ten genera). These genera include *ninety-four species*, which it would be as useless as tedious to enumerate. Many of these presentations he does not pretend to have met with in practice, but admits, on the authority of a single observer, whose accuracy may be questioned, and whose love of the marvellous may have misled him. To these apochryphal presentations he assigned such positions as they might *possibly* allow.

It is, however, due to the memory of the illustrious Baudelocque, to whom we owe so much, to state that he lived to perceive the inconvenience of his elaborate and highly artificial classification, as we learn from Madame Lachapelle, who doubts not that he would, had his life been longer spared, have reduced and simplified it. This necessary reform was undertaken by his successors, MM. Gardien, Capuron, Maygrier, Dugès, Madame Lachapelle, etc. It

would be tedious to trace its progress, and I shall, therefore, content myself with a survey of its completion, under the auspices of Madame Lachapelle and her nephew, M. Dugès. In saying that Madame Lachapelle and M. Dugès have completed this desired reformation, I must be understood to express only my own opinion; I am not unaware that still greater simplification has been attempted by others, chiefly by Professor Nägele in Germany, seconded by Dr. Rigby in England, and Professor Dubois in France. Of their attempts I shall presently express my judgment.

The ample experience of Madame Lachapelle, acquired in the Paris Maternity, where she officiated or directed in as many as forty thousand cases of labor, not having offered a single instance of presentation of the trunk, she denied altogether the possibility of any such occurrence where the fœtus is fully developed. By a critical examination of the few cases of this kind recorded by her predecessors, principally by Delamotte, Portal, Smellie, and Burt, she shows conclusively that they were really nothing more than perversions of such presentations as she admits. Her own experience authorized her to retain only the *seven* following genera, viz. presentations of—1. The vertex; 2. The breech; 3. The feet; 4. The knees; 5. The face; 6. The right shoulder; 7. The left shoulder. Under these genera are included *twenty-four species*, viz., *six* belonging to the vertex; *four* to the breech; *four* to the feet; *four* to the knees; *two* to the face; *two* to the right, and *two* to the left, shoulder. To each of these species belong *several varieties*, which are mere intermediate or incomplete positions, as, for example, when the posterior fontanel, in vertex presentation, looks towards any other than what are called cardinal points of the superior strait; or when the head is inclined so as to offer the occiput or forehead, or one of its sides, instead of the vertex, to the superior aperture of the pelvis. Similar deviations from the normal positions of the face and breech may exist as varieties, and these mere varieties have given rise to the pretended positions of the back, forehead, and side of the head, the back and fore part of the neck, the hips, loins, abdomen, &c.

It does not, however, require much observation of nature, or a great profundity of reflection, to satisfy any one whose judgment is not biased by prepossessions, that three of the genera of Madame Lachapelle, viz., the breech, feet, and knees, may be properly united under one, because there is no essential difference between the

either in relation to their mechanism, or the treatment they require. They cannot, therefore, be considered separately without tiresome and unprofitable repetition. Accordingly, M. Dugès has united them under the common denomination of presentations of the pelvic extremity of the fœtus. It is but just to Madame Lachapelle to state that she had a clear perception of the utility that might result from such a union, and was restrained from proposing it, only by the apprehension that she might be accused of pushing her reform too far.¹ The classification of M. Dugès, which I adopt, admits but five genera and fourteen species of presentations, and is advantageously exhibited in the following synopsis, extracted from his work,² in which is also shown the comparative frequency, as he believed, of the different presentations and positions in a total of thirty-seven thousand one hundred and twenty-six cases of labor, occurring in the Paris Maternity in the course of eighteen years.

NOMENCLATURE OF M. DUGÈS.

Genera.	Species.	Frequency.
I. Vertex 35,375	1st. Back anterior and left	27,443
	2d. " anterior and right	7,512
	3d. " posterior and right	276
	4th. " posterior and left	144
II. Pelvis 1,390	1st. " left	856
	2d. " right	494
	3d. " anterior	14
	4th. " posterior	26
III. Face 175	1st. " left	99
	2d. " right	76
IV. Right shoulder 103	1st. " anterior	57
	2d. " posterior	46
V. Left shoulder 83	1st. " anterior	52
	2d. " posterior	31
— 5	— 14	— 37,126

In this classification, it will be perceived, the genera and species are arranged according to their frequency, respectively, with the exception only of the fourth position of the pelvis. The regularity of its principle of division, as its author justly remarks, greatly facilitates the recollection of it; the *back* of the fœtus serves as the point of comparison, and is placed anteriorly or to the left in the first species of each genus—posteriorly or to the right in the last.

It has been already intimated that MM. Nägele and Dubois, with

¹ Pratique des Accouchements, Quatrième Mémoire.

² Manuel d'Obstétrique.

a praiseworthy ambition to divest this part of obstetrical science of its complexity, have carried their reform further than M. Dugès, and aimed to establish a degree of simplicity which ought to be welcomed, if it be found to be true to nature. In exhibiting their views, I shall avail myself of the work of M. Cazeaux, heretofore quoted, as the only channel through which I have access to them; for, in the only work of Professor Nägele which I have consulted, viz., his "Mechanism of Parturition," translated by Dr. Rigby, I do not find all the information needed.

MM. Nägele and Dubois agree with M. Dugès in admitting only five presentations, viz., vertex, face, pelvis, right and left shoulder; but Dubois prefers to denominate the latter two, presentations of the right and left *lateral planes of the trunk*, acknowledging, however, with Madame Lachapelle, that it is almost always the *shoulder* which, as the most prominent part, is found presenting at the superior strait. As to the *presentations* of the foetus there is, then, no difference between these authors. But, says M. Cazeaux, Baudelocque and his successors admitted a great number of positions, in each of which the mechanism of labor is different; and M. Nägele has, after a more careful study of them, proposed a reform relative to positions, not less important than that which he has brought about in regard to presentations. To indicate the different positions, Baudelocque established certain points of the superior strait, viz., the acetabula, the sacro-iliac and pubic symphyses, and the promontory of the sacrum, to which certain points of the foetus correspond. But M. Nägele simply divides the pelvis into two lateral halves, left and right, and these are his only points of correspondence as to the mother, while as to the foetus Baudelocque's points are retained. The vertex, for example, being the presenting part, the occiput may be turned towards any part of the left lateral half of the superior strait; this constitutes the first position of the vertex, denominated *left occipito-iliac*; or the occiput may be directed towards any part of the right lateral half of the strait, constituting the second, or *right occipito-iliac*, position of the vertex. The occiput may, it is true, look forwards transversely, or posteriorly, still it is placed more or less laterally; and these are to be regarded as mere varieties of two fundamental positions, because they do not affect the mechanism. Three varieties are admitted for each position, viz., an *anterior*, in which the occiput looks towards the acetabulum; a *transverse*, in which it looks

directly towards the side, and a *posterior*, in which it looks towards the sacro-iliac symphysis.

The same remarks are equally applicable to the positions of the nates and face. Thus, in the first of these presentations, the sacrum of the child may be directed towards the left lateral half of the superior strait; this constitutes the first or *left sacro-iliac* position of the nates; or it may be directed towards the right half of the strait, constituting the second or *right sacro-iliac* position of the nates. In face presentation, the chin may be directed towards the right half of the superior strait; this constitutes the first or *right mento-iliac* position—or towards the left half, constituting the second or *left mento-iliac* position. Finally: The two trunk presentations have each two positions: thus, the right lateral plane being the presenting part, the head of the foetus may be over the left half of the pelvis, constituting its first or *left cephalo-iliac* position; or over the right half, constituting its second or *right cephalo-iliac* position. The left lateral plane may, in like manner, be so placed that the head is to the left, which is its first or *left cephalo-iliac* position, or to the right, which is its second or *right cephalo-iliac* position. The two fundamental positions of presentations of the nates, face, and right and left lateral planes of the trunk, admit anterior, transverse, and posterior varieties in the same manner as those of the vertex.

From the foregoing summary of their scheme, it must be manifest to the reader that M. Nägele and Dubois have reduced the number of presentations and positions to their ultimatum. It is not possible to conceive how any further purgation could be practised without a total destruction of the *species* at least. The *apparent* simplicity they have attained, commends their classification to our approval; but before adopting it, we should inquire whether it embraces everything, and accords with the principle which ought, undoubtedly, to govern it. The principle is this: *Whenever the presence of any part of the foetus at the superior strait of the pelvis requires a mechanism of its own, it is entitled to rank as a presentation; and if different relations of this part to the superior strait do, or even may, affect its mechanism, these differences ought to constitute so many distinct positions of the presenting part.* M. Nägele admits the validity of this principle, when he asserts, as a reason for uniting into one position the several varieties which he allows to each, that the mechanism of labor is not affected by these varieties. But this assertion is at variance with the experience of all his predecessors, and

is not admitted to be correct by most of his contemporaries, as will be shown when the mechanism of labor is under discussion.

Again. This classification allows no place for those positions of the nates in which the back of the foetus looks directly forwards or backwards (third and fourth of Dugès), which ought not to be excluded, because they are undoubtedly of sufficiently frequent occurrence to be entitled to a place, and their mechanism is not always the same as that of lateral positions.

Allusion has been made to the apparent simplicity of the classification we are considering; it is but justice to say that this feature of it is entirely deceptive, and that in reality it is as multiplex as though six positions had been assigned to each presentation instead of two. Admitting that shades of difference only exist among its varieties, in regard to their mechanism, still we are compelled, for precision's sake, to refer to them, and this makes the nomenclature of positions cumbersome. Suppose, for example, it be desirable to note the peculiarity of vertex presentation in any case, it will not be exact to say simply left or right occipito-iliac, but anterior, transverse, or posterior must be prefixed or suffixed thus, *left anterior occipito-iliac* or *left occipito-iliac anterior*, etc.

It appears to me that M. Dugès has attained as great simplicity as the subject of foetal presentation is susceptible of, without a sacrifice of perspicuity, and, what is of more importance, of conformity to nature. Having already adopted his classification, I shall make some further remarks upon it, intended to develop its merits by comparing it with others. In doing this it will be necessary to bring under review its several presentations, in the order in which they stand as already exhibited.

1. *Of Presentation of the Vertex.*—M. Baudelocque, it is well known, admitted six positions of the vertex; in the first, the occiput is turned towards the left acetabulum; in the second, towards the right acetabulum; in the third, towards the symphysis pubis; in the fourth, towards the right sacro-iliac symphysis; in the fifth, towards the left sacro-iliac symphysis; and in the sixth, towards the promontory of the sacrum. Four of these positions, it will be perceived, are *oblique*, and two are *direct*; that is, in four, the occipito-frontal dimension of the foetal head corresponds to the oblique diameters of the superior strait; and in two, to the antero-posterior diameter, which crosses the strait *directly*, instead of obliquely. Of the two direct positions, his third and sixth, Baudelocque him-

self declares that they are *on ne peut plus rares*, the third occurring but twice, and the sixth once, in ten thousand three hundred and twenty two labors which he had observed ;¹ while Madame Lachapelle never met with a single instance of either of these positions, and declares her opinion that they are purely imaginary.² M. Capuron rejects these positions altogether ; 1, because they are exceedingly rare ; 2, because in the course of labor, the round surface of the sacro-vertebral angle will not permit either the forehead or occiput, which are also round, to rest long upon it, but will force them to glance to the right or left and produce one of the positions, which he admits (the same as M. Dugès) ; 3, because in these positions, the head cannot engage in the pelvis, unless it be very small or the pelvis very capacious ; 4, because where difficulty is offered by them, they must be changed to a more favorable position.³ Dr. Dewees met with only a few cases of these positions, and these occurred under the favoring circumstances mentioned by Capuron, while my own experience has not furnished me with a solitary instance of them.

Habit exerts a control which it is difficult for the most vigorous and best disciplined mind to resist, and it was, I suppose, under its influence that Madame Lachapelle brought in two new positions to occupy the place of the third and sixth of Baudelocque, which she had expunged. She had, it would seem, become so accustomed to the number six that she could not dispense with it. The two new positions introduced by her, are also of the direct kind, the occipito-frontal diameter of the head corresponding to the transverse diameter of the superior strait—occiput left or right. Although it may not be denied that she met with such positions, it must be allowed that they are rare, not being mentioned by many authors, and my own experience having failed to supply an instance of them. We may well be astonished, therefore, that two of the latest writers on obstetrics in France and England, M. Moreau and Dr. F. Ramsbotham, retain all of Baudelocque's vertex positions, and adopt Madame Lachapelle's two new ones, making eight in all. M. Moreau divides his eight positions into four *direct* or *fundamental*, and four *indirect* or *oblique*, considering the latter as only varieties

¹ L'Art des Accouchements, tom. i. p. 305.

² Pratique des Accouchements, Deuxième Mémoire.

³ Cours Théorique et Pratique d'Accouchements, p. 199.

of the former. His four direct positions are: *left occipito-iliac*, *right occipito-iliac*, *occipito-pubic*, and *occipito-sacral*, so denominated because, in the first two, the occiput corresponds to the extremities of the bis-iliac diameter, and, in the last two, to those of the sacro-pubic diameter. His four indirect or oblique positions are: *left occipito-cotyloid*, *right occipito-cotyloid*, *left occipito-iliac posterior*, or *right fronto-cotyloid*, and *right occipito-iliac posterior*, or *left fronto-cotyloid*.¹

The oblique positions M. Moreau considers as varieties of the direct, which he admits to be of rare occurrence. But if the direct positions are rare, it may be inquired with what propriety can they be considered as fundamental, as the species, while the oblique, which are constantly occurring, are regarded as varieties only? The truth is, as it appears to me, that the four oblique are the usual and natural positions of the vertex; all others are but extraordinary deviations from them, and are not entitled to rank as positions in a well ordered classification.

M. Dugès adopts Capuron's nomenclature of vertex positions, designating them as follows, viz: 1. *Left occipito-anterior*; 2. *Right occipito-anterior*; 3. *Right occipito-posterior*; 4. *Left occipito-posterior*; it being understood that, in the first, the occiput is turned towards the left acetabulum; in the second, towards the right acetabulum; in the third, towards the right sacro-iliac symphysis; and in the fourth, towards the left sacro-iliac symphysis. But, in my opinion, names should be preferred which define the positions more precisely; I shall, therefore, distinguish them as the *left occipito-acetabular*, *right occipito-acetabular*, *right occipito-sacro-iliac*, and *left occipito-sacro iliac*, positions of the vertex. It is convenient to have, also, shorter names for them, and none are better than the ordinal numbers, first, second, third, and fourth, commencing with the left occipito-acetabular (the first in all systems), and ending with the left occipito-sacro-iliac. Again, it is convenient, for many purposes, to have an appellative for the first and second, or left and right occipito-acetabular positions, to distinguish them from the third and fourth, or right and left occipito-sacro-iliac positions, for it is sometimes necessary to refer to them as thus classified. In this respect, the appellations of Dugès will be preserved; the first and second conjointly being denominated *occipito-anterior* positions, the third and fourth, *occipito-posterior* positions of the vertex.

¹ *Traité Pratique des Accouchements*, tom. ii. p. 69.

The frequency of vertex presentations, compared with others, deserves the attention of the obstetrical student. By reference to the synopsis of Dugès' classification, it will be seen that thirty-five thousand three hundred and seventy-five vertex presentations occurred in a total of thirty-seven thousand one hundred and twenty-six deliveries, in the Paris Maternity, showing the great preponderance of the vertex over all the other presentations together. It will be observed, moreover, that of these vertex cases twenty-seven thousand four hundred and forty-three were first, or left occipito-acetabular positions; seven thousand five hundred and twelve were second, or right occipito-acetabular; two hundred and seventy-six were third, or right occipito-sacro-iliac; and one hundred and forty-four were fourth, or left occipito-sacro-iliac. These results, as to the relative frequency of the several positions, agree substantially with those of most authors, but their accuracy has been questioned by Professors Nägele and Dubois, whose contradictory observations are entitled to our candid consideration. Professor Nägele avers that in one hundred cases of vertex presentation we may generally reckon on seventy in the first position, and thirty in the third; and that the other positions are so exceedingly rare in their occurrence, that they may be regarded as exceptions to the general rule. M. Dubois affirms that he has carefully noted nineteen hundred and thirteen cases of vertex presentation, of which thirteen hundred and fifty-five were first positions, fifty-five only were second, four hundred and ninety-one were third, and twelve were fourth. M. Cazeaux, to whom we are indebted for this information, declares that these results accord with his own observations, and those of Prof. Stolz, of Strasbourg.

At the time of the publication of the first edition of this work, a very decided opinion was given by me in favor of the ratio assigned by M. Dugès for the several positions of the vertex. Subsequent more careful observation has led me at least to doubt its accuracy. It must be confessed that it is not so easy a matter to make accurate observations on this point as I at that time supposed, and as may still be imagined by those who have not made the attempt. It is not always easy to carry the finger so high up behind the acetabulum as to feel the head of the child beyond the fontanel which corresponds to it, and even when this can be done, one fontanel may be mistaken for the other. It ought not, therefore, to be matter of surprise if the anterior fontanel has been often

mistaken for, or hastily presumed to be the posterior fontanel, and as often as this mistake may have been committed, so often the third position has imposed itself upon the examiner for the first. And then this undetected third position being, as we shall see, generally transmuted into the second, is entirely overlooked and erroneously reckoned as rare, while the second position gets credit for being more frequent than it really is.

In nothing, as I think, has Professor Simpson shown his enlightened judgment more than in rejecting, as unreliable, the reports of cranial positions as entered by the younger pupils in the records of the Edinburgh Maternity Hospital. In his report, communicated to the Medico-Chirurgical Society, giving an analysis of the obstetric practice of the institution, from 1844 to 1846¹ embracing 1421 cases, he gives the number of head presentations, viz: 1333, but very properly excludes or withholds the positions reported by the pupils in attendance. Prof. Simpson cites, however, the notes of Dr. Martin Barry on this subject, who acted for sixteen months as House-Surgeon to the Hospital, more especially as the data which that gentleman obtained entirely coincide and agree with the results of his own observations. Dr. Barry carefully observed and noted the position of the head in 335 cases of cranial (vertex) presentation, among the patients of the institution, which he classifies according to the four positions and numerical nomenclature used by many of the German schools, which are also those used by myself:—

I. OCCIPITO-ANTERIOR POSITIONS.

- 1st Position; or occiput directed to left foramen ovale, in 256 cases.
2d Position; or occiput directed to right foramen ovale, in 1 case.

II. OCCIPITO-POSTERIOR POSITIONS.

- 3d Position; or occiput directed to right sacro-iliac sym-
physis, in 76 cases.
4th Position; or occiput directed to left sacro-iliac sym-
physis, in 2 "

2. *Of Presentation of the Pelvic Extremity of the Fœtus.*—To this genus of his classification Dugès allows the four positions assigned by Baudelocque to presentations of the breech, feet, and knees, and arranges them in the same order. He alters slightly, however, the collocation of the fœtus in the first and second positions, in

¹ Works, First Series, p. 745.

which he makes the back of the foetus look directly left and right, instead of inclining forwards at the same time, as Baudelocque has it. In this he is sustained by Madame Lachapelle, who observes that Baudelocque did not sufficiently consider that this forward direction is most frequently imparted by the mechanism of labor or the hands of the accoucheur, and she positively affirms that the direct positions are at least as common as the oblique. On this account she thinks that the direct positions ought to be considered as the cardinal ones, more especially as the division of pelvic presentation is thereby rendered more regular. Such, likewise, is the opinion of M. Moreau, who asserts that, in most cases, the hips enter the pelvic excavation parallel with the sacro-pubic diameter of the superior strait, and that it is only when the foetus is very large that they engage in the oblique diameters. The four positions of the pelvic presentation, then, are all *direct*, instead of oblique, as the vertex positions are, or if there be a slight deviation from the directness of the first and second, this is of no importance, because the mechanism is not affected by it. It is not an easy task to prescribe a suitable nomenclature for presentation of the pelvic extremity, either as to the genus or its species. The difficulty arises from its complex character, embracing, as it does, according to our views, presentations of the breech, feet, and knees. We cannot, perhaps, do better for the genus than to adopt Dr. Rigby's proposal to apply the Latin word, "nates," to it, which although synonymous with the English term, "breech," may have its signification enlarged so as to include also the feet and knees. Accordingly, whenever the phrase, "nates presentation," occurs in this work, it is to be understood as equivalent to presentation of the pelvic extremity of the foetus.

The same difficulty exists as to the different positions of nates presentation. Had we only to invent a name for the relative points of the several varieties it includes, viz., breech, feet, and knees, we could be at no great loss. We might, for example, use the Latin words for these foetal points, and by prefixing them to the names of the maternal points, that is, the parts of the pelvis of the mother to which they correspond, construct phrases to define the exact position of the foetus. This is, in fact, what has been done. Thus, M. Moreau, who adheres to the breech, feet, and knees, as distinct presentations, and whose positions correspond to ours, denominates the first position of the breech, *left sacro-iliac*; the second, *right sacro-*

iliac; the third, *sacro-pubic*; and the fourth, *sacro-sacral*, because the sacrum of the foetus, which is its relative point, looks towards the left and right ilium, the pubes and sacrum of the maternal pelvis, which are the maternal relative points. And in relation to the several positions of the feet and knees, the foetal portion of their compound names is derived from the heels (*calcaneum*), and tibiae, because these are their relative points; consequently, the terms, *left calcaneo-iliac*, *right calcaneo-iliac*, *calcaneo-pubic*, and *calcaneo-sacral*, express the first, second, third, and fourth positions of the feet; and *left tibio-iliac*, *right tibio-iliac*, *tibio-pubic*, and *tibio-sacral*, indicate the several positions of the knees. But as our classification includes all these varieties under one presentation, our nomenclature must be equally comprehensive, and I propose, therefore, to make the back (*dorsum*) the foetal constituent of the names of the different positions of the nates; thus, *left dorso-iliac*, *right dorso-iliac*, *dorso-pubic*, *dorso-sacral*, clearly define the relations of the foetus to the maternal pelvis, and if the back be not literally in apposition with the different points of the pelvis indicated, in the commencement of labor, it must necessarily become so during its progress. Meanwhile, the sacrum, heels, and tibiae of the foetus, according to the variety of nates presentation that may exist, are the tangible representatives of the back.

The frequency of nates, compared with other presentations, is shown in the synopsis, from which it will be seen that in about one twenty-seventh of all the labors in the Maternity, when its statistics were compiled by Dugès, the nates presented; and this agrees pretty nearly with the calculations of other European obstetric institutions. But this proportion is much greater than I have observed in my own practice. Not having kept a record of all the cases that have fallen under my observation, I cannot undertake to state the proportion accurately, but I am persuaded that it is not greater than one-fiftieth. By referring to the relative frequency of the several positions of the nates, it will be seen that the first or left dorso-iliac position is, by far, the most common, and that the third or dorso-pubic position is the least frequent of all, having been observed only fourteen times in one thousand three hundred and ninety cases of nates presentation. Allusion is made to this point for the purpose of drawing the attention of the profession to the discrepant statement of the younger Ramsbotham, who says,¹ that *under breech*

¹ Process of Parturition, second Amer. edition, p. 238.

presentation, the most usual situation of the child is with the back towards the abdominal muscles of the mother, and the face towards the spine. This statement, I suppose, can only be explained by Dr. Ramsbotham having taken cases of first and second position, with forward inclination of the back, for directly anterior position of the back.

As to the relative frequency of the several varieties of nates presentations, it need only be observed that breech cases are more common than feet (I will not deface my page with "footling"), and that the knees are seldom met with.

3. *Of Presentation of the Face.*—Two positions only of face presentation are admitted by most modern authors, in common with M. Dugès. In the first, they all agree, the forehead is directed towards the left ilium and the chin towards the right. In the second the position of the face is reversed, the forehead being towards the right ilium and the chin towards the left.

According to the nomenclature of face presentation usually adopted, the chin (*mentum*) is made the relative point, determining both the position and its name. Thus, we have seen that the first position is denominated the *right mento-iliac*, and the second the *left mento-iliac*, by M. Cazeaux, in his exposé of the views of MM. Nägele and Dubois; and this nomenclature is ratified by M. Moreau. But the unity of Dugès' classification, in which all the positions of the fetus in every kind of presentation are regulated by the relations of the back, requires us to look to the situation of the *forehead* rather than of the chin, in framing our nomenclature of face presentation. I propose, therefore, to call the first position of the face its *left fronto-iliac*, and the second its *right fronto-iliac*. Let it be here observed that M. Dugès bestowed no other names upon any of his positions than those of their ordinal numbers, except upon vertex positions, to which he applied the nomenclature of Capuron—being apparently more occupied with *things* than *names*, in which respect he set an example worthy of our imitation. To prevent the tiresome repetition of the same word, it is, however, not improper to have more names than one for the same thing, and it is with this view that I shall attempt to make out a complete nomenclature of positions.

4, and 5. *Of Presentations of the Right and Left Shoulders.*—The two shoulder presentations may be advantageously considered in connection. To each of these belong two positions, in the first of which

the back of the foetus and the arm proper (*humerus*) are directed forwards, while the forearm and hand, flexed upon the sternum, are towards the sacrum of the mother. But in this first position the head of the child is situated over the left iliac fossa, and the nates over the right, if the right shoulder present, and *vice versa* if the left shoulder present: while in both presentations the inferior extremities, folded upon the abdomen, are contained in the posterior part of the uterus. In the second position of either shoulder presentation, the back and arm of the foetus are directed posteriorly, while the forearm and hand are towards the pubes of the mother. The head is over the right iliac fossa, and the nates over the left, if the right shoulder present, and *vice versa* if the left shoulder present; while in both, the abdomen and inferior extremities are contained in the anterior part of the uterus. In harmony with our governing principle, I propose to designate the first position of both shoulder presentations *scapulo-pubic*, and the second of both *scapulo-sacral*. Let the young student *fecundate* his mind, producing what may be called an *ideal gestation*, and ponder upon the relations of the foetus to the uterus and pelvis in these positions until he has a vivid conception of them, else he cannot comprehend them, or follow me in the comparison which I shall next make between M. Dugès' arrangement of them and that of other authors.

M. Moreau establishes his positions of the shoulders by the direction of the acromion process of the scapula, which he makes the relative point of the foetus. Thus, in his first position of both shoulders, the acromion is directed towards the left side of the pelvis, the head being towards the left iliac fossa, and the axilla and base of the thorax towards the right iliac fossa, which is his *left acromio-iliac* position. In his second position of both shoulders, or *right acromio-iliac*, the situation of the acromion, head, axilla and base of the thorax is reversed, viz., the acromion and head look towards the right iliac fossa, and the axilla and base of the thorax towards the left. M. Cazeaux agrees with M. Moreau in this arrangement of shoulder positions, differing from him, as we have seen, only as to their nomenclature, calling the first position of either shoulder its *left cephalo-iliac*, and the second, *right cephalo-iliac*. Such also is the arrangement of Madame Lachapelle, in her *Nouvelle nomenclature des Positions du Fœtus*.¹

¹ Pratique des Accouchements, Premier Mémoire.

According to the arrangement of these authors, it is evident that the numerical position of one shoulder is totally unlike the corresponding position of the other, in regard to the most important relations, practically considered, of the child's body to the mother; for in the *first* position, for example, of the *right* shoulder, the abdomen and inferior extremities of the child are contained in the posterior portion of the cavity of the uterus, while in this same position of the *left* shoulder, its abdomen and inferior extremities are situated anteriorly. Now the most important inquiry in any case of shoulder presentation is, where are the inferior extremities to be found? because in the operation of turning they are to be seized and brought down through the vagina. The method of operating is also modified by the situation of these extremities, and the operation itself is much more easily performed where they are contained in the anterior than where they are in the posterior part of the uterus. The operative procedure, applicable to the first position of either shoulder, is not, therefore, applicable to the same, but to a different position of the other shoulder. It appears to me that this is calculated to produce confusion and perplexity; I know, indeed, that it is, from actual trial of it. No such objection applies to Dugès' arrangement of shoulder positions, which is as natural as it is easily remembered. In the first position of both shoulders, the abdomen and inferior extremities of the child are directed towards the loins of the mother; in the second position of both, they are towards the anterior parietes of her abdomen.

Having acquired an acquaintance with the several foetal presentations and positions, we are now prepared to study the mechanical phenomena appurtenant to them, or, in other words, the mechanism of labor, as it is affected by them.

2. MECHANISM OF LABOR.

I. MECHANISM OF LABOR IN VERTEX PRESENTATION.

In order that the head may enter and pass through the pelvic canal, several conditions, particularly enumerated by M. Capuron, are requisite. Among these, there is one which may be said to be so essential that it is, in fact, the principle that governs all the movements of the head during its transition. It may be thus stated: *The axis of the head must be brought parallel, successively,*

with the axes of the superior and inferior straits of the pelvis, that is, its poles, the occiput and chin, must be placed, as nearly as may be, in these imaginary lines.

If this principle be rightly apprehended, it affords a key to all the mechanical phenomena of labor, as far as the head is concerned, not only in vertex, but also in nates and face presentations. The necessity of this parallelism between the axis of the head and the axes of the straits, arises, hence, that it is only when so placed that the head can offer its smallest diameters to the pelvic canal.

This most essential condition, or principle, as I have ventured to call it, does not appear to have been well understood by many writers, I had almost said by any except Capuron. Thus, Dr. Dewees mentions, among other circumstances whose concurrence is necessary to propitious childbirth, favorable situation of the head, "or, in other words, the great diameter of the child's head must constantly correspond with the great diameter of the pelvis." By the great diameter of the head, Dr. Dewees means, with us, the occipito-frontal, at least such is the use of the term by Baudelocque, whom he closely follows, and, therefore, the object, according to him, of all the mutations which the head suffers during its passage is to find room for this diameter: an idea which, as I shall hereafter show, pervades and vitiates the account which nearly all the British writers give of the mechanism of labor.

M. Dugès describes the mechanism of the first and second positions of the vertex in conjunction, under the common denomination of *occipito-anterior* positions, and that of the third and fourth, as *occipito-posterior* positions. But the uninitiated in the mysteries of obstetrical science will be less apt to get bewildered by having the attention directed to the several positions one by one. Nor need this make their studies tedious or irksome, for it will be found that, if the first position be mastered, but little remains to be learned with regard to the second; and that, when the third is understood, the fourth is soon dispatched.

1. *Mechanism of the First or Left Occipito-Acetabular Position of the Vertex.*—In this position, the occiput corresponds with the left acetabulum; the forehead, with the right sacro-iliac symphysis; the sagittal commissure is in the direction of the left oblique diameter of the superior strait; the posterior fontanel is forwards and towards

¹ Midwifery, fifth edition, p. 222.

the left; the anterior is backwards and towards the right. Previous to the rupture of the membranes, and the occurrence of strong expulsive contractions, the head of the fœtus is but slightly flexed upon the breast, and its diameters have nearly the following relations with those of the superior strait, viz: the occipito-frontal diameter is parallel with the left oblique diameter, and the bi-parietal is parallel with the right oblique diameter. The great, or occipito-frontal circumference, is, of course, parallel with the boundary of the superior strait. Fig. 60 may serve to give the student a more lively idea of the situation of the fœtus in utero, in this first position of the vertex, and of the relations of the head to the pelvis of the mother. The head is seen to be slightly flexed on the breast, and somewhat engaged in the superior strait.



Fig. 60.

Vertex Presentation : first position.

This situation of the head is, however, not favorable to its entering the superior strait, for it offers a diameter (the occipito-frontal) to the left oblique diameter of the strait, which is too great, when the diminution of available space, by the soft parts of the pelvis and the walls of the uterus, is taken into consideration. Accordingly, when the uterus assumes strong expulsive contractions, and the head is urged to enter the pelvis, the *First step*¹ of the mechanism of labor commences, which comprises the *flexion and descent of the head to the bottom of the pelvic excavation*. Flexion of the head causes the occiput to descend, while the forehead rises, and, consequently, the cervico-bregmatic

¹ It is customary with French writers to divide the mechanism of labor into several distinct parts, for the purpose of more methodically describing the process. These divisions they denominate *temps* (times), a word which could hardly be adopted by us for such a purpose. The word *stages* would perfectly convey the same idea, and might be more agreeable to a critical ear than "steps," which I employ; but the appropriation of it, by all British and American writers, to the threefold division of the entire function of parturition, forbids its application to the different evolutions of the mechanism, which is itself but a part of the phenomena of the second *stage* of labor.

diameter takes the place of the occipito-frontal, while the bi-parietal diameter remains as before. Two of the small diameters of the head, the cervico-bregmatic and bi-parietal, are thereby brought parallel with the oblique diameters of the pelvis, and its lesser circumference is parallel with the circumference of the pelvic canal, while its axis is parallel with the axis of the superior strait. The essential condition, above adverted to, is then complied with, and the head is admitted into the pelvic cavity.

The flexion of the head is doubtless caused by the resistance at the superior strait and by the converging planes of the ischia, aided by the cervix uteri, which, although it may be considerably dilated, does not at once allow the head to engage in its orifice. To understand how this resistance produces flexion, it is necessary to observe that the head forms a lever by its articulation with the spine, and that, in consequence of the articulation being nearer the occipital protuberance than the chin, the occipital arm of the lever is shorter than the mental arm. Let it be observed, moreover, that the power exerted upon the body of the child by the contractions of the uterus is transmitted to the head, through the medium of the spine, and it is easy to see that, the resistance being equal at both extremities of the lever, the occiput must descend, because it is nearest the spine. This may be illustrated by a very simple experiment: lay a foot ruler on the table, and push against it with the point of the finger opposite the figure six, which is its middle; the ruler is forced to move against the resistance of the air and friction of the table,

Fig. 61.



First Position of Vertex: first step in mechanism of labor.

and both extremities move with equal pace. Push, next, nearer one extremity than the other, and the pace of this extremity will be quickened in proportion to the nearness of the finger to it, causing it to advance before the other. As the occiput descends, the chin mounts up towards the breast of the child, that is, flexion takes place.

Prepared by its flexion, the head descends into the pelvic excavation, moving in the direction of the axis of the superior strait until its further progress is arrested by the sacrum,

against which the vertex impinges. At this time, it is evident that, although the head fully occupies the pelvis, and the right parietal bone, which is anterior, is felt considerably below the symphysis pubis, the vertex is still directed towards the sacrum, and the sagittal commissure is placed so far posteriorly that it can only be reached by introducing the finger deeply, and curving it forwards. In Fig. 61, the head is represented as having taken its first step; it is more flexed, and it has reached the inferior strait, where it preserves its oblique position.

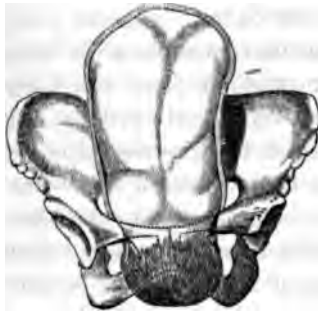
Second step—Rotation.—Arrived at the bottom of the pelvis, the head is forced to execute a rotatory movement, the occiput advancing from left to right and forwards, towards the symphysis pubis, under which it is finally placed. This movement is sometimes executed with such facility as makes it difficult to be traced; at other times, so tediously that it is tiresome to watch it.

Not unfrequently, when the rotation is carried so far as to bring the occiput behind the left ischio-pubic ramus, it is arrested for a time, the posterior superior part of the right parietal bone projecting, meanwhile, in the pubic arch, and the perineum beginning to be distended. The inexperienced medical attendant might now conclude that the birth of the child is at hand, and yet hours may elapse before that event; for the posterior fontanel is still behind the left ramus of the pubes and ischium, and the sagittal commissure still crosses the coccy-pubic diameter quite obliquely. It is under these circumstances that a swelling is apt to form on the liberated portion of the cranial integuments, viz: over the posterior superior part of the right parietal bone, which may continue some time after birth. This swelling, called the *caput succedaneum*, is formed by blood and serum, effused from the vessels of the part, in consequence of their engorgement, resulting from obstruction to the return of blood from it; the obstruction consisting in the close constriction of every other part of the head by the osseous and soft parts of the pelvis. The swelling of the head increases its protrusion at the vulva, and thus tantalizes the accoucheur with the hope of speedy release.

I have said that, when the head reaches the inferior strait, it is *forced* to rotate, by which it is to be understood that the head could make no further progress, without first undergoing this movement. To escape from the pelvic excavation, the head must move in the direction of its inferior aperture, that is, conformably to the axis of

the inferior strait, and must offer its lesser circumference to this aperture, otherwise there is not room for it to pass. But this can be brought about only by its rotation, which enables the occiput to emerge first, under the symphysis pubis, when the axis of the head is placed parallel with the axis of the inferior strait, and, the *essential condition* being now complied with, the head is prepared for its sortie. *Previous* to this rotation, the occipito-frontal diameter tends towards the left oblique diameter of the inferior strait—the occipito-frontal, or great circumference, tending towards its plane—and it is demonstrable, with a pelvis and foetal head, that the dimensions it then offers cannot pass out, except the head be very diminutive, or the pelvis very capacious; that is, the head cannot, except under

Fig. 62.



First Position of Vertex: close of second step in mechanism of labor.

peculiar favor, clear the inferior strait, in a diagonal or oblique position. *After* rotation, the cervico-bregmatic diameter is parallel with the coccy-pubic, and the bi-parietal with the bis-ischiatric diameter of the inferior strait, while the cervico-bregmatic, or lesser circumference, is parallel with its plane: the same small diameters and circumference, with which the head entered the pelvis. In Fig. 62, the head will be seen as it is placed after it has performed its rotatory movement,

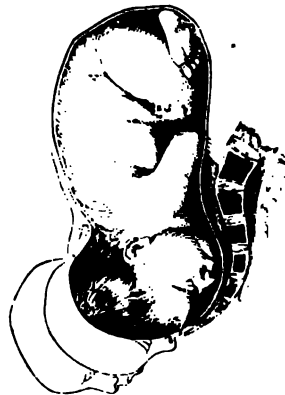
namely, with the occiput under the symphysis pubis; retaining, however, a slight degree of obliquity to the left.

Third step—Extension.—After the rotation of the head, the chin receives the principal force of the uterine contractions; it is consequently depressed, and made to depart from the sternum of the child, against which it had hitherto been strongly flexed, and this depression of the chin produces the extension of the head. While the chin is being depressed, the occiput rises towards the mons veneris, and the perineum is put more and more on the stretch, until finally the head clears the vulva—the sagittal commissure, the bregma, the coronal commissure, the nose, mouth, and chin, appearing successively before the anterior edge of the perineum. While the distended perineum is making resistance, it is, in fact, but a portion

of the posterior wall of the pelvis, and bears the head strongly upwards towards the mother's abdomen; but as soon as the great circumference of the head escapes at the vulva, its natural elasticity causes it to retreat rapidly, over the face of the child, and apply itself to the anterior part of the neck.

The cause of the extension movement of the head is well explained by M. Cazeaux, to whom we are indebted for much light upon the whole subject of the mechanical phenomena of labor. At the same time that the occiput engages in the pubic arch, the shoulders and the superior part of the trunk enter the excavation, and the flexibility of the trunk enables it to be conformed to the axis of the canal, that is, it is curved upon its posterior plane. This inflexion of the trunk withdraws it from the chin, and is the beginning of the extension movement of the head. To comprehend how this movement is completed, we have only to consider that, from the commencement of labor, the uterine contractions act both upon the chin and occiput; but, until now, their force has been chiefly exerted upon the occiput, for a reason already given; and because, moreover, when the head is flexed, the occiput is more in the direction of the force transmitted through the spine. But when the occiput is engaged in the pubic arch, the back of the neck is pressed against the posterior part of the symphysis pubis, and destroys, by its resistance, all that portion of the uterine force that had acted upon the occiput. The chin, continuing to receive its share of the force, is moved forwards, while the junction of the back of the neck with the occiput rests stationary under the symphysis, causing the cervico-bregmatic, cervico-frontal, and cervico-mental diameters, to clear successively the antero-posterior diameter of the inferior strait. During this movement, as M. Cazeaux justly observes, the head resembles exactly a lever of the third kind, whose prop is the cervico-occipital point placed under the symphysis pubis, the power being at the great occipital foramen, and the resist-

Fig. 63.



First Position of Vertex: third step in mechanism of labor.

ance at the chin, augmented by that of the perineum. Fig. 68 represents correctly the extension movement of the head, the outline heads showing its different degrees as it emerges upwardly from under the pubic arch.

Fourth step—Rotation of the Shoulder with Restitution of the Head.—Shortly after its disengagement the head rotates again, but in a contrary direction, the occiput turning towards the inside of the *left* thigh of the mother, and the face towards the inside of the *right* thigh. This movement of the head was called by Baudelocque its *restitution*, because he considered its first rotation in the cavity of the pelvis a twist of the neck, in which the trunk does not participate, and when the head is free from constraint it resumes its natural position in relation to the trunk, by the elasticity of the ligaments of the neck. The correctness of this explanation has lately been questioned by M. Gerdy, as we learn from M. Cazeaux, who adopts his views of the matter. According to M. Gerdy, the trunk of the child participates in the first or *internal* rotation performed by the head, so that the shoulders are simultaneously placed *nearly* transversely in the pelvis, instead of remaining oblique, as they were when labor commenced. They arrive at the inferior strait in this nearly transverse position, the right shoulder being a little anterior, where, encountering resistance on account of their bis-acromial diameter being offered to the smallest diameter of the strait, they undergo another rotation in an opposite direction, *viz.*, from right to left, towards the symphysis pubis, and the head, being free, simply follows the movement of the shoulders. This movement of the head he proposes, therefore, to call its *external*, to distinguish it from the *internal*, rotation it had previously executed. The head, therefore, first causes the shoulders to rotate, and is in turn rotated by them. To M. Cazeaux, however, the head has seemed, in certain cases, to execute a double movement, the occiput, immediately after its expulsion, turning slightly towards the thigh, and after remaining a few seconds in this position, experiencing a second movement, caused by the rotation of the shoulders. The first of these movements appeared to be owing to the untwisting of the neck.

One of the arguments adduced by M. Gerdy, in favor of his theory of external rotation it will be found difficult to controvert, *viz.*, the fact that, instead of turning towards the left thigh the occiput sometimes continues to look towards the pubes for a few

moments, or until there is a recurrence of efficient uterine contraction, and then revolves towards the right thigh of the mother—the internal or first rotation being continued, and the child being expelled under a long spiral movement. I have, on several occasions, distinctly observed this phenomenon, and it is not possible, I think, to reconcile it with the theory of Baudelocque.

Fifth step—Extrication of the Shoulders, etc.—The shoulders, having entered the excavation and performed their rotation coincidentally with the restitution of the head, next undergo a movement preparatory to their release. Before describing this it is proper to observe that the rotation of the shoulders may be complete or incomplete, that is, the right shoulder may be placed behind the symphysis pubis, as Madame Boivin¹ and others describe, or under the right ischio-pubic ramus, as M. Cazeaux affirms that it most usually is. In either case the shoulder that is anterior, viz., the *right*, having but a short distance to travel, makes its *appearance first* at the vulva, when it remains stationary, being pressed against the pubes, while the *left* shoulder sweeps over the inferior part of the sacrum, the coccyx, and perineum, and is *disengaged first* or along with the right. During this movement it is evident that the child's body is strongly curved upon the side that is anterior (its right side) to adapt it to the curvature of the pelvic excavation.

The hips easily follow the shoulders, executing, if they are large, the same movement; ordinarily, however, their expulsion and that of the rest of the child is so rapid that the mechanism cannot be observed.

2. *Mechanism of the Second or Right Occipito-Acetabular Position of the Vertex.*—In this position the occiput is turned towards the right acetabulum, where also the posterior fontanel is found, the forehead towards the left sacro-iliac symphysis, and the sagittal commissure is in the direction of the right oblique diameter of the superior strait.

The several steps of the mechanism are the same in this as in the first position: *flexion and descent, internal rotation, extension, external rotation, extrication of the shoulders, etc.*, follow each other in the same order and from like causes. In this position, however, it is the *left* parietal bone that is anterior, which is consequently most easily felt by the finger; the head rotates from right to left

¹ Mémorial de l'Art des Accouchements, p. 223.

instead of from left to right, or bring the occiput under the symphysis pubis. If the rotation be judiciously performed, it is upon the posterior superior part of the left parietal bone that the cranial thrust is directed, and when the head is disengaged, the occiput turns towards the right thigh of the mother, while the left shoulder appears at the vulva, and is the point upon which the right shoulder moves in some or less or other with its fellow before the anterior superior spine of the perineum.

It is asserted by M. Capuron that the mechanism of labor, usually effected in *the first* position, as in the first position, is more liable to be embarrassed in consequence of the frequent existence of right lateral obliquity of the uterus, when the force of its contractions is directed laterally and backwards, and may interfere with the descent of the head, or even increase the extension of it, which existed before labor commenced. It may happen, also, he apprehends that a lateral sinus of the rectum will prove an obstacle to the descent of the head, by impeding the revolution of the forehead and face from left to right. These apprehensions of M. Capuron appear to me to be purely hypothetical: certainly, I have met with nothing to justify or justify them. Although I have not unfrequently encountered second position of the vertex, I am not aware that either delay or difficulty could be justly ascribed to it.

3. *Position of the Fœtus in Right Oblique-Sacro-Iliac Position.*—This position resembles the first, in that the same diameters of the head correspond to the same diameters of the pelvis, before any change is made by labor: viz. the occipito-frontal to the left oblique, the biparietal to the right oblique, and the sagittal commissure crosses the pelvis in the same direction. But the relative situation of the occiput and forehead is reversed—the occiput being opposite to the right sacro-pubic symphysis and the forehead to the left acetabulum—and the left parietal bone is anterior and most accessible, as in the second position.

The third position may march through its mechanism by the same steps as the first and second, only one of them will be a *stride*: or an *error*, viz. altogether peculiar to it and to the fourth position, may be requisite, and hence the impropriety of confounding these positions with the first and second, as MM. Nägele and Dubois have done.

Flexion and *descent* of the head are the same in the third position as in the first and second; the peculiarities of it are connected with, or consequent to, the *rotation* of the head, which will, therefore, claim our chief attention. This movement may be accomplished in two modes: first, the occiput may be thrown into the hollow of the sacrum; or, second, it may be conveyed under the symphysis pubis.

(1.) *Rotation of the Occiput into the Hollow of the Sacrum.*—This takes place subsequently to the descent of the head, and when it is achieved, the occiput is lodged in the hollow of the sacrum and the forehead *behind*, not under, the symphysis pubis. It is then the occipito-frontal diameter which occupies the antero-posterior dimension of the excavation, where there is space enough to accommodate it, but the antero-posterior diameter of the inferior strait is not large enough to allow it to pass out. The axis of the head, moreover, is yet nearly parallel with the axis of the *superior* strait; the head is not, therefore, prepared to pass the inferior strait, the *essential condition*, so often referred to, not having been complied with. An *extra flexion* of the head now commences, which is the *extra step* alluded to, under which the occiput is depressed, while the forehead mounts higher behind the symphysis pubis, until the occiput emerges before the anterior edge of the perineum. This *extra flexion* establishes such relations as allow the head to be delivered, for the cervico-bregmatic diameter is now nearly parallel with the coccy-pubic, and the bi-parietal with the bis ischiatic: while the axis of the head is brought more nearly into correspondence with the axis of the inferior strait.

After the emergence of the occiput in this, as in the first, position, *extension* begins; but here its prop is changed to the perineum, instead of the under edge of the symphysis pubis, for the *posterior inferior* part of the occiput rests on the perineum, while successively the bregma, the forehead, nose, mouth, and chin come out under the pubic arch. Sustaining, as it does, the force of this extension movement, it is no wonder that the perineum is much more liable to be ruptured in this position of the vertex. Of this liability there can be no doubt: it is distinctly admitted by many writers, and by none more emphatically than by Dr. Merriman,¹ who gives

¹ *Synopsis of Difficult Parturition*, first American, from second London edition Philadelphia, 1816, p. 57.

to such a position the foremost place in his third order of difficult parturition (*Dystocia Perversa*), and remarks concerning it, "It is necessary to pay particular attention, to prevent a laceration of the perineum; for the external parts are excessively stretched when the head passes in this direction. Even women," he continues, "who have borne many children, have had the perineum lacerated under the circumstances of this kind of presentation."

The cause of the extraordinary distension of the perineum, and of its exposure to rupture, does not appear to have been very clearly perceived by writers, who usually ascribe it to the forehead not fitting the pubic arch so well as the occiput, and leaving consequently an unoccupied space which must be compensated by increased dilatation towards the perineum. But it is rather to be sought for, I apprehend, in a peculiarity of mechanism pertaining to the case under consideration. It has been already stated that the head, subsequently to its extra flexion, has its axis brought more nearly parallel with the axis of the inferior strait than it was before. It should be observed, however, that these axes are not, and it is not possible that they can be, brought so nearly parallel as they are, when, as in the first and second vertex positions, the occiput is liberated under the symphysis pubis; for the thickness of the child's neck (to say nothing of the trunk necessarily drawn into the excavation, before the occiput is disengaged) intervenes between its chin and the sacrum. It is plain, then, that the mental extremity of the axis of the head is pushed too far forwards towards the pubes, and its occipital extremity too far backwards. The *essential condition* is not, and cannot, therefore, be complied with; and, strictly speaking, the cervico-bregmatic diameter is not parallel with the antero-posterior diameter of the inferior strait; nor does the lesser circumference of the head offer to its aperture, but one that is greater, though not so large as the occipito-frontal. It is, therefore, the larger circumference of the head that passes out, together with the shifting of the prop of the extension movement, that causes greater distension of the perineum, and endangers its laceration.

(2.) *Rotation of the Occiput towards the Pubes.*—In this anterior rotation of the occiput, the head takes a *stride* instead of the corresponding *step* belonging to first and second vertex positions, for the occiput is brought from the right sacro-iliac junction and deposited under the symphysis pubis. The effect of this movement is first

to convert the third into the second position, and then to dispose of it as though it had been an original second position. There is a great difference, in different cases, with regard to the facility with which this more extensive rotation is executed. In some women, especially in such as have borne children before, and whose pelvis are capacious and parturient powers vigorous, it may be effected by a few pains, even by a single one; while in others, particularly in primiparæ, it may take place most tediously—the posterior fontanel moving forwards during a pain, and retreating as soon as the pain goes off. This bandying may be so protracted as to sorely weary the accoucheur and effectually test his patience, as I have many times experienced.

4. *Mechanism of the Fourth or Left Occipito-Sacro-Iliac Position.*—There is the same resemblance between this and the second position as there is between the third and first, in respect to the correspondence of cephalic and pelvic diameters, at the commencement of labor, viz., the occipito-frontal is applied to the right oblique, the bi-parietal to the left oblique diameter, and the sagittal commissure crosses the pelvis in the direction of the right oblique diameter. But the occiput is towards the left sacro-iliac symphysis, instead of towards the right acetabulum, and the right parietal bone is anterior and nearest the vulva, as in the first position.

The mechanism of the fourth position resembles that of the third, with only the trivial difference incident to its location. The head may be expelled by the route of posterior or anterior rotation of the occiput; but if by the former, the occiput moves from left to right, instead of from right to left, as it does in the third position; and after the escape of the head, it turns towards the left nates of the mother (its restitution), instead of towards the right nates, as it does in the third position. If its expulsion is effected by the latter (anterior rotation), the occiput describes an extensive arc of a circle, in marching from the left sacro-iliac junction forwards and towards the right, instead of moving from the right sacro-iliac symphysis forwards and leftwards, as it does in the third position.

Having described the two modes in which rotation may take place in the occipito-posterior positions, we may next inquire which of these is most conformable to the natural mechanism of labor, or, in other words, is of most frequent occurrence in childbirth?

Baudelocque considered the rotation of the occiput into the hollow of the sacrum as by far the most common—so common, indeed, that

its anterior rotation is but a rare exception, unfortunately, as he thought, too rare, seeing it is so much preferable for both mother and child.¹ And this doctrine was universally accredited, I believe, until it was controverted by the celebrated Professor Nägele, of Heidelberg, in Germany, who declares that according to his observation, "*the process which has been considered as a regular phenomenon, is a deviation; and exactly that which has been esteemed a deviation from the usual course and rule, is perfectly regular.*"² He avers that in ninety-six cases of the third vertex position, which he observed with particular care, the head came through the external passage only three times with the face upwards or forwards, and that even in these few instances there were circumstances, such as unusual capacity of the pelvis, the small size of the head, or its incomplete ossification, which seemed to favor such a termination.

M. Moreau agrees with M. Nägele on this point, candidly avowing that he had, for a long time, concurred with Baudelocque; but that his further experience had convinced him that Baudelocque mistook the exception for the rule, and the march of nature *in the majority of cases* for an exception.³ M. Moreau does not, so far as I have examined, make any more precise statement as to the proportion of cases in which this rotation occurred; but Dr. Rigby, who appears to have been fully imbued with the doctrine of M. Nägele, by attendance on his lectures at Heidelberg, bears testimony to the exceeding commonness of it. Dr. Rigby speaks⁴ of the fourth position, for example, as only a *slight modification*, occasionally observed, of the first, which, he thinks, is not detected so frequently as it really occurs, owing to its changing into the common (first) position *at an early period* of labor. He concurs with Professor Nägele in reckoning the third as the usual position, where the occiput is turned towards the right side of the pelvis; but that as labor progresses, the occiput forsakes the right sacroiliac symphysis, and, coming forwards, assumes its place in the second position. My own observation has fully satisfied me that the anterior rotation of the occiput is more common than the posterior, although, like M. Moreau, I once thought differently—

¹ L'Art des Accouchements, tom. i. p. 316.

² Mechanism of Parturition, p. 48.

³ Traité Pratique des Accouchements, tom. ii. p. 82.

⁴ System of Midwifery, chap. Mechanism of Parturition.

too credulously relying on the authority of others, particularly of Baudelocque and Dewees.

Explanatory and Critical Remarks.—Among the various movements which the head performs, none is more curious, and, at the same time, none has been so little understood as its rotation previous to its emergence from the pelvic outlet. The idea of Smellie¹ was that the head is forced to rotate, in order that it may find room for its widest part, namely, its longitudinal diameter, when it reaches the inferior strait. Placed at the brim of the pelvis, with the occiput towards one side and the forehead towards the other, the head is, according to him, “squeezed along” till the vertex descends to the lower part of the ischium, “where the pelvis, becoming narrower at the sides, the wide part of the head can proceed no further in the same line of direction; but the ischium being much lower than the os pubis, the hindhead is forced in below this last bone, where there is least resistance.” Precisely the same view is taken by Dr. Ramsbotham,² who, in speaking of the posture of the head when it comes fully to occupy the pelvic cavity, says: “Since, however, in this position its long diameter is opposed to the short diameter of the outlet—since the tuberosities of the ischia are unyielding—and since the long diameter of the head exceeds the short diameter of the outlet by half an inch—it is evident that a change in its relative situation must be made before it can be expelled.”

The reasoning of both Smellie and Ramsbotham is based upon the assumption that there is more space at the pelvic outlet in the antero-posterior direction than from one ischiatic tuber to the other, which, as we have seen (Chap. I.), is not true—there being, in fact, more room in its transverse than in its antero-posterior dimension, unless the os coccygis is pushed back to the uttermost, and even then there is as much room. It presupposes, moreover, that the long diameter of the head engages in the pelvis, as though it were fixed and incapable of displacement, whereas it has been shown that one of the earliest mechanical phenomena of labor is the substitution of the cervico-bregmatic diameter for it, brought about by the simple flexion of the head that takes place as a part of the very first step of the mechanism of labor.

What I regard as the true solution of the rotatory movement of

¹ Theory and Practice of Midwifery, 5th edition, London, 1766, vol. i. p. 87.

² Process of Parturition.

the head is involved in the description I have given of it. When the vertex, no matter what may be its position, reaches the floor of the pelvis, it has proceeded as far as it can in the direction which it must follow, so long as it meets with no obstruction viz., in the direction of the axis of the superior strait or downwards and backwards, because the uterus, which propels it, is in correspondence with this axis. Encountering the os coccygis and the inferior part of the sacrum, as well as the soft parts occupying the pelvic outlet, the head is subjected to their reaction during each uterine contraction, and is urged to move in whatever direction there is the least resistance, which is, of course, in the direction of the orifice of the vagina. But there is a mechanical obstacle to its progression, growing out of the want of coincidence between the axis of the head and the axis of the inferior strait, in consequence of which the head does not offer its smallest circumference to the strait, but one approaching its largest. The condition, spoken of at the outset of these remarks on the mechanism of labor, does not then exist; the axis of the head is not parallel with that of the inferior strait, without which it cannot, of course, offer its smallest circumference. When, therefore, the head is impelled against the inferior strait, it meets with resistance and secondary reaction. Under this action and reaction to which it is subjected, the head undergoes displacement, a smaller and smaller circumference taking the place of the larger at the inferior aperture of the pelvis, until at length its smallest circumference is offered, which can only be when the occiput is turned forwards under the pubic arch.

When analyzed, the cause of the rotatory movement of the head is essentially the same as that of its flexion, viz., the force of the uterine contractions and the resistance it meets with. If there were no resistance offered at the superior strait and by the planes of the ischia, there would be no flexion of the head, and it is equally certain that if there were no resistance at the inferior strait, there would be no rotation; and just as when the head is relatively small or the pelvis large there may be little or no flexion, so also there may be little or no rotation, the head preserving its oblique position, more or less, as it clears the inferior strait. The statement just made, that the axis of the head must be brought to correspond with that of the inferior strait, and that its smallest circumference must be offered, must be received with some qualification. Strictly speaking, such a condition is exacted only when the head is rela-

tively large or the pelvis small: in no case is a greater degree of rotation required or performed than what is necessary to bring such a circumference of the head to the outlet as can pass. In many instances, this is not the very smallest circumference, and consequently, the rotation not being complete, the head escapes more or less obliquely.

It is well known that the complete rotation of the head, as a part of the mechanism of labor, is altogether denied by the celebrated Professor Nägele,¹ who, in speaking of the first position of the vertex, says: "By continued pressure of the uterine contractions, the posterior fontanel at last gradually moves itself, by slight degrees, repeated at equal intervals, in a direction from left to right (frequently more or less from above downwards), and the occipital bone advances from the side of the pelvis under the arch of the pubes. It is not, however, the centre of the occiput that advances under the pubal arch, but the head approaches the os externum, with the posterior and superior part of the right parietal bone, and remains in this position until it has passed through the outlet of the pelvis, with the greatest circumference which it opposes to it, where it then turns itself with the face completely towards the right thigh of the mother. When the head is engaged in the external passages, and we trace the sagittal suture with the point of our finger from the posterior fontanel, it will, during examination, take the direction of a line drawn from the left descending ramus of the pubes to the right ascending one of the ischium; it is, in short, the posterior and upper part of the right parietal bone, which passes first through the os externum." No doubt the head does often make its exit in the manner represented in the above citation; but I can have as little doubt that it very often rotates completely, bringing the *occiput* under the symphysis pubis: for I have very many times traced the sagittal commissure running parallel with the coccy-pubic diameter, and found the two limbs of the lambdoidal commissure crossing the ischio-pubic rami equidistantly below the symphysis pubis. In this, I cannot, I think, be mistaken, though I am free to confess that I am now satisfied that deviations from it are not so rare as I formerly supposed, and that Nägele had a broader basis for his account of the mechanism of labor than I believed, when the first edition of my work was published.

¹ Mechanism of Parturition.

II. MECHANISM OF LABOR IN NATES PRESENTATION.

It has been already observed that, under the common denomination of "nates," are included presentations of the breech, feet, and knees, which are only modifications of one great class, viz: presentation of the pelvic extremity of the foetus. When the child presents thus, it may be, as M. Cazeaux observes: 1. That the pelvic extremity, composed of all its elements, viz: the thighs flexed upon the abdomen, and the legs upon the thighs, engages in the excavation, and in the inferior strait; 2. That the inferior extremities, floated by the liquor amnii, after the rupture of the membranes, deploy, in whole or in part, causing the feet or the knees to reach the vulva first; 3. That, the legs becoming extended, and brought into apposition with the anterior plane of the foetus, the breech alone descends; 4, and lastly. That one of the inferior extremities may be extended upon the abdomen, while the other is deployed, and thus, one foot or knee only may present at the vulva.

It is manifest that these modifications cannot materially affect the process of expulsion, and it were, therefore, worse than useless to describe the mechanism of each of them. It will be sufficient for our purpose to take the most common modification, namely, that in which the breech alone engages in the pelvis, the inferior extremities being extended upon the abdomen of the foetus.

1. *Mechanism of the First or Left Dorso-Iliac Position of the Nates.*—In this position, the back of the foetus looks towards the left side

Fig. 64.



Nates Presentation: first position.

of the mother, its anterior plane (abdomen, breast, and face) is towards the right, its left side is forwards, and its right side backwards. Its back may, however, be turned forwards towards the left acetabulum *ab origine*, or shortly after labor begins, as represented in Fig. 64.

First step—Descent of the Breech.—If the breech be not large, it engages in the superior strait, as it offers itself, viz: with the bis-iliac diameter parallel with the sacro-pubic diameter. But if it be too large to engage

thus, it undergoes a preparatory rotation, which brings its bis-iliac diameter parallel with the right oblique diameter of the strait. (See Fig. 64.) In its descent into the pelvic cavity, the breech moves in the direction of the axis of the superior strait, that is, downwards and backwards, and, consequently, the left, or anterior hip, is considerably below the symphysis pubis, when the right or posterior hip is in the hollow of the sacrum.

Second step—Rotation.—Arrested by the posterior wall of the excavation, the breech is compelled to move in the direction of the axis of the inferior strait; preparatory for this, if the breech be obliquely situated in the pelvis, rotation takes place, which brings the left hip under the symphysis pubis, and the right into the hollow of the sacrum, at the expense of a twist of the child's trunk; the shoulders remaining as before. If the breech have engaged in the pelvis, with its bis-iliac diameter parallel with the sacro-pubic, without any rotation, one hip is, of course, anterior, and the other posterior, when it reaches the inferior strait. Fig. 65 shows the twisting rotation of the hips.

Third step—Disengagement.—The left hip now engages under the symphysis pubis, and makes its appearance first at the vulva, where, continuing stationary, it becomes the pivot upon which the right hip moves, describing an arc of a circle as it sweeps over the concavity of the sacrum, coccyx, and perineum, to be completely released before the left hip is. While the hips are passing out in this manner, the trunk is necessarily incurvated upon its left side, and as soon as they have cleared the vulva, the left hip turns towards the right thigh of the mother, resuming their oblique position, if such had existed before, assum-

Fig. 65.



First position of Nates: second step in mechanism of labor.

Fig. 66.



First position of Nates: third step of mechanism of labor.

ing it if they had it not before. The cut, Fig. 66, shows this revolution of the anterior plane of the child's body backwards, or towards the posterior part of the pelvis of the mother.

Fourth step—Passage of the Trunk.—While the trunk is passing through the pelvis, its flexibility allows it to be conformed to the curvature of the canal, and it continues, therefore, to be incurvated upon the left side, which is towards the pubes. The shoulders engage in the superior strait diagonally, the bis-acromial diameter corresponding to its right oblique diameter, and the arms continue to be closely applied to the sides with the forearms crossed upon the breast, unless the child is very large, when the elbows may be intercepted at the superior strait, and the body continuing to descend, the arms may be carried up alongside the head. At the inferior strait, the shoulders rotate, the left passing towards the pubes, and the right towards the hollow of the sacrum, when the left shoulder presses against the inner face of the pubes, while the right moves over the concave surface of the sacrum, coccyx, and perineum, and is first extricated, drawing down the arm after it, if it had been carried upwards. Then follows the extrication of the left shoulder and arm from under the pubes. As the shoulders pass, if not sooner, the feet arrive at the vulva, and as soon as they are released, the inferior extremities are extended, and the child is undoubled.

Fifth step—Passage of the Head.—The head approaches the superior strait, offering the occipito-frontal diameter to its left oblique diameter; but pressed by the uterine contractions, it flexes so as to have substituted for this a diameter approximating the cervico-bregmatic. Entering the excavation thus, a rotation similar to that of vertex positions conducts the face into the hollow of the sacrum, the occiput behind, and the nucha under, the symphysis pubis. At this time, the uterus can act but feebly on the head, which is partly or wholly in the vagina, but the contractions of the abdominal muscles, aroused by pressure on the rectum and bladder, come to its aid, and their united forces produce increasing flexion of the head. The centre of this flexion movement is the junc-

Fig. 67.



First position of Nates: fifth step of mechanism of labor.

tion of the nucha with the occiput, which is stationary under the symphysis pubis, while the chin, the forehead, the bregma, and the occiput, successively pass out before the perineum. While it is being performed, the head, as M. Cazeaux remarks, represents a lever of the first kind, the power being at the occiput, the prop at the cervico-occipital junction, and the resistance at the chin, and especially the forehead, which are to be depressed. If, as he further observes, radii be drawn from the cervico-occipital point, under the symphysis pubis, to various points of the median line of the face and cranial vault, these radii will exactly represent the diameters that successively clear the antero-posterior diameter of the inferior strait, the principal of which are the cervico-mental, cervico-frontal, and cervico-bregmatic. In other words, flexion places the axis of the head parallel with the axis of the inferior strait, and then its lesser circumference is offered to the aperture of the inferior strait. Fig. 67 represents the head as it lies in the pelvic cavity, and the hands of the accoucheur applied to promote its flexion.

2. *Mechanism of the Second or Right Dorso-Iliac Position of the Nates.*—In this position, the relative situation of the several parts of the foetus is the reverse of what obtains in the first, but the mechanism of labor is essentially the same. It marches to its consummation by the same steps: the breech turns its bis-iliac diameter to the *left* oblique diameter of the superior strait, if it be too large to enter directly; when it gets to the bottom of the pelvis, the *right* hip rotates towards the symphysis pubis: in clearing the inferior strait, the *right* hip appears first externally under the pubes, but the left comes out first before the perineum; when the shoulders enter the pelvis, their bis-acromial diameter parallel with its left oblique diameter, the *right* shoulder rotates behind the pubes, where it remains until the left clears the vulva by moving over the concavity of the sacrum, coccyx, and perineum; the head, finally, presents its occipito-frontal diameter to the *right* oblique diameter of the superior strait, flexes as it enters, rotates in the excavation, throwing the face into the hollow of the sacrum and the occiput behind the pubes, and then, under increased flexion, the chin, the forehead, the bregma, and the occiput, are successively born.

3. *Mechanism of the Third or Dorso-Pubic Position of the Nates.*—In this position, the back of the foetus looks directly forwards; its anterior plane, with the inferior extremities doubled upon it, looks directly backwards; its right side is towards the left of the mother,

and its left side towards the right. The same steps belong to its mechanism as to that of the first and second, only they are a little varied to suit its circumstances. Thus, the breech plunges into the pelvic excavation, with its bis-iliac diameter parallel with the transverse diameter of the superior strait, and when it reaches the floor of the pelvis, either hip indifferently may rotate forwards, but rotation is not usually carried further than to place the hips in one of the oblique diameters of the inferior strait, and the breech passes out in this oblique manner, the hip that is most forwards appearing first, but that which is posterior being completely expelled before it. The passage of the shoulders is the same as that of the hips, and the head escapes as in the first and second positions.

4. *Mechanism of the Fourth or Dorso-Sacral Position of the Nates.*

—The relations of the foetus to the mother in this position, are the reverse of what they are in the third, and its mechanism is considerably, and may be materially, different. The difference pertains chiefly to the manner in which the head is transmitted through the pelvis. The occiput may remain posterior until the head is completely expelled, or, what more frequently occurs, it may come forwards, and be placed behind the symphysis pubis.

(1.) *Revolution of the Occiput forwards.*—This, as M. Cazeaux remarks, may commence with the disengagement of the hips, the trunk and head participating in the rotatory movement, which begins with them and is extended to the occiput, so that the child descends spirally, and by the time the head reaches the excavation, the occiput is brought behind the pubes. But this transmutation of the head may take place even after it is lodged in the excavation, and the trunk is entirely expelled, with the back still directed posteriorly. The head is then placed diagonally in the pelvis, the occiput being at the posterior extremity of one of its oblique diameters, and the forehead at its anterior extremity. It executes a rotatory movement, by which the occiput revolves forwards from one of the sacro-iliac symphyses to the pubes, while the forehead rolls backwards into the hollow of the sacrum. When the occiput is once placed behind the symphysis pubis, whether in one or the other of the modes now described, the labor is terminated in the same manner as in the preceding positions.

(2.) *The Occiput maintains its posterior station.*—In this situation, the head may be disengaged in two ways. According to the *first*, which is most common, the head enters the excavation under de-

cided flexion, and soon undergoes rotation which deposits the occiput in the hollow of the sacrum, and the forehead behind the symphysis pubis. It is then extricated by being forced to become more and more *flexed*, and as flexion proceeds, the face, forehead, vertex, and occiput successively appear beneath the symphysis pubis. The centre of this movement is the nucha resting upon the anterior commissure of the perineum.

According to the *second* and rarer method, the head becomes *extended* on entering the pelvis, in consequence of which the chin rises above the pubes, while the occiput is retroverted. This extension is carried to its utmost limit, causing the face to look towards the superior strait, while the occiput is depressed along the posterior wall of the excavation, and is first disengaged before the perineum, to be followed by the vertex, forehead, and face. The centre of this movement is the guttural fossa, bearing upon the under part of the symphysis pubis.

Whether the head be disengaged in one of these modes or the other, it is released from the pelvis with much more difficulty than when the face is turned into the hollow of the sacrum. The difficulty was formerly attributed to the chin getting hooked upon the superior border of the pelvis, and rules were prescribed for preventing such an accident. Baudelocque was right in rejecting such an unfounded explanation, but that which he substituted, though not so chimerical, is not more satisfactory. He supposed the difficulty to be owing to the forehead and vertex being too broad to pass under the symphysis pubis, the narrowest portion of the pubic arch. A more correct rationale will be found by adverting to the fundamental principle, governing the head's transmission; for, a moment's reflection will show that in the actual position of the head, it is not possible for its axis to become parallel with the axis of the inferior strait, but it continues oblique—whether the head be flexed, or extended, more so in the latter than in the former case—and therefore not its lesser circumference, but one approaching the greater, is offered to the inferior pelvic aperture.

Explanatory and Critical Remarks.—Although I have described the hips as rotating, the one under the symphysis pubis and the other into the hollow of the sacrum, in the first and second nates positions, it is not to be understood that this takes place in every instance, or even perhaps in a majority of cases. The rota-

tory movement is frequently, if not most commonly, only partial, bringing the hip that is anterior (the left in the first, and the right in the second, position) under the corresponding ramus of the pubes, where it remains until the posterior hip is expelled, the breech preserving a certain degree of obliquity as it is passing through the inferior aperture of the pelvis. It is not, however, without the warrant of high authorities that I have assumed complete rotation to be a part of the regular mechanism of these positions; it is so described by Gardien, Capuron, Dugès, and, more recently, by Moreau and Cazeaux—the latter, however, affirming that the hips pass the bony outlet of the pelvis somewhat obliquely and become directly antero-posterior, as they pass through the vulva. As we cannot suppose that these eminent practitioners were all deceived on this point, we are bound to conclude that such complete rotation is no uncommon occurrence; and I adopt it as the regular procedure for the purpose of placing the mechanism of these positions in contrast with that of the third and fourth, looking at the *directness* of the former and the *obliquity* of the latter.

The more or less oblique passage of the hips is described by Baudelocque as the regular mechanism of the first and second positions of the nates—I say more or less oblique, for Baudelocque makes a difference in degree between the same position of the feet and breech, affirming that in the first position of the feet, as soon as they are born, the breech appears at the vulva, *almost always in a diagonal situation, the left hip corresponding to the right leg of the pubic arch, and the right hip to the left sacro-ischiatric ligament.* He adds that the breech continues to advance in this direction, rising slightly towards the mons veneris as the trunk is disengaged;¹ while of the corresponding position of the breech he says, *as it descends, its greatest dimension (bis-iliac diameter) becomes almost parallel with the antero-posterior diameter of the inferior strait, the left hip being placed a little obliquely under the pubes, and the right before the sacrum.*²

Madame Lachapelle testifies to the frequency of the more or less oblique passage of the hips. She even affirms that the most usual course is for one hip to pass out under one branch of the pubic arch, and the other along the opposite sacro-ischiatric ligament.³

This admirable writer makes, moreover, some very judicious

¹ Par. 730.

² Par. 770.

³ *Pratique des Accouchements, Quatrième Mémoire.*

reflections upon the mechanism in general of nates presentation, observing that it is far from being as uniformly the same as that of the different positions of the head, nor are its steps and movements as distinct and well-defined. On account of the softness of the parts concerned, the nates accommodate themselves more easily to the different forms of the straits; they are readily moulded, and have, consequently, less occasion to change their direction to acquire the most advantageous relations with the great diameters of the straits and excavation. If, as she truly observes, the head were soft enough to be conformed to the configuration of the different parts of the pelvis, its mechanism would be null, at least as far as rotation is concerned; nothing would remain but the movements dependent upon the difference between the axes of the two straits. This is almost literally true of the nates; the hips, and even the shoulders, may traverse the straits in any wise, save with their great diameter, the child being large, directed antero-posteriorly at the superior strait, or transversely at the inferior. The head alone must, of necessity, pursue the same march as in vertex cases, in order that it may escape.

Professor Nägele subjects nates presentation fully to the dominion of his oblique theory of parturition. In the essay which has been already several times quoted, he reduces this presentation to the two following species, viz., 1. Presentation of the nates with the back turned forwards, towards the anterior parietes of the uterus; 2. Presentation of the nates with the back turned towards the posterior parietes of the uterus; remarking, however, that the back of the child, at the beginning of labor, is usually turned more or less sideways, the ischia running parallel with one or the other of the oblique diameters of the pelvic entrance. In either species and in every case, he maintains, the hips pass through the *entrance*, *cavity*, and *outlet* of the pelvis in this oblique position; the shoulders follow in like manner, and lastly the head, entering obliquely, sinks into the excavation in the same direction, or with its occipito-frontal diameter "more approaching the conjugate diameter." "After this," says he, "it passes through the external passage and the labia in such a manner that while the occiput rests against the os pubis the point of the chin, followed by the rest of the face, sweeps over the perineum, as the head turns on its lateral axis from below upwards."

There is one interesting, and, practically considered, important

feature of nates presentation, only slightly alluded to as yet, which deserves to be exhibited in higher relief; I mean *the strong tendency of the back parts of the child, in the dorso-posterior position, to revolve forwards so as to bring the occiput towards the pubes as the head engages in the pelvic cavity.*

For the promulgation of this important truth, and its ameliorating influence upon the management of nates presentation, we are indebted to Professor Nägele. Baudelocque describes the head as entering the pelvis, in this position, with the forehead directed to one of the acetabula at first, but rotating afterwards under the pubes; and he does not, as far as I can discover, hint at the possibility of a different course. But Nägele affirms, more truly, that after the hips pass out along one of the oblique diameters, the anterior surface of the child turns first towards the pubes, and then backwards, either immediately or as the rest of the trunk advances; and that the manner in which the head presses through the entrance, cavity, and outlet of the pelvis is the same as in the other positions. He mentions a remarkable fact, which shows the strength of the tendency to this auspicious revolution of the child's body, viz., should the anterior surface of the body continue to be directed obliquely forwards, even until the shoulders engage in the pelvis, it may yet turn from the side completely forwards, and then to the opposite side, during a single pain by which the shoulders are expelled; and this extensive rotation of the body, which brings the head so much more favorably into the pelvis, may take place "in the twinkling of an eye."¹ That this change does not, however, *always* occur, Prof. Nägele admits, and the experience of others abundantly confirms; hence the propriety of recognizing posterior in contradistinction from anterior positions of the nates as well as of the vertex.

III. MECHANISM OF LABOR IN FACE PRESENTATION.

Before describing the mechanism, it is necessary to observe that face presentation may be *primitive* or *secondary*—that is, the head may be completely retroverted, causing the face to offer fully at the superior strait, when labor begins; or it may be only partially retroverted, in which case the anterior fontanel is found presenting at first, but, in the progress of labor, this is replaced by the face.

¹ Mechanism, p. 137.

Secondary face presentations are considered by authors as deviations from those of the vertex, produced by obliquity of the uterus; but different explanations have been given of the *modus operandi* of this alleged cause. Baudelocque maintained that it is the manner in which the uterine force acts upon the head, where obliquity exists, that causes it to be extended rather than flexed, and thus gradually brings the face into the pelvis in place of the vertex. The obliquity, he affirms, is almost always towards the side where the occiput is placed, and the force of the uterine contractions traverses the head obliquely from its base to the vertex and from the occiput to the forehead, a little anterior to its centre of motion, and terminates upon the forehead, which it tends to depress; but to depress the forehead is necessarily to raise the occiput, or, in other words, to extend the head.

Dugès accounts, more satisfactorily, I think, for the transformation of vertex into face presentations, by attributing it to the impulsion of the occiput against the side of the superior strait, where it is of course arrested, and the face is made to descend by the head representing a lever of the third kind, the prop being at the occiput, the resistance at the forehead, and the power at the occipito-atlantoid articulation.

Secondary face positions, being nothing more than transmutations of vertex presentations, are apt to retain a part of the character of their original, viz: they are usually diagonal instead of direct, the chin being directed towards one of the sacro-iliac symphyses, and because the first vertex position is most common, the first facial position is so likewise, seeing that a considerable number of face presentations are secondary.

It will be remembered that we admit but two positions of the face, namely, the *left fronto-iliac*, and the *right fronto-iliac*. In the first, the forehead corresponds to the left iliac fossa, and the chin to the right, the fronto-mental diameter is parallel with the transverse diameter of the pelvis, and the bi-malar diameter is parallel with the sacro-pubic; the

Fig. 68.



Face Presentation: first position.

back of the child looks towards the left side of the mother, and its breast towards the right; its right side is forwards, and its left backwards. In the second, the relations of the foetus to the mother are the reverse of the first, but the same diameters of the head correspond to the same diameters of the pelvis. The cut, Fig. 68, represents the first position of the face.

It is hardly necessary to describe the mechanism of expulsion in the two positions of the face separately, so nearly do they resemble each other. They will, therefore, be considered in connection, and what is peculiar to each pointed out in its proper place.

The mechanism of face presentation comprises the following movements:—

First step—Descent of the Face.—If the head be so completely extended as to offer the face fully to the superior strait, as it is in the primitive cases, no resistance is made to its engaging in it, for its small diameters, the gutturo-bregmatic and bi-malar, apply for admittance. In such instances, descent of the face to the floor of the pelvis is the whole of the first step. But in secondary positions, gradual extension of the head, by which the forehead is depressed and moved from one side of the pelvis to the other, takes place

preparatory to the engagement of the face, which then descends as in primitive positions. In secondary cases, it is the occipito-frontal diameter of the head which is first parallel with the transverse or oblique diameter of the superior strait; in the progress of their transformation, this cephalic diameter is replaced by the occipito-mental, which is eventually succeeded by the fronto-mental. In both primitive and secondary positions, it is the gutturo-bregmatic diameter which traverses the pelvis transversely or diagonally. The cut, Fig. 69, shows the face engaged in

Fig. 69.



Face Presentation: first step in mechanism of labor.

the pelvis, as the result of the first step. It is still transversely situated, but the head is not so much extended, and the forehead rests on the floor of the pelvis.

Second step—Rotation.—The face now rotates, and the chin re-

volves forwards, from the right in the first position, from the left in the second position, and is lodged under the symphysis pubis; while the vertex is thrown into the hollow of the sacrum, and the forehead rests on the floor of the pelvis posteriorly. This rotation is to the extent of one-fourth of a circle in primitive, three-eighths of a circle in secondary, positions, and when it is achieved, the gutturo-bregmatic diameter is parallel with the coccy-pubic. The cut, Fig. 70, represents the position of the face after rotation, the chin appearing under the symphysis pubis.

Fig. 70.



Face Presentation: second step in mechanism of labor.

Third step—Flexion.—The head next begins to be flexed, which causes the chin to emerge first from under the symphysis pubis and rise towards the mons veneris, until its further movement is checked by the anterior part of the neck being pressed against the posterior surface of the symphysis. The action of the expulsive force upon the chin being destroyed by this resistance, but continuing to bear upon the other extremity of the occipito-mental diameter, the occiput is made to descend until the head is completely disengaged under the flexion movement. While it is being executed, the head, as M. Cazeaux observes, represents a lever of the third kind, whose prop is at the guttural fossa, resting on the under edge of the symphysis pubis, the power being at the occipital foramen, and the resistance at the occiput: and the gutturo-frontal and other coincident diameters measure the antero-posterior diameter of the inferior strait, as the forehead, bregma, and occiput successively emerge before the anterior border of the perineum. Fig. 71 illustrates the manner in which the head is disengaged, the outline sketches showing the different degrees of flexion which it undergoes.

Fig. 71.



Face Presentation: third step in mechanism of labor.

Fourth step—Expulsion of the rest of the Fetus.—The face turns

towards the side to which the chin corresponded at the beginning of labor; the shoulders and the rest of the trunk engage and are delivered as in vertex presentations.

Explanatory and Critical Remarks.—The mechanism of face positions is liable to several anomalies, two of which deserve especial notice.

1. *Rotation may take place before the face has completely descended in the pelvis.* To understand the reason of this, it is necessary to observe, that the length of the child's neck is not sufficient to allow the face, in any case, to reach the inferior strait in a transverse position, so as to have the chin upon a level with one ischiatic tuber and the forehead upon a level with the other, for the depth of the lateral walls of the pelvis exceeds the length of the neck. In order, therefore, that the face may complete its descent *regularly*, flexion must take place in a slight degree, that is, the chin remaining as low as the neck will permit, the forehead must be pushed down to the floor of the pelvis, as seen in Fig. 69. This internal flexion, which accompanies descent, was not noticed in describing the mechanism, for fear of confusing by complicating its study. Now, instead of thus flexing to reach the inferior strait, the head may rotate the chin forwards, behind the symphysis pubis, and then the anterior part of the neck being opposite the short or pubic wall of the pelvis, there is no obstacle to the speedy completion of its descent. When the face traverses the pelvis in this manner, there is first, descent, as far as the neck will allow, then rotation, and finally descent resumed and completed. These anomalous movements, as I regard them, are described by M. Cazeaux as the regular march of nature, in face presentation, although he admits that in a large number of cases, what I have described as the ordinary mechanism, does really occur, that is, partial flexion and complete descent of the face, prior to rotation.

2. *The head may rotate so as to throw the chin into the hollow of the sacrum; or the chin, being directed towards one of the sacro-iliac symphyses from the beginning, may retain its posterior look from default of rotation.* If there have been no interference with the regular progress of the labor, it is exceedingly rare that rotation fails to carry the chin forwards and place it under the symphysis pubis. This occurs in the diagonal position of the face, where the chin is opposite one of the sacro-iliac symphyses, with even greater uniformity than does

the revolving of the occiput forwards in posterior positions of the vertex. The testimony of Prof. Nägele to this effect, is very decided: "In a midwifery practice of twenty years," says he, "I have never had a case come before me, where, in presentation of the face as the labor advanced (if no mechanical assistance had been given by art, as, for instance, changing the direction of the head, bringing it down further, etc.), the forehead had turned itself forwards or upwards, and brought the face at the inferior aperture of the pelvis, into a direction contrary to the usual one. I have been assured of this by several accoucheurs, who were men of observation, some of whom had been much longer in practice than myself."¹

Madame Lachapelle, speaking of the second step of the mechanism of face presentation (rotation), declares that *it is constant and constantly the same*. She says, indeed, that she has two or three times seen the face escape at the vulva transversely, or nearly so; but these she reckons rare exceptions, and thinks it may be laid down as a general principle, that, in all manner of face presentations, rotation is effected in the excavation, so as to bring the chin under the pubes, while the vertex is lodged in the hollow of the sacrum.²

It cannot be doubted, nevertheless, that the chin does occasionally remain opposite the sacro-iliac symphysis, or turn into the hollow of the sacrum, an instance of each of which is related by Dr. Smellie, whose accuracy may not be questioned.³ In such instances, in order that the face might escape through the inferior aperture of the pelvis, it would seem that additional and extreme extension of the head must take place; and so it must, could the head be expelled by a mechanism analogous to that of occipito-posterior positions of the vertex. This is, however, physically impossible, where the child is fully developed, as Madame Lachapelle has irrefutably demonstrated. It is impossible, because either the sternum and clavicles must abide at the sacro-vertebral angle until the chin passes out before the perineum, which would require the neck to be so enormously stretched as to measure the whole length of the sacrum, coccyx and perineum (at least eight inches), or the thorax must be drawn into the excavation between the head and the sacrum, and be so flattened as to occupy not more than two inches of the antero-posterior diameter of the excavation, leaving three inches

¹ Mechanism of Parturition, p. 81.

² Pratique des Accouchements, troisième Mémoire.

³ Collection XXX., Cases IV. and V.

for the cervico-bregmatic diameter of the head. The head cannot, therefore, be expelled by the natural efforts, or extracted by art, in such cases, unless the position be first changed to one more favorable, or transmuted into a vertex position. When transmutation is effected, it is produced either by the gradual depression of the occiput, the chin being stayed against the pelvic wall, and becoming the centre about which the occipito-mental diameter describes a considerable arc of a circle, or by the chin mounting upwards, as the occiput is forced downwards. In either way, the occiput subsides behind the pubes, and, appearing at the superior part of the vulva, emerges first: the rest of the head is expelled as in vertex positions. Professor Meigs gives a different account of the head's passage through the inferior strait: after having described the mechanism of the mento-anterior position of the face, he says: "A very contrary state of things from the foregoing obtains, where the chin, instead of revolving towards the front, turns towards the back part of the pelvis. Here the *forehead* must be born first; then the nose; the mouth; the chin escapes from the edge of the perineum, and then retreats towards the point of the coccyx, allowing the crown of the head to pass out under the arch; and, lastly, the vertex emerges, which concludes the delivery of the head."¹ Professor Meigs does not inform us whether the picture he has drawn is taken from nature, and none of the cases he relates is the counterpart of it. These mento-posterior positions, moreover, are, as has been already stated, very rare, and still rarer is spontaneous delivery in them; it may, therefore, be presumed that he has copied from some other artist, but I know not from whom. Smellie, the only author to whose *cases* Professor Meigs refers, states expressly that, in the case (No. 5) where he found it necessary to deliver with the forceps without changing the position, "the parts between the coccyx and os externum were gradually extended by the face and forehead of the child, and at last yielded, *so as to allow the vertex to come out from below the pubis*; then turning the handles of the forceps towards that bone, I delivered the woman safely of a dead child, which was, in all probability, lost by the long compression of its head in the pelvis." Any one who has ever delivered with the instrument, will readily allow that this description is much more suitable to forceps delivery in vertex than in ordinary face cases.

¹ Philadelphia Practice of Midwifery, first edition, p. 203.

IV. MECHANISM OF LABOR IN SHOULDER PRESENTATIONS.

In the notice that has been taken of them, in a previous chapter, presentations of the shoulders were considered in connection with each other, nor is there now any necessity of separating them. When either shoulder presents, the body of the foetus is placed more or less transversely in the uterus; and it is physically impossible that it can be born, by the unaided efforts of nature, unless its position be changed, or it be amassed in an unusual manner. Such a presentation may, therefore, with strict propriety, be regarded as preternatural. It does, nevertheless, occasionally happen that the natural resources are, by an extraordinary exertion, sufficient for the exigency; and the mechanism by which this is accomplished deserves to be studied, not only as curious, but as affording useful hints to us in practice.

Dr. Denman, who first directed the attention of the profession to the subject, denominated the movement by which nature contrives to expel the foetus in these cases *spontaneous evolution*—a vague appellation, expressive of the result, rather than the expedient adopted for its attainment. *Spontaneous version* would have been a more proper phrase, considering the views which he entertained in regard to nature's procedure; for he says: "As to the manner in which this evolution takes place, I presume that, after the long continued action of the uterus, the body of the child is brought into such a compacted state as to receive the full force of every returning action. The body, in its doubled state, being too large to pass through the pelvis, and the uterus pressing upon its inferior extremities, which are the only parts capable of being moved, they are forced gradually lower, making room, as they are pressed down, for the reception of some other part into the cavity of the uterus, which they have evacuated, until the body, turning as it were upon its own axis, the breech of the child is expelled, as in an original presentation of that part."¹

Dr. Denman's explanation was generally received as a satisfactory solution of the phenomenon, until it was objected to by Dr. Douglass, of Dublin, in a pamphlet entitled *Explanation of the Real Process of the Spontaneous Evolution of the Fœtus*, which I have never seen, but the substance of which may be gathered from the refer-

¹ Introduction to the Practice of Midwifery, chapter 14, section 8.

ences to it by subsequent systematic writers. Contrary to the declaration of Denman, Dr. Douglass maintained that the fetus actually does pass the pelvis in a doubled state; first, the shoulder and chest are propelled low in the pelvis, when the whole of the arm is made to protrude externally; the acromion then appears under the symphysis pubis, and as the loins and breech descend into the pelvis at one side, the apex of the shoulder rises towards the mons veneris, making room for the complete reception of the breech into the cavity of the sacrum; and this part is eventually expelled, greatly distending the perineum, to be followed by the other shoulder and arm, and lastly the head.¹

Considered as a description of what occurs in the great majority of instances of natural expulsion in shoulder presentations, Dr. Douglass' narration must be reckoned to be, in the main, faithful; but his reasoning against Dr. Denman's hypothesis is not entitled to much weight, when he observes "that it is incompatible with the received ideas of uterine action to suppose that the uterus, when contracting so powerfully as to force down that part of the child which was at its fundus, could at the same moment form a vacuum into which another portion, already low down in the pelvis, should recede." There is nothing more impossible, as Dr. Burns truly remarks,² so far as uterine contraction is concerned, in the child revolving during the action of the uterus, by the efforts of the womb on the upper end of the ellipse (the nates), than that we should, during the uterine contraction, find the shoulders with facility go up, merely by drawing gently at the feet: and, we may add, in a certain number of cases (the proportion being probably small), nature does proceed after this manner, performing a genuine version of the child. Still, it undoubtedly is according to the other manner, described by Dr. Douglass, that nature usually operates; and this might be called the *duplication*, instead of the *spontaneous evolution* of the fetus.

The expulsion of the child by the process of duplication is pretty well described by Dr. Douglass: but it may not be amiss to study its mechanism somewhat more particularly, availing ourselves of the valuable assistance of M. Cazeaux, to whom we are already so largely indebted. For this purpose, we may take the first or *aca-*

¹ Ramsbotham's *Process of Parturition*.

² *Principles of Midwifery*.

pubo-pubic position of either shoulder; for, in this respect, there is no essential difference between them; but we select, with M. Cazeaux, the first position of the right shoulder, in which, it will be remembered, the head of the child is placed in the left iliac fossa, the breech in the right iliac fossa, its back looking forwards, and its breast backwards. Its great axis corresponds nearly with the transverse diameter of the pelvis. This first position of the right shoulder is exhibited in Fig. 72, the hand and forearm of the child protruding through the vulva.

After the rupture of the membranes, and the immediate escape of nearly all the liquor amnii, the uterus is brought into close embrace of the foetus, and causes the presenting part to engage in the excavation; and now commences what may be called the *First step*, viz: *flexion* and *descent*, which I unite, although M. Cazeaux makes of them two distinct steps. This first step is performed in the following manner: the great axis of the foetus is strongly flexed upon the side opposite that which presents, the head is thrown upon the left side, and the breech upon the flank of the same side. While this flexion is going on, the shoulder descends lower and lower in the pelvis, until its progress is arrested by the neck, whose shortness will not permit the shoulder, any more than the face, in face positions, to reach the floor of the pelvis, and for the same reason; that is, its length is not equal to that of the lateral wall of the excavation. Figure 73 represents the effects of the first step; the foetal trunk is strongly flexed upon the left side, the shoulder is deeply engaged in the excavation, the forearm and the greater part of the arm protrude externally.

Fig. 72.



Shoulder Presentation: first position of the right.

Fig. 73.



Right Shoulder Presentation: effects of first step in mechanism of labor.

A *rotatory movement* now occurs, as the *Second step*, by which the axis of the trunk is placed nearly antero-posteriorly, instead of transversely as it was; the head is brought over the horizontal branch of the os pubis, and the breech before the sacro-iliac symphysis; and now the *descent* can be completed—since the side of the neck is behind the symphysis pubis, the depth of which is not greater than its length. The shoulder now emerges, the arm having preceded it.

The shoulder not being able to advance further, on account of the hindrance of the neck, and the expulsive force continuing to act on the nates, the doubled body of the child is pushed into the excavation, and sweeps over the concavity of the sacrum and along the perineum, which is greatly distended. The *Third and final step*

Fig. 74.



Right Shoulder Presentation: third step in mechanism of labor.

is now taken, viz., *disengagement*, or, as it is very properly called by M. Cazeaux, *deflexion*, which is executed by the shoulder remaining stationary, under the pubes, while the side of the chest, the side of the loins, the hip, and lastly, the thighs and the whole of the inferior extremities successively, emerge before the anterior commissure of the perineum. The head and the left arm only remain, and these are easily expelled. The situation of the foetus after rotation of the trunk is seen in Fig. 74, which represents the right shoulder, at this period, in its second position; the entire trunk is engaged in the pelvic excavation, and deflexion is commencing, the side of the chest and the flank having

become disengaged before the perineum.

The mechanism is not materially different in the second or *scapulo-sacral* position of either shoulder; but M. Dubois, as we learn from M. Cazeaux, has observed in two cases of this kind, that at the moment when the nates were being disengaged before the anterior commissure of the perineum, the entire trunk was twisted so as to bring the back of the child forwards towards the pubes, which would otherwise have been directed towards the anus: so that even here the general law continues to reign, by which it is provided that, *no matter what may be the primitive relation of the posterior plane of the foetus, it is ultimately turned towards the anterior part of the pelvis*—a law as salutary as it is wonderful.

SECTION III.**PHENOMENA OF THE THIRD STAGE OF LABOR.**

The third stage of labor comprises the separation and expulsion of the secundines ; and while this is in progress, the child, that had been ushered into the world at the close of the second stage, is assuming the functions of extra-uterine life, and divides with the mother the attention of the accoucheur. The most important phenomena of the third stage, in a practical point of view, relate to the manner in which the placenta and membranes are detached and expelled. In considering them we may speak, 1. Of the instrumentality employed in effecting the separation ; and, 2. Of the mode in which they separate and escape from the organs of the mother.

1. *Of the Instrumentality employed in separating the Placenta and Membranes from the Uterus.*—In many cases of labor, there can be no doubt that the pain, which expels the child, detaches the placenta at the same time ; for it can be felt by the finger over the uterine orifice, immediately after the birth of the child. Where, however, this does not take place, and the separation is a distinct and special part of labor, it will be found, I apprehend, that *tonic contraction* of the uterus is the means employed by nature to accomplish it. This is not the account usually given by writers, who speak of the return of pain (muscular contraction), after a longer or shorter interval, to separate as well as to expel the placenta and membranes. Dr. Dewees had juster views of the subject, and declares that “the tonic contraction *almost* exclusively detaches the placenta from the uterine surface, in order that it may be expelled.” From many observations, carefully made, I deem myself justified in concluding that when the placenta is not detached by the last labor throee preceding the expulsion of the child, it is by the agency of the tonic contraction alone that the uterus dissolves the connection between itself and the placenta. I have, many times, introduced my fingers up to the os uteri, passing them along the cord as a conductor, immediately after the birth of the child, without being able to reach the placenta ; and I have repeated the examination, several times, at short intervals, until the placenta could be reached in this way, and satisfactorily ascertained it to be lying loose and unattached, notwithstanding *pain* had not been complained of by

the patient, although frequently asked if she felt pain. From observations like these, it may be safely concluded that the placenta is detached without pain, viz., without muscular contraction of the uterus, and the only other agency that can be operative is tonic contraction.

That the placenta is not detached by muscular contraction might have been inferred from the nature and design of this mode of uterine action, independently of observation. It is expulsive in its tendency and aim, and its occurrence implies, therefore, the presence of something in the uterus to be expelled. But the placenta and membranes, so long as they are attached to the inner surface of the organ, are in bonds of vital union with it, and cannot, in any sense be reckoned as extraneous matters. This consideration explains if I mistake not, a fact as notorious as remarkable, constantly occurring in cases of abortion, which has been referred to in a previous part of this volume, but which will, I think, bear repetition. I allude to the prolonged retention of the placenta and membranes where the ovum is ruptured and the foetus escapes. At the period of pregnancy, when these accidents usually happen, the connection of the foetal envelops with the uterus is stronger than at the conclusion of gestation, and the womb is less powerfully contractile. Hence, these envelops are not so easily separated; and until they are, nature will make no effort to expel them. Meanwhile, as the separation slowly progresses, the woman is exposed to repeated attacks of hemorrhage, until it is completed, and expulsive contractions are aroused by the irritation of the detached placenta and membranes, then acting as a foreign body in the uterine cavity.

But although muscular contraction is not the agency provided by nature to detach the placenta and membranes, it must not be supposed that this mode of uterine action is incapable of such an effect, should it be excited by any cause whatever. For, it is manifest that muscular contraction diminishes the cavity of the uterus, as well as tonic contraction; and this diminution of its cavity, no matter how produced—nothing being contained in it beside the placenta and membranes—must cause their separation. We have an illustration of the truth of this remark, in cases of retention of the placenta from uterine inertia, that is, on account of defective tonic contraction, in which the administration of ergot, or the introduction of the hand into the cavity of the womb, excites pains that both separate and expel the placenta.

2. *Of the Manner in which the Placenta and Membranes are sepa*

rated and expelled.—The separation begins with the placenta, and commences usually about its centre, extending gradually towards its margin. While this is going on, more or less blood escapes from the denuded mouths of the uterine vessels; and, by its pressure, forms the detached portion of the placenta into a cup like cavity for its reception. When the attachment of the margin of the placenta is broken up, the entire mass falls by its gravity, or is pushed by uterine contractions, to the external orifice of the womb, its smooth, fetal surface being foremost. The placenta, fallen or driven to the inferior part of the uterus, necessarily draws the membranes along with it, which are inverted as they are torn loose. As the placenta is expelled through the vagina and vulva, it becomes more cupped, and the membranes, as they are peeled off the inner surface of the uterus, continue to be inverted, so that when the whole is expelled, they are completely turned inside out and thrown over the lobulated uterine surface of the placenta, concealing the blood that had been effused into the placental cup, which is now seen to be coagulated, upon lifting its membranous covering.

The separation of the placenta sometimes takes place differently. Its margin may be detached first; and if it should happen that the separation begins with that part of its margin which is below and near the os uteri, the placenta is rolled into a cylinder in the direction of the axis of the uterus, and its lobulated surface is presented to the examining finger. In this case, as Baudelocque remarks, its expulsion is preceded by the discharge of a little, or it may be a considerable quantity, of fluid blood. No more blood may be effused than is perfectly normal; and yet, because it flows away, instead of being retained, for want of a placental cup, it might alarm the medical attendant, unless he satisfies himself of the cylindrical disposition of the placenta.

After the expulsion of the secundines, no mechanical obstacle is opposed to the full exercise of the tonic contraction of the uterus; and if this be healthily exerted, the womb sinks into the hypogastric region of the abdomen, where it can be felt by the practitioner as a hard globe, of considerable magnitude. The tonic contraction diminishes the calibre of the utero-placental vessels sufficiently to prevent the flow of much blood from their orifices, though it is usual for some to escape during the first twenty-four hours, and the lochial secretion may be tinged with blood for several days.

CHAPTER IX.

THE DIAGNOSIS AND PROGNOSIS OF LABOR.

THE diagnosis and prognosis of labor may be properly associated in the same chapter, seeing that they are intimately connected with each other, and cannot, indeed, be separated in practice. Prognostication in general would be nothing but conjecture, or pretence without an accurate knowledge of the nature of that whose course and termination it is required to predict. Diagnosis, then, is the indispensable foundation of prognosis, and, as such, it will first claim our attention.

SECTION I.

THE DIAGNOSIS OF LABOR.

The diagnosis of labor may be divided into *general* and *particular*—the former being concerned with discrimination between labor, and all other states of the female system that may resemble it, and be mistaken for it; the latter, with the differences among labors, growing out of the accompanying circumstances, especially the foetal presentations and positions.

1. GENERAL DIAGNOSIS.

It might, at first blush, seem wholly superfluous to say anything concerning so obvious a topic as the mere fact of labor. What possibility, it may be asked, is there that any doubt or uncertainty can exist, in so plain a matter, requiring diagnostic skill for its removal? And yet, the grossest mistakes have been repeatedly committed by men, not unused to obstetric practice, which, I dare

say, astonished themselves not less than others. The mistake in question is no less than supposing a woman to be in actual labor, who is not really pregnant! a delusion which, I think, can only be accounted for by the blinding influence of an erroneous prepossession, acquired either by too implicit assent to the opinions of the patient herself, or too hasty construction of appearances. A female, for example, of lively imagination or nervous temperament, believes herself to be pregnant, and makes every preparation for her accouchement; at the expected time she is seized with pains, resembling those of labor, and sends for her medical attendant, who, observing her form, and size, and actions, takes it for granted that she is, as she reports herself, in labor. It does not require much experience in the fallacies of the touch, to foresee upon what a wild-goose chase it may be led, when employed as the instrument of the mind—already persuaded of the main fact, namely, that the woman is truly in labor, and only desirous of learning its conditions.

Upon what other principle can we account for such a mistake as that recounted by Dr. Montgomery, in his work on the *Signs and Symptoms of Pregnancy*? “A lady,” says Dr. Montgomery, “who married rather late in life, and remained some years without conceiving, at length had the catamenia suppressed; from which, and other symptoms, she considered herself pregnant; she increased in size, and, at the expected time, pains came upon her, which were considered as those of labor; in consequence of which she sent for her medical attendant, who concurred in the opinion of her being parturient, and remained with her. At the end of forty-eight hours, as the pains continued severe, and she was not delivered, Dr. Labatt was called in to see her, in order to determine whether she ought not to be delivered with instruments, and what kind ought to be used; the attendant stating that he was unwilling to use the crotchet, because, having several times in the course of the night applied the stethoscope, and heard the pulsations of the foetal heart, he was assured of the child’s continued vitality. Dr. Labatt, having examined carefully, suggested that there was no necessity for the use of any instrument, as the lady was not in labor; and for the best of all possible reasons, because she was not pregnant; which was the fact.”

We are not told what manner of practitioner he was, who had charge of the case; but he was evidently a man of some pretension,

because he used a stethoscope, and made no greater mistake when he declared that he heard the pulsations of the foetal heart than some renowned stethoscopists have made, when they plainly discovered all the physical signs of a cavern in a sound lung.

Many other analogous cases might be cited for our instruction and warning: but I shall be content with only one other, in which the stethoscope was used to better purpose. It is related by Dr. Evory Kennedy, in his *Observations on Obstetric Auscultation*. "Catherine ———, *ætat.* 18, an unmarried girl, was sent into the Lying-in Hospital by the directions of an eminent surgeon in the city, by whom she was pronounced pregnant, and in active labor. On paying the evening visit to the labor ward, our attention was attracted by the vociferations of this patient, and the apparent violence of her labor, in which she outvied all the patients in the ward, several of whom were near being delivered at that moment. On pressing the hand over the abdomen, it appeared distended and tense, but the limbs or body of the child could not be distinguished through the parietes. This circumstance excited some suspicion; and on making a vaginal examination, the os uteri was felt high, and placed so nearly beyond reach, that we could not with certainty pronounce as to its enlargement. The stethoscope was now applied, when no placental or foetal sound could be anywhere detected, but the intestinal murmur was evident over every part of the abdomen. On resting my cheek on the parietes, and allowing it to remain there for some time, as the abdominal muscles were in violent spasmodic action, they became gradually fatigued and relaxed, and the spine was distinctly perceptible without any uterine tumor intervening. After purging this patient freely, a copious menstrual discharge set in, which, with a free evacuation of feces and wind from the bowels, reduced her abdomen to its natural state, and left not a vestige of pregnancy."

What a *reductio ad absurdum*, as a logician might call it! A sickly girl, with her courses stopped, and bowels inflated with feces and wind, and the womb in trouble, striving to restore its wonted menstrual evacuation, and the abdominal muscles thrown into cramps by their efforts to assist—sent to a lying-in hospital by an eminent surgeon! These illustrations of the fallacy of the senses and the danger of preoccupation of the mind will fail us, if they only excite our mirthfulness; they ought rather to make us doubly vigilant lest we fall into the same blunder.

When called to a case of labor, we should take an early opportunity to ascertain whether the pains, of which the patient is complaining, proceed from uterine contractions or not, and the least objectionable way, in which we may first attempt to gain this knowledge, is, to place the hand upon the abdomen during a paroxysm. If the parturient state truly exists, the uterus will be felt through the abdominal walls as a large hard tumor, which is uniformly resisting to the pressure of the hand or the points of the fingers. When the paroxysm subsides, this same tumor is felt to be soft and yielding, but not equally so, some portions of it, corresponding to the prominent parts of the child, being more firm than others.

If, on the contrary, the pains are only pseudo-parturient, no uterine tumor will be felt at all, but the abdominal muscles will be found in a state of spasmodic contraction, and, like a rigid barrier, will hinder the hand from exploring any organ lying beneath them—a condition which can only exist in genuine labor at an advanced stage, when there is but little chance of deception. In the intervals of such pains, an opportunity will be afforded to feel the uterus, if gravid, or to determine the nature of the abdominal enlargement, if it is not produced by pregnancy. For the method of discriminating between abdominal tumefaction, produced by pregnancy, and that which may be caused by different morbid states, the reader is referred to the Chapter on the Clinical Exploration of the Sexual Organs.

An obstetric practitioner ought not, however, to rely on abdominal palpation alone, but should, without needless delay, proceed to institute a careful digital examination per vaginam, in the manner explained in the chapter just referred to. If labor has truly commenced, there ought not to be much difficulty in recognizing it. There may be some delay at its very inception in finding the os uteri, on account of the distance to which it is removed from the vulva and the unusual position given it by obliquity of the uterus. But when it is found and clearly identified, the point of the finger may be insinuated into it, and kept there until there is a paroxysm of pain. If the pains be truly parturient the os will be felt to contract, and its margin will be rendered tense and more rigid than before. The membranes, also, will be found tense and resisting, instead of slack and yielding, as they were just prior to the recurrence of the paroxysm. These two indications

combined afford the most indubitable evidence of parturition; the default of them, neither the os nor the membranes being in the least degree affected, shows us conclusively the spurious character of the supposed parturient pains. It need hardly be added that if the supposed parturient be not even pregnant, the vaginal examination ought surely to discover it: nothing but mental blindness and bewilderment (such, however, as may befall the incautious) could fail to make so palpable a discovery.

2. PARTICULAR DIAGNOSIS.

Supposing it to be certainly ascertained that labor is in active operation, we have next to study its *particular* diagnosis, or, in other words, to determine the presentation and position of the foetus. In pursuing this branch of our subject, I shall consider these presentations and positions in the order in which they have been arranged in the classification already submitted.

1. *The Diagnosis of Vertex Presentation and its Positions.*—It is generally easy to distinguish the vertex from any other part of the child that may present; its regular convexity, smoothness, and hardness, together with its commissures and fontanels, one of which at least can always be felt, when the os uteri is sufficiently opened, will scarce allow even the least experienced to mistake it. It may often be felt through the membranes, with a sufficient number of these characteristics, to enable us to pronounce positively as to its presence at the superior strait; but if any obscurity exist then, all doubt may be removed after the membranes are ruptured. It is not so easy a matter to make out the *position* of the vertex, though practice ought to enable any one, possessing ordinary tact, to do this with a great deal of accuracy. To determine this point, the finger must be introduced deeply and then directed upwards, to feel for the sagittal commissure, which looks downwards and backwards in the direction of the axis of the superior strait, at least in the early stage of labor; the sagittal commissure being found near the centre of the pelvis, the finger traces it anteriorly until the fontanel, which is opposite one of the acetabula, is found. To reach this, the finger must be passed, in the absence of pain, between the cervix uteri and head of the child, to a greater or less distance, according to the degree of dilatation of the os uteri and the greater or less flexion of the head. The finger having arrived

at the fontanel, the examiner ascertains whether it is the posterior or anterior, which is determined by the number of concurrent commissures belonging to it: if four commissures can be traced into it, and it be lozenge-shaped, it is the anterior fontanel; if, on the contrary, only three commissures run into it, and it be triangular, it is the posterior fontanel. Now, if the sagittal commissure crosses the pelvis, in the direction of its left oblique diameter, and the posterior fontanel is found opposite the left acetabulum, the vertex is placed in its first position; but if, the sagittal commissure crossing in the same direction, the anterior fontanel is opposite the left acetabulum, the vertex occupies its third position. If it be found that the sagittal commissure corresponds to the right oblique diameter of the pelvis, then it is the second or fourth position, according as it may be the posterior or anterior fontanel, which is discovered opposite the right acetabulum.

Both Nägele and Rigby speak of the equal facility of reaching the two fontanels, and declare that although the posterior is most frequently lowest, occasionally the reverse is the case, and it is the anterior fontanel, without at all influencing the progress of the labor.

This does not agree with my experience, and I must candidly avow that whether it has been owing to my awkwardness, or the limited reach of my finger, I have not been able to feel both fontanels, in a single instance; and I can never feel the fontanel that is placed posteriorly, except in the occipito posterior positions, and then only after the head has flexed so considerably as to carry the anterior fontanel above the reach of the finger.

Most British authors direct us to feel for the ear of the child, that is, immediately behind the pubes, in order to determine the position of the head. "When you are desirous of discovering the situation," says Dr. Blundell, "make it your first endeavor to distinguish the ear, by interposing the finger between the symphysis pubis and the head of the foetus; and there, *if the accoucheur be skilful*, and the condition of the labor natural, even in the earlier parts of labor, the ear may be felt without difficulty. Again, anxious to ascertain the position of the head, examine the ear once more, taking care not to double the part upon itself, observing carefully which is the *flap* of the ear, and which is that part of the ear which is *bound down* close upon the head; for the flap of the ear lies towards the occiput, as the part which is sessile is lying towards the face, so that where you feel the ear, and take care not

to displace and falsify its indications by doubling it upon itself, observing respectively those parts which are attached and disengaged, you may make out the situation of the face and occiput with facility and precision."¹ I must confess that my endeavors to feel and distinguish the ear have been, so far, quite unavailing. As, however, to do this may not be so difficult as I imagine, it is proper that I should vindicate myself from the imputation of extraordinary obtuseness, by stating that I have made but few attempts to feel the ear, being accustomed to rely on the more precise information afforded by the commissures and fontanel, and even in those few instances, the usual position, in which my examinations are made, viz., on the back, is not so favorable for *auricular* researches, as the universal obstetric position of British practitioners.

If an examination be made, for the first time, after labor has been greatly protracted, and considerable intumescence of the scalp has taken place, or sometimes at an earlier period of labor, where the ossification of the head is so advanced as to obscure the commissures and fontanel, it may not be possible to ascertain the exact position of the head. Here, auscultation may afford us some aid. If the pulsations of the foetal heart can be distinctly heard, we may be sure that the back of the foetus is turned towards the side of the mother where they are heard; and if, therefore, they are heard in the left iliac region, we may be sure that it is a case of either the first or fourth position, most probably of the first, inasmuch as this is so much more common than the fourth. If, on the contrary, these pulsations be discovered in the right iliac region, it is conclusive evidence of either second or third position, most likely of third, as this probably occurs more frequently than second position.

2. *The Diagnosis of Nates Presentation and its Positions.*—Considered in a diagnostic point of view, the several varieties of nates presentation possess some characters in common, but they differ, also, from each other much more than in respect to their mechanism. We may, therefore, consider first the signs which denote nates presentation in general, and afterwards point out the marks which serve to distinguish its three modifications, viz: presentation of the breech, feet, and knees. Among the signs of nates presentation, those most to be relied on are the following:—

¹ Lectures on the Principles and Practice of Midwifery, edited by Charles Seaverns, M. D., Philadelphia edition, 1842, p. 108.

(1.) *The Form of the Abdomen.*—It is sometimes the case, particularly in lean women who have borne children before, and in whom the abdomen is consequently relaxed, that we are able to feel the head of the child, more or less distinctly, at the fundus of the uterus, and inclined towards one side. If we are not able to define the head satisfactorily, we may, nevertheless, feel the prominences formed by it and the shoulders, giving to the upper part of the womb an irregularity not observable when it is occupied by the nates. The evidence then is, however, reduced to greater or less probability.

(2.) *Hearing the Fœtal Heart's Action above the Umbilicus.*—The sounds produced by the action of the foetal heart are transmitted through the posterior and superior part of its thorax, and heard mostly in whatever region of the mother's abdomen this part may be opposite. These sounds are consequently detected, in cases of vertex presentation, in the inferior lateral, but seldom in the umbilical region of the abdomen; and if they are distinctly heard in such high region and not in the lower, strong proof will be afforded that the nates are situated towards the pelvis of the mother. Dr. Collins assures us that he has "not unfrequently diagnosed the presenting of the breech or inferior extremity," before there was any appearance of labor, by attending to this sign alone; and he observes, with his usual judiciousness, that "a knowledge of this fact may assist us where we are doubtful as to the presenting part; but until the os uteri is considerably dilated, little practical benefit, further than putting us on our guard, can be derived from it."¹ "In cases of breech presentation," Dr. Kennedy remarks, "the foetal heart's action is observed higher up, and according to the state of advancement of labor at the time of applying the stethoscope, above or below the umbilicus."² Let it be remembered, however, that when the back of the foetus is turned forwards (as it most frequently is after labor begins), and comes in contact with the abdominal parietes, then, according to the observation of the author last quoted, the foetal pulsation is sometimes heard extending from two or three inches above the umbilicus, over the whole of the anterior part of the abdomen, inclining to one or the other side, according to the position of the back of the foetus. This extension

¹ *Practical Treatise on Midwifery*, Boston edition, 1841, p. 30.

² *Observations on Obstetric Auscultation*, New York edition, 1843, with notes by Dr. J. E. Taylor, p. 268.

of the sound results from the heart being brought nearer the surface, and the proximity of the back of the child to a good conductor. When thus diffused, it is not equally distinct over the whole space, but will be most plainly heard near the maternal umbilicus; whereas the point of its greatest intensity, in vertex presentations, is in one of the iliac regions.

(3.) *The Form of the Membranous Cyst and of the Orifice of the Uterus.*—It is an old observation, that when the breech presents the membranes protrude at the os uteri in an oval form, and when the feet present, depend in an elongated form, resembling a purse. The observation is not without some foundation, but the form as well as the extent of the cyst is much more influenced by other circumstances, such as the shape of the orifice, the density of the membranes, the quantity of liquor amnii, &c.

The oval form of the uterine orifice, after the membranes rupture, appears, however, to be entitled to more notice. This is caused by the oval figure of the breech, which, being propelled into the cervix by the contractions of the body of the uterus, makes it conform to its figure, and consequently the long diameter of the orificial oval corresponds to the hips of the child.

(4.) *The Elevation of the Presenting Part, making it difficult to be reached while the Membranes are whole, and the unusual flow of the Waters after the rupture of the Membranes.*—The breech, with its appendages, constituting nates presentation, offers a volume so considerable that it does not easily engage in the superior strait. It remains, therefore, so high in the pelvis, although labor may have lasted a considerable time, as to be beyond the reach of the finger, or only accessible towards the pubes. Meanwhile, the formation of the membranous pouch, and the gathering of the waters beneath the nates, increases the difficulty of satisfactorily determining the nature of the presentation, even after the os uteri is amply dilated. If the presenting part still remain high for a time, notwithstanding the rupture of the membranes, and more especially if there be a great gush of liquor amnii, which continues to flow during the pains, even after the orifice is occupied, the probability is strong that it is a nates presentation. The reason of the continued escape of the liquor amnii was correctly assigned by Mauriceau, who was also well aware of the disadvantages of the entire depletion of the uterus, resulting from it.¹ The liquor amnii runs off through

¹ *Traité des Maladies des Femmes Grosses, Livre II., Chapter 13.*

channels left by the inequalities of the presenting parts; if the feet or knees present, they are too small to obstruct the orifice; if the breech offers, the water flows between the thighs; whereas, when the head presents, its volume and regular roundness fit it to act as a complete stopper.

Although these signs usually accompany nates presentation, we shall be liable to err in our diagnosis, if we rely too implicitly upon them. Most, if not all, of them may be present, and yet the vertex may prove to be the presenting part. Of this I had a very interesting illustration, quite recently, in the case of an Irish woman, who had been in labor all night, previous to my seeing her early in the morning. The membranes were entire, and formed a large projection into the vagina, but the margins of the os uteri could nowhere be felt, it was so completely dilated and withal attenuated. During the pains, it was impossible to feel anything but the tense globe of waters: in the intervals, I could, by pushing the finger very high, barely touch something solid just behind the top of the symphysis pubis. I apprehended a nates presentation; but to clear away all obscurity, as well as to fulfil a practical precept which I shall hereafter inculcate, I ruptured the membranes by pressing the point of the finger firmly against them during a pain. This was followed by such a rush of waters as I have rarely witnessed, and the flow continued very free, during subsequent pains, until the patient was completely drenched. The presenting part meanwhile slowly descended, and proved to be the vertex. The child, a female, was born, in two or three hours, completely asphyxiated, but was recovered by the usual means.

(5.) *Discharge of the Meconium.*—This affords a sign which must be considered as pretty conclusive, provided we do not allow ourselves to be deceived by its counterfeit—I refer to the discharge of meconium, which is liable to occur in head presentations, when the foetus is dead, or in a suffering condition. In that case, the meconium is diluted by mixture with the uterine and vaginal discharges, and is altogether different from the thick, viscous, and tarry excrement, issuing directly from its repository.

All the signs common to nates presentation, which have now been enumerated, are more or less fallacious, and our diagnosis can seldom be entirely satisfactory until it is enlightened by the touch, and we can never otherwise determine the *position* of the presenting part.

With regard to the *marks discoverable by the touch*, the several modifications of nates presentation differ so much that it is necessary to consider them separately.

The *breech*, when engaged in the pelvis and sufficiently accessible to the finger, is distinguished from every other part of the child, by marks so characteristic that it is not easily mistaken. These are, its fleshy feel, and its two gluteal prominences, with an intervening depression in which may be felt the *point of the os coccygis*—surmounted by the unequal posterior surface of the sacrum; the *anus*, differing from any other orifice in its thin, puckered, circular margin, and small size, requiring, indeed, to be forced before it will allow the finger to penetrate it; and lastly, *the genital organs*. It must be remembered that in by far the most usual positions of the breech, with the sacrum to one side or the other of the pelvis of the mother, the finger first encounters the hip that is anterior, which might be mistaken for the head, if the examination is not prosecuted, for this hip offers a roundish surface of considerable extent, and anteriorly the trochanter major feels hard and resisting. But on passing the finger as deeply as possible, and curving it forwards, as in searching for the sagittal commissure in a vertex case, the cleft of the breech may be reached, and what is felt there, as already described, will clearly reveal the nature of the presentation. The direction of this cleft and the situation of the coccyx point out the position of the breech. Thus, the cleft runs transversely in the first and second positions, the coccyx being towards the left side of the pelvis in the first, and towards the right in the second: it runs antero-posteriorly in the third and fourth positions, the coccyx being forwards, in the third—where it and a good part of the sacrum can be easily felt—and backwards in the fourth.

Let none imagine, however, that it is always an easy matter to ascertain how the breech is situated, or even to recognize the breech itself when it is presenting. Previous to the rupture of the membranes, it may be placed too high, or be too obscurely felt; and, after the escape of the waters, it may be so disfigured by tumefaction, from long detention in the pelvis, that its natural features are obliterated. In this latter condition, Baudelocque informs us, the best-instructed practitioners have mistaken it, for one part and another, even for the head of the child, the integuments of which were supposed to be engorged and swollen. A very celebrated accoucheur, he states, having mistaken the breech under such circumstances for locked

head, applied the forceps successfully, and considered the mistake fortunate, as it taught him a new resource in difficult breech presentations.¹

But, it may be said, how much soever the breech may be deformed by swelling, the anus is so characteristic it ought to be sufficient to prevent such mistakes. Aye, so it ought, if it were always found a closed and puckered orifice: but if the child be dead, and a curious examiner have been poking at it before we are called, it may be gaping and tumid, and feel like the mouth, while the buttocks, to the touch alone, are not unlike the cheeks. No wonder then if it should be mistaken for a face presentation, one instance of which is within the compass of my own knowledge—in sooth, *magna pars fuit*.

Madame Lachapelle relates that such a mistake was committed by a veteran professor of *l'Ecole de Médecine*, under circumstances that rendered it as ludicrous as notorious. He assured the pupils, who were present during an accouchement whose progress he was watching, that he recognized the face, and had even put his finger in the child's mouth, notwithstanding that this same finger, covered with meconium, and extended towards the pupils in gesticulating, flatly contradicted what he was announcing.

When the feet present and can be fairly examined, they ought to be distinguished from the hands by attending to the following marks: the toes are short, of nearly equal length, and but slightly movable; the fingers are long, flexed upon the palm, may often be felt to contract, and the thumb is more separated from the rest; the internal margin of the foot is thicker than the external; the two margins of the hand are of nearly equal thickness; the foot forms a right angle with the leg, the hand a continuous line with the arm. While the feet are high in the pelvis, and before the membranes rupture, they may be mistaken for some other part, or we may experience momentary uncertainty. The feet are naturally flexed upon the leg, and it may be that only the heel is accessible, which may then be taken for the elbow, which it very much resembles in form, as Madame Lachapelle observes, the heel being like the olecranon, and the malleoli like the condyles of the humerus. Under this delusion, it is easy for any one, as she justly remarks, and I myself have experienced, to imagine that the breech

¹ Par. 1262.

which is felt just above the foot is the thorax, and conclude in favor of a shoulder presentation. Such an error cannot, however, be of long duration, and if not corrected before the membranes rupture, must be discovered shortly after that event.

It is not always easy to form a correct diagnosis as to the position of the child in nates presentations, when this must be determined by examining the feet alone, the breech being too high to admit of satisfactory exploration. If both feet are down in the vagina, the diagnosis is, of course, perfectly plain, for the heels correspond to the back of the child, as constantly as does the sacrum, when the breech is lowermost. The heels being towards the left side of the pelvis, then, indicate the left dorso-iliac position; towards the right, the right dorso-iliac position, etc. If the feet are yet contained in the uterus, or even in the membranous sac, and both can be felt parallel with each other, the heels still point directly towards the back of the child and indicate its position. But if they are crossed upon the breech and the toes turned inwardly, so that the toes of each are near the heel of the other—a disposition by no means unfrequent, Madame Lachapelle says once in three cases—we may be confounded at first in our attempts to make out the position, but with care we shall succeed. We have only to take either foot, and ascertain to which side of the foetus it belongs, which may be done by attending, as M. Cazeaux directs, to the relation existing between its internal margin and heel, and different points of the pelvis of the mother. Let us suppose, with him, that the heel is turned towards the symphysis pubis, and the internal margin towards the right side of the mother, it is evident that it is the right foot; if, on the contrary, the heel be towards the sacro-vertebral angle and the internal margin towards the right, it is the left foot, etc.

Having distinguished which foot it is we are examining, we have only to notice towards what part of the pelvis the toes point, in order to determine the position of the foetus. If, for example, it be the right foot (still borrowing an illustration from Cazeaux), and the toes are turned towards the anterior half of the pelvis, the back of the foetus is directed towards the left side: if it be the left foot, with the toes similarly turned, that is, anteriorly, the back of the foetus is towards the right side, and *vice versa*.

The *knees* so seldom present, and differ so much from the elbow, the only part for which they might be mistaken, that it is not

necessary to dwell on their diagnosis. They are distinguished by their size, roundness, and the magnitude of the members proceeding from them; to which it may be added, that they are less movable, and the hams offer concavities instead of convexities, as in the bend of the elbows. If any uncertainty is experienced, it may be removed by bringing down the leg, from which no harm would arise should it turn out that we had mistaken an arm for the leg, as prolapse of the arm not unfrequently occurs in shoulder presentations, without embarrassing any operative procedure that may be called for. It may be observed further, that if both knees present, we may be sure that they are not elbows, for the child's trunk is never so situated in the uterus as to allow both arms to offer at the superior strait. The same remark is applicable to the feet; when both can be felt, we need not fear that they may prove to be the hands, for both hands cannot offer at the same time.

3. *The Diagnosis of Face Presentation and its Positions.*—It is not difficult to recognize the face under circumstances favorable to an examination, viz., when the part is sufficiently within reach of the finger, the os uteri dilated, the membranes flaccid in the intervals of the pains, or, better still, ruptured, provided too long a time has not elapsed since their rupture. We can then distinguish, on one side of the pelvis, the forehead, by its round, smooth, and solid surface, marked by the commissure which divides it; extending our researches towards the other side of the pelvis, we feel the triangular projection made by the nose, and may even feel both nostrils by pressing the finger against them—then the transverse fissure of the mouth, with the lips and gums, and finally the chin. On either side of the nose and mouth, the cheeks may be distinguished, feeling like soft tumors, surrounded with a bony circle; the cheek that is anterior (the right in the first position, left in the second position) may be most easily reached.

But under less favorable circumstances, especially when a long time has elapsed since the escape of the waters, and the face is greatly swollen from infiltration of its loose, cellular tissue, it may not be easy to penetrate its disguise. The tumid cheeks, pressed together, convert the median line of the face into a deep furrow, in which the distinctive characters of the face lie buried; and this furrow may be mistaken for the cleft of the buttock, which the distended cheeks closely resemble. When to this it is added that the lips are swollen, misshapen and puckered, so as to offer a round

orifice instead of a transverse slit, which might pass for the anus, it ought not to be matter of surprise if a jury of matrons, sitting *cheek by jowl*, should mistake the face for the breech. More astute judges have acknowledged that they have been thus deceived, and he who laughs at them, shows that either he has had but little experience, and is, therefore, impregnable in his practical ignorance, or he is uncandid and uncharitable.

The remarks, which have now been made, relate to primitive, or at least to full, presentations of the face; the secondary cases are to be distinguished by the anterior fontanel, the superior portion of the orbits of the eyes, and the root of the nose. As the labor progresses, the fontanel recedes, the eyes, nose, and mouth approach, and finally the chin can be felt.

The presentation being ascertained, there is no difficulty in making out the position—the chin is towards the right ilium in the first, but towards the left ilium in the second position.

4. *The Diagnosis of Shoulder Presentations and their Positions.*—Previous to the rupture of the membranes, it is not possible to ascertain, certainly, the presence of the shoulder at the superior strait. From the form of the uterus, viz., its unusual width, in connection with the elevation of the presenting part, which cannot be reached by the finger, and more especially if a small, floating member of the foetus can be felt, we may suspect that we have to do with a shoulder presentation, but cannot attain to certainty, until the membranes have ruptured and the shoulder is somewhat engaged in the pelvis. Then it may be either the shoulder proper, or the elbow and side of the child, which offers at the centre of the superior strait—the *acromial* and *cubital* varieties of Madame Lachapelle—and the marks, which will be recognized by the touch, will be different, as one or the other of these varieties may chance to be present.

The shoulder is distinguished by the round tumor it forms, not so large or so resisting as the head, for which it can scarcely be mistaken, neither is it so large as the breech, but its consistency is about the same, and hence it has been mistaken for it. But, by carrying the finger sufficiently high, we may be able to feel the acromion process and spine of the scapula, the clavicle, the axilla with its margins, and, if the child be not very fat, the ribs and the intercostal spaces—all, or even several, of which will serve to distinguish the shoulder from any other part. Our next aim is to

determine which shoulder presents and what is its position, and this can be learned by attending to the relations of the *back* and the *axilla* of the child to the pelvis of the mother. In the first position of both shoulders, the back of the child and arm proper (humerus) are forwards, while the forearm and hand flexed upon the sternum are towards the sacrum of the mother. The scapula will indicate the location of the back; and supposing this first position to exist, if the axilla is directed towards the right ilium of the mother, it is the right shoulder; if towards the left ilium, it is the left shoulder. In the second position of both shoulders, the back of the foetus and arm are placed posteriorly, the flexed forearm and hand anteriorly, and if now the axilla is towards the right ilium, it is the left shoulder; if towards the left ilium, it is the right shoulder.

The elbow is distinguished by its three bony processes, the olecranon and the condyles of the humerus, by the prominence of the tendon in its bend, and the vicinity of the chest, with its ribs and intercostal spaces. If our examination be limited to the elbow, it might be mistaken for the heel of the foot; but the elbow is smaller and more pointed, and the condyles are not so remote from it as are the malleoli from the heel. Should any uncertainty be felt, it may be removed by tracing the forearm to the hand, which may be readily distinguished from the foot, by the marks formerly given. The elbow once clearly recognized, we are enabled, by it alone, to ascertain the shoulder that presents and its position. If the forearm is backwards, it is the first position; and if the elbow is towards the right, it is the right shoulder; if towards the left, it is the left shoulder. The forearm being forwards, denotes the second position; and then the elbow being towards the right, it is the left shoulder; and being towards the left, it is the right shoulder.

In shoulder presentations, the arm is not unfrequently extended, and is found hanging in the vagina, or protruding through the vulva. This does not obscure, but rather facilitates, the diagnosis, provided we be careful to ascertain that it is a precursor of the shoulder, and not of the head, for procidence of an arm sometimes complicates head presentations. An arm having prolapsed, we may easily ascertain whether it be the right or left, by applying the palm of our right hand to its palm; if its thumb corresponds to our thumb, it is the right hand; but if its little finger correspond to our thumb, it is the left hand, and its thumb will correspond to the

thumb of our left. Having learned, in this way, which shoulder presents, we can ascertain its position by passing a finger or two along the arm to the axilla (which should be done, at any rate, to make sure that the shoulder is above it); if it is the right arm, the axilla is towards the right side in the first position, and towards the left in the second; if it is the left arm, the axilla is towards the left side in the first position, and towards the right in the second. Both the presentation and the position are so clearly indicated by the prolapsed arm, that it will be proper, in all cases of doubt and perplexity (and who has not met with such?), to bring down an arm to enlighten the diagnosis, especially as such a procedure will not at all embarrass the treatment of the case.

SECTION II.

THE PROGNOSIS OF LABOR.

The same distinction may be made of the prognosis, as of the diagnosis, of labor into the *general* and the *particular*—the former having reference to the function itself, in its intimate physiological nature, and the latter, to the greater or less facility of its performance in the different presentations and positions.

1. GENERAL PROGNOSIS.

Of all the functions of the animal economy, parturition is the only one attended with pain in its performance. All others are either accompanied with pleasurable sensations or none at all, being carried on without the consciousness of the individual. Defecation and micturition, for example, with which parturition has been associated by some physiologists, cause no pain, but, on the contrary, relieve the slight uneasiness that prompted them, and the heart carries on the circulation of the blood, and the lungs its aeration, without our consciousness.

But when the time arrives for the gravid uterus to expel its contents, the first intimation of parturition being at hand is *pain*, slight, indeed, at first, but gradually increasing in intensity until it becomes excruciating. It were vain to attempt a description of the anguish of childbirth, or to give an idea of it by comparing it to pain arising from other causes, for no other pain, probably not

even that of torture itself, is equal to it; and hence, when the sacred writers would alarm those whom they were addressing, by portraying the terribleness of the sufferings they threatened, the pains of a travailing woman furnish the frequent figure of speech employed by them to impart an adequate conception of their severity.

It is this pain of travail, mysteriously interwoven with the function of parturition, that constitutes one of its grand peculiarities, and must be ever held in view in all our prognostications. Though natural, in the sense of its being uniformly suffered, it is most unnatural in respect to its effects upon the nervous system and through it upon the system at large. Parturient pain cannot be endured, more than any other pain, without necessarily exhausting the *vis nervosa* and affecting the innervation of every part of the body, thus deranging all the functions, more or less, and inviting the encroachments of disease. And if it be true, as doubtless it is, that the powers of life may be extinguished and sudden death induced by extreme pain, no reason can be assigned why pain may not be equally fatal in extreme cases of parturition.

A second peculiarity of the parturient function is, that its performance exacts an extraordinary expenditure of muscular force, not only of the muscles of the uterus, but also of nearly the whole muscular system, voluntary and involuntary. The muscles of the limbs are thrown into a state of contraction, during the parturient paroxysm, but little short of clonic spasm, whilst those of the trunk, particularly the diaphragmatic and abdominal muscles, participate in the intense exertion—all the powers of life seeming to be concentrated in the struggle in behalf of the nascent being. What a world would this be if all the animal functions were performed with such throes! The *vis incita* is as much exhausted by the parturient effort as the *vis nervosa*, by the pain accompanying it, which is plainly evinced by the weariness that succeeds.

But muscular exhaustion and fatigue are not the only effects of the throes of labor; the circulatory system is, also, necessarily implicated. The action of the heart and arteries is increased, whilst at the same time the circulation of the blood being impeded in some parts, an unusual quantity is conveyed to others. It is obvious that during the paroxysm, while the breath is held, blood ceases to be transmitted through the lungs, causing congestion in all the veins communicating with the right side of the heart, as the turgescence of the jugulars and their branches witnesses, and it is

not less certain, though not so obvious, that the blood is excluded from all the muscles engaged. The equilibrium of the circulation is, therefore, broken, nor is there time, during the intervals, for its complete restoration.

It is, I think, impossible to contemplate such a function without a secret foreboding that danger, and even fatality must attend it, and accordingly all experience attests that not a few women are sacrificed in its performance, and a yet greater number of children are its victims. While this fatality may be enhanced by numerous extrinsic causes, there is undoubtedly mortality lurking in the parturient act itself: the excruciating pain, the convulsive throes, the broken balance of the circulation of the blood, are all causes that may snap the brittle thread of life, and the wonder is that it is not more frequently broken.

In looking at parturition in a general prognostic point of view, and supposing that we had no experience to enlighten us, we should be apt to suspect that the danger attending it would bear some proportion to its duration. If there be any inherent danger, growing out of the very nature of the function, it could scarcely be imagined that it is a matter of indifference whether it be tardily or expeditiously performed—whether the patient be subjected to the rack for a long or a short time. As well might it be supposed that it is immaterial to the result, whether an individual swallow a large dose of poison, or one so small as to be comparatively innocuous. Reason would, therefore, teach us that the danger of parturition is multiplied in proportion to its duration, but her teaching is discountenanced by a large majority of obstetric authors, who abound in topics of consolation, under the most protracted labors, and foresee no evil consequences. There is, it must be confessed, the semblance of practical observation in favor of such an opinion, for the mortality of labor, under any circumstances, is not so great as to make a very vivid impression upon the memory, and a private practitioner, who keeps no register of his cases, may easily fail to remember the circumstances of such as prove fatal. A large collection of accurate statistical data, such as only lying-in hospitals can furnish, is needed to enable us to calculate the bearing of the various circumstances of labor on its results.

Such a collection was made in the Dublin Lying-in Hospital during the mastership of Dr. Collins, and published in his valuable practical treatise on midwifery. Dr. Simpson has availed himself

of these statistics to establish several important propositions, and this among others, namely, that "*the maternal mortality attendant upon parturition increases in a ratio progressive with the increased duration of the labor,*" which is proved by the following facts. The duration of labor was noted in 15,850 cases, among which 138 maternal deaths occurred. These cases are arranged in tabular form by Dr. Simpson, with a view of showing the proportion of 138 maternal deaths in relation to the duration of labor. The table, which is subjoined, reads thus: 3,537 mothers had their labors terminated within one hour from their commencement; and of these 3,537 mothers 11 died, or 1 in every 322. The labor continued from 2 to 3 hours in 6,000 cases, and out of these 6,000 cases 26 mothers died, or 1 in every 231, and so on.

Duration of labor.	Number of deliveries	Number of deaths.	Proportion of deaths.
Within 1 hour . . .	3,537	11	1 in 322
From 2 to 3 hours . . .	6,000	26	1 in 231
From 4 to 6 hours . . .	3,875	29	1 in 134
From 7 to 12 hours . . .	1,672	21	1 in 80
From 13 to 24 hours . . .	502	19	1 in 26
From 25 to 36 hours . . .	134	8	1 in 17
Above 36 hours . . .	130	24	1 in 6
Total	15,850	138	1 in 115

It is asserted by Dr. Simpson, upon the strength of this kind of evidence, which it is hard to resist, that the liability to various morbid complications during labor increases in proportion as the labor is increased in its duration, and he tabulates the cases of puerperal fever occurring in the hospital, in proof of the assertion. The numbers need not be given, but the proportions were as follows: 1 in 219 where the labor was accomplished within 6 hours; 1 in 59, where the labor continued above 12 hours.

Does the infantile mortality attendant upon parturition increase, like the maternal, in a ratio progressive with the increased duration of the labor? This question is plainly answered in the affirmative, as shown by the following table of still-births:—

Duration of labor.	Number of deliveries.	Number of still-born children.	Proportion of still-born children
Within two hours . . .	7,050	347	1 in 23
From 3 to 6 hours . . .	6,362	346	1 in 18
From 7 to 12 hours . . .	1,672	151	1 in 11
From 13 to 24 hours . . .	502	88	1 in 6
From 25 to 36 hours . . .	134	42	1 in 3
Above 36 hours . . .	130	71	1 in 2
Total	15,850	1,045	1 in 15

The language of these figures cannot be misinterpreted, nor could more convincing evidence be adduced of the inherent perils of parturition, both to the mother and child, and the danger to be apprehended from its inordinate protraction.

"It is an old observation, confirmed by daily experience," observes Dr. Denman, "that, after the completion of slow or lingering labors, patients usually recover better than after those that are quick; not to mention, that they are less liable to the untoward accidents which precipitation may immediately produce." But these figures negative this old observation, nor will they be persuaded by the plausible and ingenious reasoning of Dr. Denman to change their verdict.

Who can read the argument of Dr. Denman and not exclaim, Almost thou persuadest me that it is far better to suffer long than short. "The pain attending a labor is periodical," he insinuatingly observes, "with intervals of twenty, fifteen, ten, or five minutes, according to its progress, and as regular as the clock, but with a longer or shorter duration, according to the action of the *uterus*, on which it depends; and the more the pains are multiplied the better it is for the patient. For, if an effect of great importance to the constitution is to be produced, the more slowly it is made, provided the slowness of the progress does not depend on any morbid cause, the more gradual will be the change, and of course the danger, which sudden violence might produce, will be avoided or lessened; *the division of the pain being equal to the diminution*, nearly in the same proportion as rapidity is an addition to force." "No more of your blarney," these gruff figures reply, "we tell you that time is precious, and the longer the suffering struggle is protracted, the greater is the danger."

The observations, which have now been made on the mischievous consequences of undue protraction of labor, concern its

entire length, from the beginning to the end of the process. It is a question of no little importance whether the protraction of its several stages is alike mischievous, or whether one of them, at least, namely, the first stage, may not be protracted never so long, and yet no harm ensue? Unfortunately we have no statistical reports to aid us in our response to this question, attention having been hitherto directed only to the total duration of labor. Nor, indeed, with such disagreement as to the line of demarcation between the first and second stages, would reports concerning the relative length of the first stage have availed to prove anything definitively.

In default of statistical evidence, we are, therefore, compelled to substitute reasoning and the impressions made on the minds of practical men, in whose sagacity we have the greatest confidence.

Reason would teach us that the first stage of labor may be endured, with comparative impunity, for a longer time than the second, not only because the pain is less in amount and intensity, but also because it is free from the concomitants that aggravate the mischief liable to ensue from protraction of the second stage. When the second stage is prolonged, the pressure of the child's head upon the bladder and rectum, as well as upon the vagina and cervix uteri, may give rise to fatal inflammation and sloughing of some of these parts, or the exhaustion consequent to long-continued pain and exertion may carry off the patient. Still, reason would suggest that inordinate protraction of the first stage might prove detrimental by uselessly squandering the parturient power that ought to be reserved for the second or expulsive stage of labor, for it is known that the uterus is not endowed with an inexhaustible fund of contractility, and that, if the foetus be not expelled in a reasonable time, there is danger that the patient may fall into a state of powerless labor, requiring manual or instrumental aid.

So much for reason. If we consult the impressions and beliefs of writers, in the absence of the more reliable data which accurate statistics might afford, we find that these are, by an immense majority, in favor of the perfect innocuousness of the first stage, however long it may be protracted, provided no morbid cause can be discovered. Against this view, however, Dr. Hamilton, of the Edinburgh school of medicine, earnestly protested, at about the commencement of the present century, assuring us that he was but a very short space of time in practice, when he saw reason to believe

that the management of the first stage had been much misunderstood by the profession. Observing that when the natural powers alone are trusted to, this stage is often greatly protracted, he inferred, from reasoning upon the subject, that injurious effects must be the consequence. "He considered," to use his own language, "that upon the occurrence of every uterine contraction, there must be a certain influence on the action of the heart and arteries, and that if pain and sleeplessness were continued beyond a limited time, there must be an exhaustion of the sensorial power. He concluded, therefore, that when the first stage of labor is not completed within a certain time, the strength of the patient must be proportionably lessened, the uterine action must be enfeebled, and the circulation of the blood must be disturbed."¹ But, finding that the most respectable practitioners, both British and foreign, deprecated all interference with the first stage of labor, he felt diffident in promulgating his opinions, and did not do so until the year 1800, when he stated as the result of his observation and experience, for about fifteen years, that "unless the first stage of labor (supposing that there are regular pains) be completed *within twelve or fourteen hours* from its real commencement, the following consequences may be dreaded:—

"*Firstly.* That the powers of the uterus may be inadequate to expel the infant with safety to its life, or to the future health of the parent.

"*Secondly.* That after the birth of the infant, the uterus may contract irregularly, so as to occasion the retention of the placenta.

"*Thirdly.* That after the expulsion of the placenta, the contractions of the uterus may be too feeble to prevent fatal hemorrhage. And,

"*Lastly.* That, supposing the patient should escape all these untoward circumstances, febrile or inflammatory affections of a most dangerous nature may ensue, from the previous protraction of pain and the irregular distribution of the blood."

Dr. Burns, a countryman of Dr. Hamilton, and one of the faculty of the Glasgow school, is equally decided in the opinion he expresses on this point: "If a long time is to be spent in accomplishing the first stage of labor, or dilatation of the os uteri," he observes, "the vigor of the uterus and strength of the patient may be impaired so

¹ Practical Observations on various Subjects relating to Midwifery. American edition, Part 1, p. 60.

much as to render the subsequent stage dangerously tedious, or to prevent its completion, at least consistently with safety." * * * "It is an undeniable proposition," he continues, "that there is in every case a period beyond which it cannot be protracted without exhaustion," &c.

According to the current opinion, as I have said, protraction of the first stage is totally harmless ; but we cannot avoid feeling some distrust of its truthfulness when it is remembered that its advocates are the identical authors, who have been so entirely mistaken in their general estimate of tedious labors ; insisting so strenuously that they are fully as favorable, if not more so than those of short duration. If their experience, recorded on the fading tablet of memory, has not taught them that protracted labor, as a whole, is attended with more risk to mother and child than labor performed in the usual time, how could it be expected that the consequences of protraction of its first stage would leave a more correct impression ?

No obstetric writer, not excepting even Dr. Denman, defends the innocence of protracted first stage of labor more earnestly than Dr. Churchill, who observes, "Very slight experience is sufficient to show that delay in labor may occur in either the first or second stage, and a more extended observation will prove, 1, that when the delay is excessive, the *relative* duration of the two stages is destroyed, so that they bear no steady proportion to each other; thus, for instance, in a labor of sixty hours, the first stage may occupy fifty-nine, and the second only one, or *vice versa*; 2, that the effects of a prolonged labor upon the constitution of the patient, depend upon the stage in which the delay occurs; and 3, that delay in the first stage involves very little if any danger, no matter how tedious it may be, but that delay in the second stage, beyond a comparatively short time, is always of serious import."

These deductions, Dr. Churchill thinks, are involved, though not distinctly enunciated, in the practical remarks of writers on midwifery, who distinguish the causes of delay in the first stage from those in the second, as being much less dangerous; and in further corroboration of them, he publishes a tabular synopsis of one hundred and forty-three cases, to exhibit the relative duration of each stage, in labors of twenty-four hours and upwards, in which the delay occurred in the first stage, and the results to mother and child. The table offers such cases as the following: First stage 34½ hours, second ½ hour; first stage 41½ hours, second ½ hour; first

stage 59½ hours, second ½ hour; first stage 176 hours, second 1 hour. Notwithstanding the tediousness of the labors, all the mothers recovered, and but ten of the children were lost, one of which was putrid. According to these statistics, supposing them to be accurate, the powers of the uterus are not enfeebled in the slightest degree, by the utmost prolongation of the first stage; on the contrary, the second stage is, notwithstanding, executed with remarkable facility, and without involving the least risk, present or prospective, to the mother; the only disadvantage being the loss of a larger proportion of the children, than in labors performed in better time.

I have already expressed the opinion that we have no statistics touching the duration of the several stages of labor, and it is, therefore, incumbent on me to show that Dr. Churchill has failed to supply the deficit, which it will, I think, not be difficult to do. True, if his definition of the first stage be received, he has successfully defended his position, nor is there even a possibility of controverting it, for if it be granted that the first stage lasts, not only until the os uteri is dilated, but, until the foetus has surmounted two out of the three *obstacles* in its path—having passed through the superior strait into the pelvic cavity, and cleared the cervix uteri—the second stage need not be long. When all other obstacles are vanquished, and the foetus is found battering the very outlet, it may be safely predicted that parturition is drawing to its close; but ere this can possibly be, there must of necessity have been *expulsive* contractions of the womb; the *grinders*, as the contractions of the first stage are sometimes called, cannot accomplish it.

The most physiological of all the British writers on obstetric medicine, Dr. Tyler Smith, is particularly careful not to attribute the propulsion of the foetus to such uterine contractions, which have for their sole aim the dilatation of the os uteri; but he, gratuitously, as I think, makes of the latter part of Denman's first stage a *new* stage, that of *propulsion*, intervening between our first and second. He describes: "1. The Preliminary stage, in which the preparations for actual labor are made. 2. The stage of Dilatation, in which the os uteri is dilated for the passage of the presenting part of the foetus. 3. The stage of Propulsion, in which the foetus is propelled through the os uteri and vagina. 4. The stage of Expulsion, in which the foetus is expelled through the external parts. 5. The Supplemental stage, in which the placenta and membranes

are extruded, and in which the uterus returns to a state of permanent contraction, and at length to a state of rest."¹

Dr. Smith's stage of *expulsion*, it will be perceived, corresponds precisely with Drs. Denman and Churchill's second stage, and of it he says: "It is the shortest of the whole progress, but it is the most important and decisive of all. It often compresses into a few moments as much suffering and as much concentrated action of mind and body, as would go to an age of ordinary life."² It is manifest, then, that Dr. Churchill's second stage is concerned only with the actual extrusion of the foetus, which may take place in a few moments as well as in an age, and all that precedes it belongs to the first stage. Who does not see that with such an unwarrantable extension of the first stage and contraction of the second, it is easy to prove that the second stage is always and necessarily short, no matter how long the first may have continued? His statistics prove only that when the child is actually being expelled, it is expelled quickly: they do not prove that, though two or three days may have been consumed in opening the os uteri—the legitimate work of the first stage—the proper expulsive stage is not enfeebled or rendered completely impotent, as it is liable to be, according to the observation of Drs. Hamilton and Burns.

There can be no doubt, I think, that in many, if not all, the cases of tedious labor reported by Dr. Churchill, the true first stage, that of orificial dilatation, though protracted, was succeeded by the true second stage, long, long before actual expulsion occurred; but then expulsion, or, as Dr. Tyler Smith will have it, propulsion, was going on all the while. Had the time been accurately noted when the first stage really ended and the second began, these cases would probably have afforded statistical evidence in support of Dr. Hamilton's observation that tedious first stage is apt to be followed by correspondingly tedious second, because the uterus is weakened by the delay of the first stage. But notwithstanding the delay, Dr. Churchill's patients were all so fortunate as to recover—a result strikingly at variance with the experience of the Dublin Lying-in Hospital, where, as we have seen, *one* mother in *seventeen* died, when labor lasted from 25 to 36 hours, and *one* in *six*, when labor was protracted above 36 hours.

Having now considered the question by the light of reason and

¹ Parturition and the Principles and Practice of Obstetrics, Am. ed., 1849, p. 163.

² Op. cit., p. 172.

the experience of others, it only remains that I should declare the impressions and convictions which my own observation has produced. I would say, then, that all the ill consequences, portrayed by Hamilton, have seemed to me to depend, in very many instances, on unusual retardation of the first stage of labor, but that, nevertheless, I have met with a considerable number of exceptions. I am fully convinced of the tendency of tedious dilatation of the os uteri, in most instances, to wear out the power of the uterus and unfit it for the performance of its subsequent acts, in such manner as best comports with the safety of the mother and child.

2. PARTICULAR PROGNOSIS.

The particular prognosis of labor, as already defined, takes cognizance of the influence of the different presentations and positions on its progress and result. These will be considered in regular order.

1. *The Prognosis in Presentation of the Vertex.*—Vertex presentation is decidedly more favorable than any other for both mother and child, especially for the latter. The reason of its preferableness will be best apprehended, when the disadvantages of all other presentations are pointed out. But the several positions of the vertex are not equally favorable, the third and fourth being less so than the first and second. The cause of difficulty and danger in the occipito-posterior positions was explained in connection with their mechanism; we know now, however, that they are not so much to be dreaded as they formerly were, because they are apt to be spontaneously converted into occipito-anterior positions, and even where this fails to take place, the expulsion of the head is not *necessarily* very tedious and hazardous. On the contrary, I have witnessed cases of this kind, in which the labor was terminated with reasonable facility, and safely for mother and child. M. Capuron errs, therefore, in considering these positions so unnatural that they might be refused admission among the regular vertex positions, and so difficult, that they necessitate delivery by the forceps.¹ While it should not be forgotten that they involve some risk, our confidence in the resources of nature (always proportioned to the

¹ Cours Théorique et Pratique d'Accouchements, p. 200.

care with which we have studied them), should restrain us from resorting hastily to instrumental or other extraordinary assistance.

2. *The Prognosis in Presentation of the Nates.*—Parturition is ordinarily more tedious and difficult in nates than in vertex presentations: the os uteri is more slowly dilated, and the process of expulsion is not so simple or so vigorously executed. It might, indeed, be supposed that the foetus would be expelled more readily in nates than in vertex presentations, when the feet are foremost, as its small extremity then engages in the passages, which are gradually dilated as the base of the cone represented by the child's body approaches them. What I have put as supposition has been advocated as the truth by some writers, who seem to have based this opinion upon fallacious analogies, rather than on observation, or a careful study of the economy of the parturient function.

It is evident that when the small extremity of the foetus presents, the most difficult part of the process of expulsion is reserved for its closing stage, when the shoulders and head have to be transmitted. This would offer no difficulty, if the parturient power were more energetically exerted then, when there is the most need for it. But the fact is otherwise. The uterine fibres, as we have seen, like those of all other muscular structures, lose contractile force in proportion as they are shortened by the reduction of the size of the organ, and consequently, when the bulky parts of the child remain to be expelled, they are incapable of contracting as powerfully as while the inferior extremities are passing. The most voluminous part of the child, and that of which a compliance with the mechanical laws of labor is most rigidly exacted—the head—is, therefore, to be expelled when the uterine power is at its minimum, and is, moreover, baffled by the head being partly in the vagina. It is true that, in this emergency, the aid of the abdominal muscles is invoked, and not more true than fortunate, for otherwise the completion of labor would be oftener deferred beyond the bounds of safety.

But even at the commencement of the expulsive process, the uterus does not commonly contract so efficiently in nates as in head presentations, because, as has been already stated, it is drained of its waters soon after the rupture of the membranes, on account of its orifice not being so well stoppered. In vertex presentations, a portion of liquor amnii is nearly always retained until after the expulsion of the child; and whether this subserves any useful purpose, as has been supposed, by moistening the parts, a little of it

escaping from time to time, it is certain that it sustains the force of the parturient contractions, by keeping up that moderate degree of distension of the organ which is most favorable.

From these considerations, it appears that the advantages of vertex presentation consist chiefly in the surmounting of the greatest difficulties in the early stage of labor, when the greatest power is possessed and exercised by the uterus, viz: procuring the full dilatation of the os uteri, and causing the head and shoulders to execute, with comparative facility, the movements required of them during their passage, and when these have escaped, the tapering remainder of the child follows without difficulty. In this respect, breech presentations resemble vertex much more than do the feet, for the breech, with the thighs folded upon the pelvis, is even more voluminous than the head; and, therefore, although the labor may, upon the whole, be more tedious than in feet cases, expulsion is performed with more rapidity and facility, because, when the parts are sufficiently dilated to allow the breech to pass, they can offer no obstacle to the shoulders and head.

Neither the less energetic manner in which labor is executed in nates presentation, compared with vertex, nor the circumstances accompanying it, necessarily involve any increased hazard to the mother. It was formerly believed, indeed, that when the breech presents, and the child is necessarily born doubled upon itself, that the neck of the womb must be more or less torn, or if this accident did not occur, that the woman is very liable to have prolapsus uteri. Another difficulty was ascribed to such a presentation, viz: that the legs may continue crossed upon the breech, instead of being carried up and extended upon the abdomen. But there does not appear to be any foundation for the apprehension of serious lesions in these cases, and the legs rarely fail to be elevated except where there is room in the pelvis to allow them to pass along with the breech.

The prognosis is much more unfavorable as far as the child is concerned, and the risk it runs of being lost in the birth, by the circumstances of a nates presentation, is so great as to justify us in preparing the father at least to expect such a disappointment to his hopes. All experience testifies to the truth of this statement; but it may not be amiss to consult the records of the Paris Maternity, as collated by Madame Lachapelle, for information as to the amount of risks incurred by the child. From these it appears that eight

hundred and four nates presentations yielded one hundred and two *feeble* children, sixteen premature or deformed, one hundred and fifteen dead, and five hundred and eighty-one alive and vigorous. The proportion of deaths to the total is one-seventh, while in twenty thousand six hundred and ninety-eight vertex presentations, only six hundred and sixty-eight were dead born, which is not quite one-thirty-first. It appears, moreover, that the several modifications of nates presentation differ in point of fatality, the proportion of deaths being about one in eight and a half for the breech, one in six and a half for the feet, and one in four and a half for the knees.

The death of the foetus is caused by the compression of the umbilical cord, which, after the breech is expelled, is necessarily placed between the trunk, first, and subsequently the head of the child, and the pelvis of the mother; and if this compression be so great or long continued as to intercept the circulation of its blood to and from the placenta, it dies asphyxiated, just as a breathing animal does from the interruption of its pulmonary circulation. The less complete dilatation of the os uteri, and the consequent more tardy transit of the child, accounts for the greater fatality of presentations of the nates where the feet are foremost.

3. *The Prognosis in Presentation of the Face.*—Although presentations of the face were, for a long time, regarded as essentially preternatural, it may be easily demonstrated that they do not necessarily offer any obstacle to parturition, which the natural resources cannot surmount, nay, that, so far as *the passage of the head merely* is concerned, there is no material difference between them and vertex presentations. The diameters which the face applies to the superior aperture of the pelvis, viz., the fronto-mental and bi-malar, do not exceed those which the vertex applies, viz., the occipito-frontal and bi-parietal; while the face is traversing the excavation, it offers the gutturo-bregmatic and bi-malar diameters, which again are not greater than those with which the vertex progresses, viz., the cervico-bregmatic and bi-parietal; and, lastly, when the face is about to clear the inferior strait, it is still the gutturo-bregmatic diameter which it offers to the coccy-pubic diameter, and this is as good a passport as the cervico-bregmatic, offered by the vertex. In short, in face presentations, as well as in vertex, the axis of the head is nearly parallel with the axis of the strait it is traversing, and hence the essential condition, ex-

plained in treating of vertex positions, is fulfilled in both cases—the principal difference between them being that, in face cases, the mental extremity of this axis is downwards, while in vertex positions, the occipital extremity is downwards.

What has been advanced in the preceding paragraph is true only of primitive positions of the face, for it is evident that in secondary positions, the head is not so favorably situated in relation to the pelvis: the forehead being at the centre of the superior strait, the axis of the head, so far from corresponding with the axis of the strait, is placed parallel with the transverse or oblique diameter of the strait; and as the axis is the greatest dimension of the head, it is not possible for it to engage in the pelvis without additional extension, which is, as has been shown, a part of the first step of the mechanism in such cases. Under such circumstances, what has been erroneously affirmed of all cases of facial presentation may be truly said—parturition cannot be accomplished unless the head be small, or the pelvis large, until the face fully present. The disadvantages of secondary positions, in this respect, are so great, that it is matter of astonishment that so able and accomplished a writer as M. Gardien should not only deny the fact, but assert the contrary to be true; for he says: “We are surprised that some authors have thought that labors in which the child presents the forehead, are more unfavorable than where the face is the presenting part. It is evident that the difficulties in the way of delivery are greater when the face presents, since the diameter which must traverse the superior strait is longer than where the superior part of the forehead presents.”¹ In either case, however, in M. Gardien’s opinion, there is so great a want of conformity between the dimensions of the head and those of the pelvis, that its rotation and disengagement are prohibited, unless the head be very small *and* the pelvis very spacious (*à moins que le bassin ne soit très spacieux et la tête très petite*), thus estimating, at a very high rate, the difficulties attendant upon any kind of face presentation.

Madame Lachapelle labored to show, by reasoning and observation, the falsity of such an exaggerated estimate of these presentations, and contributed more than any other writer to place them in their true light before the profession. Adopting Levret’s comparison of the head to a cone, of which the occiput is the apex, and the

¹ *Traité complet d’Accouchements*, tom. ii. p. 309.

face the base, she declares that as the head lies in the excavation after being extended or flexed, according as the face or the vertex presents, the only difference is that in the one case, the base of the cone is above, and in the other it is below; and then she inquires, what matters it, whether the base or the apex is in advance, inasmuch as in both cases alike the cone moves in the direction of its axis or greatest length? Must not the diameters and circumferences be always the same?

In her zeal to overthrow established opinions and prejudices, as it appears to me, Madame Lachapelle goes too far when she declares that face presentations are more favorable to delivery than vertex; this opinion rests, in good part, on the assertion that, as there is more free space between the chin and the spine than between the occiput and spine, the chin may more completely emerge from under the pubes than the occiput may, and consequently less of the base of the cone has to pass out at once. She allows, nevertheless, that the *real* advantage thus gained is diminished by the breadth of the jaw, which hinders it from occupying the arch so fully as does the occiput.

Now, although I have stated that, so far as the passage of the head is concerned, there is no *material* difference between face and vertex presentations, yet it must, I think, in candor be admitted, that there is *some* difference. The face may unquestionably engage in the pelvis as readily as the vertex, nor is there any reason to believe that it may not descend as readily until its free progress is arrested by the shortness of the neck; afterwards, as it can continue to advance only by becoming flexed, unless it rotates, the head's axis is made to decline from the axis of the pelvis, as the chin moves towards, and is pressed against, the pelvic parietes, and consequently greater diameters of the head are brought into the pelvis, which must impede the completion of its descent, if it be large, or the pelvis contracted, or the soft parts resistive.

But even though there were absolutely no difference between face and vertex presentations, in regard to the magnitude of the diameters they offer, the former labor under a disability from which the latter are exempt, viz., the circuitous manner in which the force of the uterine contractions is transmitted to the head, and the consequent loss of power. This will be readily comprehended, when it is remembered that the face can only be made to present by the yielding of the ligaments and fibro-cartilages of all the cervical

vertebræ, in consequence of which the neck is bent backwards like a bow, and that the head is moved by the uterine force, transmitted through the spine. The force, therefore, instead of operating in a direct line, reaches the head nearly at right angles, after traversing the bend of the neck, and loses considerably on account of the indirect manner in which it is exerted. This disability is felt in every step of the mechanism, but especially in the third (flexion), when, as we have seen, the head represents, in both face and vertex cases, a lever of the third kind, which necessarily involves a loss of power, or, in other words, the working of which requires the employment of much power. If, on this account, the extension of the head in vertex cases may fail to take place for want of adequate uterine force, we should, *a fortiori*, expect that in face cases its correspondent movement, flexion, may fail, and require extraordinary aid for its achievement. M. Cazeaux reports a case of face presentation, in which an attempt was unsuccessfully made to deliver with the forceps, but the child was expelled naturally, ten hours after the rupture of the membranes; in carefully examining it, he could feel, in the vicinity of the posterior fontanel, something like little splinters of bone, which crepitated under the finger, and a marked depression was observable upon the dorsal region—from which he infers, I think justly, that the thorax was flexed upon itself, and strongly pushed against the superior part of the occiput, to aid in urging it forwards.¹

From the foregoing remarks it may be concluded that labors in which the face presents are not necessarily much more difficult than vertex presentations, but at the same time are liable to be more protracted, and to involve more suffering, if not more hazard, as far as the mother is concerned. With regard to the child the prognosis is different; it is more apt to be born feeble, and runs decidedly more risk of being lost in the birth. These effects result from the compression unavoidably experienced by the extended neck, which, arresting the return of blood from the head, produces cerebral congestion and a disposition to convulsions. The stasis of blood adds to the swelling of the face, which takes place independently of it, from the sero-sanguineous infiltration which any part that presents is liable to, for the reasons assigned when treating of vertex positions; and hence the visage, from its

¹ *Traité Théorique et Pratique de l'Art des Accouchements*, p. 342, note.

tumefaction, turgescence, and lividity, may be frightful to behold, even where the child is born alive or is easily resuscitated. But, under the use of the usual discutient applications, this hideous mask, as Madame Lachapelle calls it, is thrown off in a few days, and the countenance regains its healthy tint and expression.

4. *The Prognosis in Presentations of the Shoulders.*—These presentations have, in all ages and countries, been regarded as sinister, and as requiring the interposition of art, to surmount the difficulties which they oppose to childbirth. Such an opinion could hardly have gained currency and maintained its ground, were there any sufficient foundation for the more favorable estimate of the powers of nature, which Dr. Denman was pleased to entertain. In his opinion, “a woman in a state of nature, *with her child presenting in any manner*, would not die undelivered, if no assistance were afforded to her;” but, in a country “somewhat civilized,” much would be thought requisite to be done for an equally healthful woman, and she might fall a sacrifice to “the ungainly and rude exercise of art”—the attempts of art defeating the natural efforts. In the instances of women dying undelivered, their children presenting with the arm, because it was not possible to pass the hand into the uterus, to turn the child and deliver by the feet, communicated to Dr. Denman, by his medical friends, he more than hints, that spontaneous evolution was hindered by the efforts that were made to turn. It may be true, that natural expulsion would have taken place, in many more instances than have been witnessed, if practitioners had never interfered; and yet, there is reason to believe, that many more women must have died, either undelivered, or in consequence of the severity of the labor, under this expectant treatment, while it is well ascertained that but few of the children could have survived. The records of these cases show clearly, what their very nature might have authorized us to predict, that the labors were terminated after severe and long conflicts, committing the mothers, who were not always so fortunate as to escape death, and destroying the greater part of the children—one hundred and twenty-five of the one hundred and thirty-seven, whose fate has been commemorated by M. Velpeau.

With such evidence as this before us, we should not, *willingly*, confide shoulder presentations to unaided nature, however much we may admire the fertility of her resources, and however gratefully we may acknowledge the overwhelming power which she

occasionally brings to the rescue, when the help of man is vain. On the contrary, it is our duty to lighten her burden, and consult the safety of both mother and child, by *turning*, and thus adjusting the axis of the child's body to the axis of the parturient passages, whenever this can be done with any degree of facility, and with a due regard to the safety of the mother. There are, nevertheless, cases in which we shall be justifiable in deferring to act, in hope that the child may be expelled by the process of *duplication*; as for example, in premature labor, where the small size of the child warrants the expectation that it may easily pass, doubled upon itself; or where, in labor at the full period of pregnancy, the pains are unusually powerful and frequent, and the child is already forced so low down in the pelvis as to distend the external parts. A remarkable instance of the latter kind, which came under my own observation, I may be permitted to relate. February 27, 1816, I was requested by Dr. Donne to accompany him to the house of Mrs. B., who was in labor with her second child, under the disadvantages of a shoulder presentation. I found Dr. Lewis Rogers at the house, who had made an effort to turn, but was defeated by the strength of the uterine contractions. It was plain, from the patient's behavior, that the pains were still exerted with unusual vehemence as well as frequency, and I proceeded, as soon as possible, to make an examination; when it was discovered that the left shoulder presented in the second (*scapulo-sacral*) position, with the arm extended and the hand protruding through the vulva. Before the examination was completed, however, the perineum began to be distended, and I remarked to the medical gentlemen, that the child would probably be expelled by duplication, which did accordingly occur in a few moments afterwards, in the manner already described. The child, which appeared to be fully developed and of average size, was born dead; its left arm being considerably swollen, and the left side of the neck, with the corresponding cheek, retaining marks of the contusion they had suffered. The labor was not unusually protracted, and the mother recovered without any unfavorable consequences. It should, perhaps, be observed, that the time when this case happened seemed to be propitious for *independent* child-bearing; as no fewer than four women, to whom I was called, were delivered by dame Nature, before I could reach their domicils, albeit I made as much haste as is consistent with obstetric dignity.

CHAPTER X.

THE TREATMENT OF THE FIRST STAGE
OF LABOR.

PARTURITION being a natural function, is not attended with any real difficulty, in by far the greater number of cases, nor does it require much assistance from art. But like all other functions, it is liable to derangement of various kinds and even to obstructions, which the natural resources cannot surmount. Hence the origin and the necessity of obstetric science and art; the systematic study of the numerous obstacles to labor, and the means of counteracting their influence or altogether removing them.

To facilitate a study, at once so diversified and important, various classifications of labor have been proposed by systematic authors which have answered the end in view, more or less perfectly, but none of which are free from objections.

The classification of the celebrated Baudelocque has, perhaps, been rendered more familiar to the profession in this country than any other, owing to its adoption by Dr. Dewees, who, first through an abridgment of Baudelocque's Midwifery, which he edited, and subsequently by his own writings, gave it extended diffusion among us. Baudelocque established three orders of labor, viz., *natural*, *preternatural*, and *laborious*; the first comprising such labors as may be safely performed without assistance from art; the second, such as require the aid of a skilful hand; the third, such as cannot be terminated without the help of instruments. His second order includes all the malpositions of the foetus, which are considered as *essentially* preternatural, besides the various circumstances which may complicate parturition and render it *accidentally* preternatural, such as hemorrhage, convulsions, syncope, cessation of the pains, obliquity of the uterus, contraction of its neck round that of the child, plural births, shortness or prolapsus of the umbilical cord, &c.

Among British writers hardly two agree perfectly in their classification of labor, either as to the number or designation of the orders which they admit, but with common consent they expunge from the order of natural labor all cases in which the vertex of the child does not present, differing in this respect from Baudelocque, who allowed presentations of the feet, knees, and breech to enter this order, because the child may, in such cases, be expelled without any more assistance than is required where the vertex presents.

As the classification of Dr. Denman has served as their model, it may not be amiss to glance at its leading features. Labors are divided by him into four classes: *natural, difficult, preternatural, and anomalous*; the first including every labor in which the head of the child presents, which terminates within twenty-four hours, and requires no artificial assistance; the second, every labor protracted beyond twenty-four hours, the head presenting; the third, every labor with presentation of the inferior or superior extremities; the fourth, every labor attended with complication, such as hemorrhage, convulsions, &c.

I do not adopt any of these classifications, because I think that they are all objectionable, and by their very multiplicity, serve rather to perplex than assist us in our obstetric studies. The division of labor into stages, and the analysis of the foetal presentations and positions, which I have made the basis of our inquiries hitherto, will supersede the necessity of any other classification for practical purposes; and I shall pursue the same course, in discussing the treatment of labor, as I have followed in considering its physiology, its diagnostics and prognostics.

In conformity with this plan, the treatment of the first stage of labor will first occupy our attention, and to this I will address myself in this chapter, premising only that it is essentially the same in all cases of labor, irrespective of the presentation of the child.

SECTION I.

THE ORDINARY TREATMENT OF THE FIRST STAGE OF LABOR.

Seeing that the first stage of labor is naturally more dilatory than the subsequent stages, it may be justly reckoned a prime duty of the accoucheur to wait patiently, as a general rule, for its con-

summation. Indeed, his patience is not always taxed very severely in this way, as many females do not request his attendance so long as the pains that are characteristic of this stage continue, or at least not until they have been regularly established for a considerable time. Meanwhile, inquiry ought to be made concerning the patient's general health, and especially concerning the state of the bowels, which ought to be evacuated by an enema of gruel and common salt, or a dose of castor oil, provided it be ascertained that they have been neglected and fecal accumulations have been allowed to take place. An examination per vaginam ought to be made, as early as convenient, to learn the condition of the os uteri, the degree of actual dilatation that exists, and also its dilatability; and this should be repeated, at suitable intervals, to note the progress that is being made. The patient ought not to be restricted in her movements, or confined to any particular position, but suffered to indulge her own inclinations in these respects. There is hardly any need of prescribing a dietary, as few women in this situation are inclined to take nourishment of any kind, and probably it is best that the stomach should not be occupied with the digestion of food. Cold water as a drink may be freely allowed, and her apartment should be kept cool and well ventilated. The medical attendant ought frequently to retire from the room, that no unnecessary restraint be imposed on the patient by his presence, and also that he may not be importuned to do something, when nothing need be done.

Such is the general rule of practice, dictated by experience as well as common sense, for our guidance in the treatment of the first stage of labor. But is it subject to no limitation? May the first stage be suffered to run its course for an indefinite period, and will it always be naturally completed without detriment of any kind? Authors are divided in the responses which they give to this question. There is, however, a great preponderance in favor of the practice of unreservedly committing the first stage of labor to nature. "Whether a short or a long time be required for this purpose," says Dr. Denman, whose judgment has been affirmed by most of his successors, "it is the duty of the practitioner to abstain from interfering in this part of the process. It may sometimes be necessary to pretend to assist, with the intention of giving confidence to the patient, or composing her mind. But all artificial interposition contributes to retard the event so impatiently ex-

pected, by changing the nature of the irritation and the action thereon depending, or does mischief by inflaming the parts, and rendering them less disposed to dilate; in short, by occasioning either present disorder or future disease."¹

But, in opposition to this, Dr. Hamilton maintained that it is both proper and necessary to manage the first stage so as to bring it to a close within a certain time prescribed by him, namely, in twelve or fourteen hours, in order to avert the injurious consequences of delay, which have been already depicted, in considering the prognosis of labor. In prescribing limits to the first stage of labor, he is careful to guard against any mistake or abuse that might grow out of the restriction: there must be a continuance of regular pains for the period specified, "for it sometimes happens that, after regular pains have commenced, the agitation of the patient, or the mismanagement of the attendants, occasions a suspension for some hours. If there be no injurious pressure upon the passages during that suspension, the patient's strength is recruited, and the duration of the first stage is to be reckoned from the recurrence of the pains." And then, again, spurious pains are to be discarded from the estimate; these may precede the true ones for hours, or days, producing no tightening of the edges of the os uteri; and unless this is present, labor has not really commenced. By the adoption of this rule, the author asserts confidently that "*no patient under his charge, for the last thirty-five years, has been above twenty-four hours in labor, and, except in cases of disproportion, none so long.*"

Prof. Burns abridges the period prescribed by Dr. Hamilton, within which the first stage of labor should be completed. "If," he says, "the pains be continuing without suspension, for an interval of some hours, and the labor be going on all the time, but slowly, it is a good general rule to effect the dilatation of the os uteri within *ten or twelve hours*, at the furthest, from the commencement of regular labor."² In his opinion, so certain is exhaustion to ensue, with its pernicious effects, if the first stage be much prolonged, that we have only the choice of either suspending the action altogether for a time, or of endeavoring to render it more efficient, and of effecting the desired object within a safe period.

¹ Introduction to Midwifery, chap. ix. sec. 6.

² Principles of Midwifery, American edition, with notes by Professor James, vol. i. p. 417.

Viewed in the light of reason, it would seem that the point at issue is a very plain one. To maintain that the first part of labor can never need assistance, while it is notorious that the subsequent parts frequently do, is the same thing as to affirm that the provision made by nature for the former is so complete and effectual that nothing can frustrate it, which is plainly more than can be predicated of any function, either in whole or in part. Still, it may be contended, as in fact it has been, that it is immaterial whether the dilating stage be slowly or speedily performed, because no harm can arise from delay. Whether this be true or not can only be determined by clinical observations in which we are, as I think, deficient. Meanwhile, the whole tenor of my own experience is confirmatory of that of Hamilton and Burns.

But granting, for the argument's sake, that no positive mischief can accrue from even the indefinite extension of the first stage, yet it ought to be confessed that, if impediments to the completion of the first stage may occur, the removal of which might expedite delivery, it is the duty of the accoucheur to remove them, with a view of abridging the suspense and sufferings of the patient.

Having thus endeavored to establish general principles for our guidance, I proceed to notice the most common causes of delay in the first stage of labor, and the best means of removing them.

SECTION II.

THE RETARDING CAUSES OF THE FIRST STAGE OF LABOR, AND THEIR TREATMENT.

1. OBLIQUITY OF THE UTERUS.

By obliquity is meant a want of correspondence between the axis of the uterus and that of the superior strait. A slight degree of obliquity, forwards or to one side, usually to the right, exists in all cases, which, as it is spontaneously corrected, is not worthy of serious notice. But if the aberration of the uterine axis be so considerable as to place the os uteri against one of the sides of the pelvis, or the promontory of the sacrum, where it can be barely reached, or is beyond the reach of the finger, it becomes a cause of such retardation as demands the attention of the accoucheur, for the woman may suffer for hours or even days, if nothing be done

to relieve her, and yet the os uteri be but little opened, and the membranes not at all engaged within its orifice. The labor-pains have not the character of the genuine, but are productive of much suffering and distress, and even when they become of the bearing-down sort, the woman is not inspirited by them as in natural labor, but is conscious of their worthlessness.

We cannot be at a loss to account for the slow and painful progress of labor, in these cases. To awaken proper parturient contractions at first, and to bring them gradually up to the healthy standard, gradually increasing orificial irritation is required. When there is no vicious obliquity, the situation of the uterus is such that its axis corresponds, or nearly so, with the axis of the superior strait of the pelvis, and the os uteri, being in the route of the fœtus, receives the impulses, impressed upon the fœtus, by the uterine contractions. The os uteri is, therefore, in the way to receive and communicate irritation. But if there be obliquity, the axis of the uterus does not correspond to the axis of the superior strait, which, nevertheless, must still be the route of the fœtus, for it can be moved only in this direction. Propelled in this direction, the fœtus is made to bear upon a point of the uterus, more or less remote from the os uteri, which point becomes the most dependent part, and usurps the place of the os uteri, without any qualifications for performing its offices.

In bad or mismanaged cases, this dependent part becomes greatly attenuated and inflamed—descends before the child until it appears externally, and becoming gangrenous, is ruptured.

In the treatment of obliquity, the indication is, to restore the os uteri to its natural position. This may generally be effected by regulating the posture of the patient, enjoining her to lie on the side opposite that towards which the fundus inclines. If, for example, there be inclination of the fundus towards the right side, she must be required to lie on the left, and *vice versa*; if anterior obliquity exist, she must be confined to her back. When the latter species of obliquity exists, in a great degree, a properly adjusted bandage around the abdomen will materially contribute towards restoring the uterus to its natural situation.

Should strict attention to posture, continued for a reasonable time, fail to correct the obliquity, and the labor in the meanwhile make but tardy progress, it is proper to hook the os uteri by inserting the extremity of the finger within its orifice, and draw it towards the

centre of the pelvis, in the intervals of the pains. When a pain comes on, its tendency to relapse to its former position is to be resisted, with as much force as can be safely employed. If this tendency is too powerful to be resisted, the finger must yield to it; but, as soon as the pain ceases, bring back the os uteri to the centre, and again endeavor to maintain it there during the next pain. By cautiously and gently, but perseveringly, acting thus, the os uteri will, after a succession of centripetal and centrifugal movements, be restored to its proper place, and, the parturient forces having been brought to bear upon it, its dilatation will be effected as speedily as in ordinary cases.

The importance of obliquity of the uterus was, doubtless, overrated by Deventer, who regarded it as the most common cause of difficult and preternatural labors, which cannot be true, as Baudelocque justly remarks, because such labors are rare, and obliquity is so common, that scarcely one woman in a hundred is exempt from it. It is furthermore true, as this same celebrated author asserts, that the greatest degree of obliquity does not necessarily derange the mechanism of labor, or render it more difficult;—the uterine contractions, aided by the flexibility of the fœtus, being often sufficient to correct it. Baudelocque recognized it, however, as an obstacle to labor, of considerable moment, requiring *sometimes* the interposition of art, and he assisted in the manner which has just been recommended. He records the following case as a specimen of many others that occurred in his practice: “A robust and well-formed woman, the mother of several children, presented herself, towards the close of 1773, for delivery in the presence of my pupils, and afforded them, by her indocility, an opportunity of observing the effects of obliquity and its treatment. The uterus was manifestly inclined forwards, and to the right side, to such a degree, that its orifice, which was situated backwards, could not without difficulty be discovered by the touch. The waters were evacuated, the pains frequent and violent, and the child presented well. The patient could not be persuaded to keep in a recumbent posture, and allow the presence of the finger, but would sit or stand, and, as often as she felt the pains, make improper efforts to aid them. The head of the child, after the lapse of twelve or fifteen hours, came down to the bottom of the pelvis, covered by the anterior-inferior part of the uterus. The uterine orifice could not be discovered upon any part of the sphere, presenting in this man-

ner; but by directing the finger backwards and upwards, as high as the base of the sacrum, its anterior edge could be reached. The portion of the uterus pushed before the head, and covering it like a hood, which could only be seen at first by separating the labia, became more apparent as the labor progressed. It was smooth, shining, tense, remarkably injected, displaying a fine network of vessels, and too sensitive to bear the slightest touch. The lower part of the abdomen was also threatened with inflammation, having become so painful as to be annoyed by the clothes. Notwithstanding she had been bled, fever was kindled, and her mind began to wander, when a fortunate incident caused her to become sufficiently docile to listen to the salutary advice she had rejected for about forty-eight hours. Intimidated by the unexpected presence of two officers of the law, dressed in their robes, she went to bed: I raised the abdomen with one hand, to diminish the obliquity of the uterus, while with two fingers of the other, having previously pushed up the head a little, I hooked the anterior edge of the orifice, to bring it towards the centre of the pelvis, where I held it during a few pains, and then permitting the woman to bear down with the strength she had left, she was delivered in the space of a quarter of an hour. The child did well, and the mother had a good recovery."¹

A distinguished British teacher, Dr. William Hunter, differed altogether from M. Baudelocque in his estimate of the influence of obliquity on labor, and declared that as far as he had been able to observe, "the mere obliquity of the uterus never occasions so difficult a labor, as to require any artificial arrangement to bring the os uteri into a proper situation," and that "in such cases, as in many others, art can do little good, and patience will never fail." The decision of Dr. Hunter has been generally acquiesced in by the writers of his own country, who have succeeded him, or if some have admitted the necessity of confining the patient to a proper position, they agree in repudiating all attempts to restore the os uteri to its lost place. Nor are some of the later French writers much more deeply imbued with the doctrine of Baudelocque, in regard to obliquity of the uterus. M. Velpeau, not to mention others, confesses that, whereas he once faithfully labored to correct obliquity, an incident, which occurred in his practice, convinced

¹ L'Art des Accouchements, tom. i. p. 168.

him that he had been spending his strength for naught. "One day," says he, "I was under the necessity of leaving a case in charge of a pupil, who neglected the instructions I had given him. I returned in three hours, and found the cervix completely dilated, the membranes ruptured, and the head well engaged. Since that time I have done nothing in such cases, and the organism has always succeeded in bringing everything right."¹ I would ask M. Velpeau whether he thinks that the *organism* would be sufficient in such a case as that quoted from Baudelocque?

In deliberating, however, upon the propriety of artificial aid, in cases of obliquity of the uterus, the ability of nature ultimately to overcome the difficulties which they offer, is not to be taken into consideration. The primary question is, can obliquity seriously retard labor? and this has been answered in the affirmative, even by Dr. Hunter, in his commendation of *patience*, but less equivocally by Dr. Denman and others of the same sect. Obliquity ought, then, to be remedied in all cases, when it unduly protracts the first stage of labor, if the principles of Dr. Hamilton should govern our conduct. Labors, rendered tedious from this cause, may undoubtedly hobble to their end, even to the expulsion of the fœtus in some way—nevertheless all the mischiefs that grow out of delay, are justly chargeable to the obliquity, and might have been averted, had it been remedied.

This is the true ground on which to rest the vindication of the treatment I have recommended, and on this it might be safely rested, were it more hazardous than it really is. British writers, without exception, as far as my memory serves me, condemn all manipulation in these cases as useless, if not pernicious. Dr. Churchill, for example, declares that he does not think that interference with the os uteri is ever justifiable;² and Dr. F. Ramsbotham avows that he is "decidedly opposed to any forcible attempts being made to drag the os uteri into a more convenient situation, lest it should be lacerated or bruised, or excited to inflammatory action, by the irritation necessarily attendant on our endeavors; and I have," he adds, "at best very little faith in obliquity of the os uteri producing serious protraction, unless, indeed, there be pre-

¹ *Traité Complet de l'Art des Accouchements*, deuxième edit. Paris, 1835. Tom. ii. p. 230.

² *Theory and Practice of Midwifery*, Amer. ed., 1843, p. 237.

sent also more or less rigidity, or some disproportion between the pelvis and head."¹ Does Dr. Ramsbotham really believe that there is any danger of inflicting such direful injuries upon the os uteri, as are here depicted? I can hardly conceive how any one, restricted to the use of a single finger, could bruise and lacerate the part at such a rate, even were it his design to do all the mischief in his power. The truth is, the os uteri is made of sterner stuff than it has credit for, else would it be unfit for its post, which exposes it to the risk of contusion and laceration, in the most natural labor that can occur. The utmost that can be conceded is, that *awkward* and *unskilful* attempts of this kind may produce inflammation of the uterus, but this is chargeable to the *operator*, not to the *operation*, which need not cause pain, much less any such serious consequences. For my own part, I can safely declare that no mischievous effects of any kind have ever resulted, in my practice, from such tractions upon the os uteri as have been recommended, and the testimony of Dr. Dewees is equally decisive in regard to their safety and efficacy. Nay, this eminent practitioner deemed them of so much importance as to advise the introduction of the entire hand, well lubricated, into the vagina, in order to get hold of the os uteri with the finger, when it cannot be reached by a well-directed search in the ordinary way; and, under the circumstances that he has specified, I should not hesitate to follow his advice, although I have not as yet had occasion to do it.

2. INEFFICIENT ACTION OF THE UTERUS.

This is recognized by all writers as a very common cause of delay, in the first stage. For this condition of the uterus, it is not easy to account satisfactorily; it has been ascribed to constitutional weakness, to disorder of the digestive organs, to plethora, and to peculiar temperament. Whatever may produce it, the simple fact is, that the uterus is not disposed to exert the force it possesses, in the most advantageous manner: the pains may be recurring with regularity, and may be sufficient to worry the patient, and exhaust her strength and spirits, yet they do little or no good. The parturient passage is cool and moist; the os uteri is not rigid, on the contrary, it is pliant and soft, but it is little affected by the pains, and does

¹ Process of Parturition, p. 197.

not dilate so as to give promise of being duly prepared for the passage of the child, within a reasonable time.

If any morbid state of the system can be reasonably assigned for this condition of things, it ought to be corrected; if the pulse is full and strong, blood should be abstracted; if the bowels are confined, they ought to be relieved by an enema, or a dose of castor oil. If these means fail, or not being indicated, are not resorted to, the proper remedy is, *irritation of the uterine orifice by means of the finger, for the purpose of exciting more efficient contractions of the organ.*

In the first place, the manner of doing this must be explained, in order to guard against any misapprehension, or abuse of it. It is rarely necessary to employ more than the index finger, the extremity of which is to be introduced within the orifice, in the absence of pain, with its palp or feeling surface turned towards the anterior lip of the os uteri. The patient is placed on her back, which is certainly the most convenient position for the manipulation. When a pain comes on, or after the lapse of the usual interval, whether there be pain or not, and for the purpose of exciting one, pressure is to be made with the finger, moved slowly around, so as to bear successively on every part of the anterior semicircumference of the orifice. Having described a half circle in one direction, for example, towards the right side of the patient, the finger is to be moved in the same manner in the opposite direction, and these movements are to be continued during the pain, or, if there be no pain, for a minute or two. It is then to be withdrawn from the orifice, but retained in the vagina, or if kept within the orifice, it must rest from its work for a few minutes. When pain recurs, or should recur, the finger is to be used in the same manner, and so on, until the uterine contractions become stronger, and act with more efficiency upon the orifice, when it is to be withdrawn from the vagina. The invigorated contractions may finish the dilatation of the orifice, without any further assistance. Should they flag, however, or progress slowly, the finger may be reintroduced, from time to time, to freshen them. If the membranes are ruptured, and the os uteri contracts much during a pain, there may not be room for the finger between it and the presenting part of the child; in this case, the finger must be used, as directed, in the interval of pain, and when contraction comes on, it must be withdrawn, and made to press on the verge of the orifice. To produce the requi-

site orificial irritation, the finger must press, with different degrees of force, in different cases; but, in all cases, the pressure should be gentle at first, and gradually increased, and it is never allowable to use such force as would be required, literally, to stretch the os uteri. The mere contact of the finger is not sufficient to excite the os uteri; it is, therefore, necessary to make pressure with it, but it must be remembered that this pressure is intended to *stimulate*, not to *force open*, and that it acts upon a *vital*, not upon a *mechanical*, principle.

Speaking from abundant experience, I can truly say that it is equally surprising and gratifying to observe the prompt effects of this manipulation, in many cases of the kind under consideration. Not unfrequently, a few movements of the finger are sufficient to impart such energy and aim to the uterine contractions, that the waters begin to gather, as the phrase is, and cause the membranes to protrude.

In recommending the practice of artificial irritation of the os uteri, I am, of course, well aware that I stem the strongest current of authority that runs through obstetrics, and expose myself to the shafts of ridicule. No practice has met with such unqualified, and almost universal reprobation. Instead of burdening my pages with a great many, I shall quote only a few, of the sentences of condemnation pronounced upon it.

“Every man who has had occasion to use the lever, or other obstetric instruments, the lever especially, must be aware, that when he gets a bearing on the head, and begins to draw down upon the outlet, not unfrequently pains are excited. Previously, perhaps, the pains have been few and rare; but when the head is drawn down, the irritation gives rise to a powerful action of the uterus; and hence we may enumerate, among the causes well fitted to excite the uterine movements, that compression and irritation of the mouth and neck of the uterus, which may be produced by the action of the lever, or by means that are analogous. *On this principle it is, that some practitioners have advised us to press with the fingers on the mouth and neck of the womb, and others have recommended, that the fingers of the right hand, being deposited on the back of the vagina above, these fingers should be repeatedly drawn down over the front of the rectum, with pressure of the parts, so as to stimulate and excite the pains. Both these practices, however, I mention with a view to give a caution against them. I am*

not prepared to say that, under prudent management, they may never be safe and serviceable; but I regard them with fear, and think it better to refrain. If the womb is to be stimulated at all on these principles, *the vectis is, perhaps, the best instrument for the purpose.*¹

“Nor must I allow the custom of irritating the mouth and neck of the womb with the finger, and rubbing it down the back of the vagina, along the rectum, to pass unnoticed; nor that still less justifiable mode of proceeding—the endeavor to dilate the os uteri by the first two fingers introduced within it; which last means also has received the sanction of the deservedly great name of Professor Burns, as applicable to some states of the os uteri; but which I do not feel myself warranted in mentioning except in terms of reprobation.”²

“I do not deny that dilatation may thus be effected; but I believe it to be hazardous in skilful hands, positively dangerous in unpractised ones, and unnecessary in all cases.”³

Even Dr. Dewees, with the inconsistency he was prone to fall into, when any point of practice really or apparently clashed with one of his favorite dogmas, condemns it. Criticizing the position of Professor Burns, that the dilatation of the os uteri ought, as a general rule, to be effected in ten or twelve hours at furthest from the commencement of regular labor, he observes: “This position is followed by the necessary directions for the fulfilment of this intention by mechanical means; and though we acknowledge the mode pointed out for this purpose, and the conditions necessary to render them profitable, are as well guarded as the assumption of the principle will permit; yet we must declare our unfeigned aversion to the practice, for we are every way certain that it can be done with advantage in but very few instances, even by the skilful; and never, without the risk of much mischief, by the unskilful or inexperienced practitioner. When the os uteri remains unyielding for a long time, it is an evidence that the natural processes, which so beautifully, kindly, and safely effect this change, have from some cause or other been interrupted. And *though mechanical force* may be made to usurp the organic function, it nevertheless will always be at the expense of the health, or even the integrity (be this more

¹ Blundell—Lectures on Principles and Practice of Midwifery, p. 361.

² F. Ramsbotham—Process of Parturition, p. 170.

³ Churchill—Theory and Practice of Midwifery, p. 235.

or less), of that portion of the uterus to which the force is applied. So well assured am I of this fact, that I never employ force to open the os uteri. Nor do I hold the argument, 'that no mischief has been seen to follow this plan,' of the slightest weight; as we have it not in our power at the moment, to determine satisfactorily any consequence, but the proximate or immediate effect of the violence; which may be, and most probably is, but slight or even unappreciable at the instant it is committed. But can we with any certainty declare, that many of the severe and dangerous chronic affections of the neck of the uterus do not owe their origin to this cause?"¹

Dr. Dewees may well be charged with inconsistency in displaying such aversion for the practice of artificial irritation of the os uteri, and expressing such groundless fears as to its consequences, when, as we have just seen, he had no such dread of hooking it with the finger and holding it in the centre of the pelvis, in cases of obliquity of the uterus. Now, I leave it to the reader to decide which of these manipulations is most likely to do violence to the os uteri, and plant the seeds of future disease, which spring so luxuriantly before the excited imagination of the doctor. It is very manifest that Dr. Dewees had no correct apprehension of the principle upon which the manipulation acts, and that he regarded the finger as a wedge cleaving its way into the uterus: hence, it is no wonder that he was shocked at the contemplation of it.

It is equally manifest that the other writers, whom I have quoted, have formed their opinion of the practice, from the dangers incident to the grossest abuse of it—the literal opening of the os uteri by the mechanical power of the fingers, formerly in vogue, which I deprecate as much as they. In this case, as in many others, the abuse of what is good has discredited its use, and disseminated most erroneous notions concerning the capabilities of the os uteri. Because it cannot bear the rudest handling and stretching, it has acquired the character of being remarkably delicate, and we are forbidden to *touch* it oftener than is absolutely necessary, in our examination to ascertain the progress of labor. Now, while I would not be understood to encourage too great familiarity with the os uteri, I am entirely convinced that it is not a *touch-me-not*, and that no harm ever did arise from such manipulations as I have

¹ Midwifery, p. 349.

recommended. I have, for many years, been in the habit of employing them, under the circumstances which have been pointed out, in a great number of cases, and no evil consequences whatever have resulted, but labor has been greatly assisted, and many accidents, as I am firmly persuaded, have been averted, which would otherwise have happened from its undue protraction. My testimony, founded on experience, is therefore in favor of the safety and efficiency of the practice; while those who condemn it so vehemently do not even pretend that they have tested it for themselves.

But as my single testimony, positive as it is, may not be deemed sufficient to settle a disputed point of so much importance in practice, I shall corroborate it with that of one of the most sober and judicious of writers on obstetrics, Professor Burns, of Glasgow. In cases of tedious dilatation from premature rupture of the membranes, where the os uteri is lax and thin, or soft, he advises that it be gently dilated with the finger during a pain: "If this be done cautiously," says he, "it gives no additional uneasiness, while the stimulus seems to direct the action of the uterine fibres more efficiently towards the os uteri, which sometimes thus clears the head of the child very quickly, and the pains, which formerly were severe, but, in the language of the patient, unnatural, and doing no good, become effective and less severe, though more useful."¹ But he does not limit the practice to this condition alone, for he declares, that "*in most cases of tedious labor it is beneficial.*" When we connect this declaration with the general rule, so earnestly contended for by him, "to effect the dilatation of the os uteri within ten or twelve hours, at the furthest, from the commencement of regular labor," there can be no doubt but that Professor Burns very frequently resorts to artificial irritation of the os uteri. It makes, however, no great figure in his writings, nor has he any theory of labor to maintain, which increases the value of his testimony. Dr. Power is also a decided advocate for the practice, and gives several very striking cases in illustration of its efficacy; but his testimony will naturally be received with distrust, because it goes to support a favorite theory of his. I cannot, nevertheless, refrain from citing one of his cases, because I have kept no record of my own; and cases, like examples, are more persuasive than precepts.

¹ Principles of Midwifery, vol. i. p. 416.

“February, 1819. I was sent for to Mrs. C., in the habit of suffering very painful and lingering labors, and who had been many hours ill, under the care of a female midwife. I found her greatly dejected, under a high state of febrile excitement, and the soft parts remarkably puffed and swollen, so that I found a difficulty in detecting the presentation, which proved the head, with one hand, and the umbilical cord descended before it. The pains were very slight. After bleeding her freely, the inflammatory state of the vagina seemed diminished, and I succeeded in returning both the hand and the cord. Being under the necessity of seeing another patient, I directed the midwife, during my absence, to apply hot fomentation, with a view of eliciting uterine action. On my return, two hours after, I found her much in the same state, the action very slight, and the head high up, so as to make little pressure on the os uteri. I now applied a bandage tightly round the belly, in hopes of pressing the child’s head more firmly downwards, after which I began to stimulate the os uteri itself with my finger. These plans had a wonderful effect in increasing the efficacy of the pains, and, more particularly, the latter; so much was my patient sensible of its advantage, that, during the pains, she would not allow me to intermit it for an instant. After the head began to make way upon the perineum, the pressure of the finger was continued, with the same good effect. Towards the latter part of the labor, we experienced some interruption and delay, from violent pains in the left side and right thigh, which were soon relieved by friction of the parts affected. The patient was delivered of a large still-born child, in about four hours from first commencing the abdominal pressure and stimulation of the os uteri.”¹

I refer with some reluctance to the testimony of patients themselves, because, although it may serve to strengthen our own faith, it will not weigh much with the inquirer, while an opposer may sneer at it. But I have assisted in many lingering labors, where the patients have been sensible that no progress was making, and in a few minutes after I had stimulated the os uteri, the pains have become brisker and more effective—the orifice has rapidly dilated, and the child has been expelled with surprising promptitude; and when my ministry was over, the patients have spontaneously ascribed their delivery to it, declaring, in parturient phrase, that

¹ Midwifery.

before it commenced, the pains had altogether "worked upwards," but that when I began to assist, they "worked downwards."

3. IMPEDED ACTION OF THE UTERUS.

By "impeded action," I mean action of the ordinary degree of force, or even greater than is usual in the first stage, but which is rendered unavailing by the circumstances attending it. The circumstance that most frequently operates to impede the uterine contractions in producing their intended effect, viz., opening the os uteri, is the *premature rupture of the membranes*. It sometimes happens that the membranes are so frail as to give way, during the first few pains of labor, or even before there is any pain complained of; and, although the labor may not be affected by this occurrence, the first stage is rendered both more tedious and painful, in a sufficient number of cases, to justify Dr. Hamilton, and others, in considering it as untoward, especially in a first parturition.

The os uteri dilates more tediously and painfully, because the cervix is not so equally distended by the head, or other presenting part of the child, as it is by the membranes with the fluid they inclose, and unless there be this equal distension, the propelling force is not transmitted to the orifice first, and then equally radiated to the circumference of the cervix, but is expended upon such points of the cervix as are most pressed upon by the head of the child. Suppose, for example, the os tincæ is too acuminate to allow the head to press upon it as firmly as it presses upon the outer circles of the cervical fibres, then, although these circles will be greatly distended during the pains, there will be but little retraction of the os towards them, and consequently but little tightening of the edges of the orifice, notwithstanding the pains may be severe. This unequal pressure operates, moreover, to disturb the equilibrium of the circulation in the neck of the uterus; being prevented from returning across the outer cervical circles, the blood is accumulated in the os tincæ, and hence its tumidity and puffiness, noticed as of frequent occurrence by all practical writers.

Among the causes which may seriously retard the first stage of labor, Dr. Hamilton mentions "the interposition of a portion of the cervix uteri between the head of the infant and the bones of the pelvis;" and the band thus caught between the head and pelvic bones operates, he thinks, as a cause of retardation, by preventing

the contractions from being extended to the os uteri. This state of things he ascribes to premature rupture of the membranes—to the entrance of a part of the child and cervix uteri into the pelvis, previous to the commencement of labor—or to the large size of the head or smallness of the aperture of the pelvis. Dr. Gooch speaks of a “soft, flabby, and œdematous” state of the os uteri as a cause of tedious dilatation, which, he also says, is generally induced by an early rupture of the membranes, “owing to which the cervical portion of the uterus is compressed between the head of the child and the pubes; and the return of the fluids being obstructed, the os uteri becomes thickened, and its dilatation is in consequence extremely slow.”¹

That a band of the cervix may be thus intercepted between the head of the child and the pelvis of the mother, in cases of decided disproportion, I should not be warranted in denying (such appears to have been the fact in the fatal case recorded by Dr. Hamilton); but that this occurs from premature rupture of the membranes, I cannot believe, even on the authority of two such distinguished teachers. The grounds of my dissent are, 1. Such an interception is not necessary to explain what is observed—the unequal pressure of the head upon the cervix, without the counter pressure of the pelvic bones, being sufficient. 2. There is no particular reason why premature, any more than *mature*, rupture of the membranes should cause this interception, seeing that, as has been already observed, nothing is more common than for the os uteri to continue between the pubes and head until a short time before the egress of the latter, and yet the symptoms ascribed to this interception are most commonly observed in cases of premature rupture of the membranes.

I conclude, therefore, that the “soft, flabby, and œdematous” state of the os uteri is not the cause of its tedious dilatation, but that this morbid state and the accompanying tardy dilatation are *effects* of the same cause, viz., the disadvantageous manner in which the propelling contractions act upon the cervix uteri, in consequence of the premature rupture of the membranes. This altered state of the os uteri is not, however, always present, for the action of the uterus may be so impeded as to retard the dilatation of the cervix, without sensibly affecting its circulation.

In the *treatment* of tedious dilatation, resulting from this cause,

¹ Practical Compendium of Midwifery, prepared for publication by George Skinner. Philada., 1832, p. 173.

it will be proper to detract blood freely, if the os uteri be hot, tender to the touch, and rigid as well as tumid: but the judicious employment of the fingers in aid of the uterine contractions is much more frequently indicated, and is often the only thing that can be done to assist the patient. The fingers are *not* to be used to excite uterine contractions (for they are already too strong), nor to stretch the os uteri, but to *press upon its margin*, during the pains, in order that their counter pressure may keep it in as firm contact with the head as the rest of the cervix, and the orifice be thus brought within the pale of the dilating influence of the uterine contractions. Both Hamilton and Gooch highly recommend this practice, but their object is to *push up* the edge of the orifice over the head of the child; to liberate the band of the cervix, supposed to be incarcerated—a condition which, if it really existed, could scarcely be reached by such a procedure. As affording a happy illustration of the difficulty we are considering, and its remedy, I quote the following case from Dr. Gooch: "I attended a lady whose former labors had been very quick; on my arrival I found the *pains were strong*, and though the os uteri was only dilated to the size of half-a-crown, I, like a simpleton, patted her on the shoulder, and told her to keep up her spirits, for the child would soon be born. A man must be a goose under such circumstances to give such a prognosis; for he knows not when the labor will be over; and if his prognosis be not verified, he loses credit. Hour after hour passed, and the pains continued, but the os uteri was not more dilated, the labor-pains became still more rapid and violent; she complained also of a constant pain near the symphysis pubis, and I feared a laceration of the uterus would take place. I bled her to the amount of fourteen ounces; she fainted; I kept her in an upright posture in order that the syncope might produce its full effect; the pains were suspended for about half an hour, when they returned, and her cheeks resumed their natural color. I examined, but found the bleeding had done no good. I then applied two fingers against the edge of the os uteri next the symphysis pubis, and pushed it up at the time of a pain, and kept it up after the pain was gone off: at the next pain I pressed the os uteri still higher, and repeated the same proceeding at about a dozen pains, when the os uteri slipped quite over the head of the child, and the labor was soon over."¹

¹ Loc. cit.

4. MORBIDLY RESISTED ACTION OF THE UTERUS.

By this appellation I shall distinguish inordinate contraction of all the fibres of the sphincter or cervix uteri, commonly called *rigidity of the os uteri*, which is the most formidable cause of protracted dilatation, encountered in practice. Although referred by some to "natural toughness" of this part, it consists really, in most cases, in morbid irritability of the cervical fibres, in consequence of which they refuse to yield as readily as in a healthy state. It is always attended with more suffering than labor in which no such morbid condition exists: "There is," as Dr. Hamilton observes, "a feeling of wretchedness which is not relieved during the intervals of the pains; sickness at stomach, with excessive retchings, are very usual symptoms—restlessness and despondency are the natural consequences." In an examination per vaginam, it is discovered that the os uteri, besides feeling remarkably rigid and being more or less painful and hot, is so strongly contracted during the pains, that its margin is unusually tense—all which distinguishes between this and the case just considered.

We may form some estimate of the strength of the resistance, which these fibres are capable of making, when inordinately excited, by observing its effects upon the head of the child. Every one, who has been much engaged in obstetrical practice, must have seen children born after tedious first labors, with the head prodigiously elongated, and resembling a sugar-loaf. That the alteration of shape was owing to the difficult manner in which the head was squeezed through the resisting os uteri, and not to any want of room in the pelvis, might be inferred from the fact that rigidity of the os uteri occurs most frequently in first labors; and the correctness of the inference is proved by the same mother giving birth subsequently to children, with greater facility, and without any such deformity of the head.

Besides acting as a barrier to the egress of the child, rigidity of the os uteri hinders the head from executing the rotatory movement, essential to its easy escape through the inferior aperture of the pelvis, and thus perpetuates itself sometimes almost indefinitely, especially where its treatment is not properly understood. To make this apparent to any one who comprehends the mechanism of labor, it is only necessary to observe that rigidity, though it may resist the passage of the head through the os uteri, cannot

prevent it from descending in the pelvis, bearing the cervix before it. Urged by the propelling contractions of the uterus, the head does in fact descend to the bottom of the pelvis, and seems to be on the point of emerging from it: but arrived there, it can advance no further, even if the os uteri were to open, without previously undergoing rotation. This arrest of the head at the inferior strait deprives the expulsive contractions of the means of efficiently overcoming the resistance of the cervix, viz., the forcible intromission of the head into its orifice, and consequently it is enabled to hold out so much the longer, in the resistance which it offers.

The condition above described, viz., the head descended low in the pelvis, and held by the cervix uteri as it were in a sling, is, as it seems to me, the ultimate effect of rigidity of the os uteri, though Dr. Dewees does not so consider it, while he allows that it has all the effects of that condition. The descent of the anterior portion of the cervix before the head may, doubtless, be produced by causes unconnected with rigidity, such as obliquity of the uterus, for example; but rigidity, when obstinate, necessarily produces it, if the contractions of the uterus become powerfully expulsive. It is not a little singular, by the by, that Dr. Dewees should not have known that any writer has noticed this cause of tedious labor, when it was as familiar to Smellie as to him, who recommends, also, precisely the same management of it.¹ Dr. Smellie, moreover, relates cases produced by both of the causes above mentioned, rigidity and obliquity.

With regard to the *treatment* of rigidity of the os uteri, it must be observed that it should be vigorously applied, at as early a period as possible, for the affection is apt to gather strength by continuance. Practitioners of the cast of those who attended Job in his afflictions, sadly abuse the misplaced confidence of their patients, upon occasions such as these. Whatever is to be done must be done quickly, and with unwearied diligence, until the patient is rescued from suffering and from danger. *A meddling midwifery is bad, but a shilly-shally midwifery is worse.*

The first and most successful remedy is bloodletting, which should be so copious as to make a decided impression on the circulatory system. "As much blood should be abstracted by one venesection," says Dr. Hamilton, "as would be taken from a patient of

¹ Cases in Midwifery, Collection XVII.

a similar constitution, if she were laboring under an acute inflammatory disease." Bloodletting appears to diminish the morbid resistance of the cervical fibres, without impairing the healthy propulsion of those of the superior portion of the uterus. Should venesection disappoint the expectations of the practitioner, the question will arise as to the propriety of its repetition. It is a sound principle in obstetric practice, though lamentably disregarded by some, to be as economical as possible in the shedding of blood, lest, in the progress of the labor, the further unavoidable loss of it should sink the patient below the point of recovery. It is therefore best, as a general rule, to prove at once the power of the remedy by bleeding from a large orifice—in order that the desired effect may be produced, with as little sanguineous loss as possible—and to resort to other means in the event of its failure.

Among these, opium, in the form of an enema, deservedly stands high. Administered with due attention to the circumstances that should govern its use, it greatly soothes the sufferings of the patient, and promotes the dilatation of the os uteri. Dr. Hamilton's practice, in this particular, may be safely imitated: "If strong and frequent pains, continued for six or eight hours, do not decidedly promote dilatation, the opiate enema should be had recourse to, and it will seldom disappoint the expectations of the practitioner. But if the first stage (with strong and frequent pains), be allowed to go on for twelve hours or upwards, without having completed the dilatation of the os uteri, there is the risk that the opiate will so far interfere with the progress of the labor, that instrumental delivery shall become necessary."¹

Tartarized antimony is another remedy which may be tried, when bloodletting fails, and the opiate enema is judged to be improper, or has been tried in vain. This medicine is very highly commended by Dr. Evory Kennedy, of Dublin, and it is mentioned on his authority, more than from my own experience of it. In a valuable paper, contributed by this distinguished gentleman to the *American Journal of the Medical Sciences*, for February, 1836, entitled *Observations on the Use of Tartar Emetic in Obstetric Practice*, the advantages of tartar emetic over bloodletting are thus set forth: "It is an agent by which the system can be with safety brought into a much greater degree of temporary depression; between which state

and relaxation of the contractile tissues, a marked connection holds, if they do not absolutely stand, in the relation of cause and effect. The principal recommendation, however, to tartar emetic in these cases is, that in its use, the power of regulating the necessary degree of lowering the system, exists completely in the hands of the practitioner, as he has only to increase or diminish, or suspend the dose, in order to produce the effect he wishes; and, when the necessary effect is produced, the withdrawal of the medicine leaves the vital energies but little impaired." He gives the medicine in conjunction with small doses of laudanum; five or six grains of the tartrate, dissolved in eight ounces of water, with the addition of twenty drops of laudanum, and a small quantity of syrup, make a mixture, of which one, two, or more tablespoonfuls may be given at intervals of from fifteen minutes to two, three, or four hours, according to the effect it produces, and the necessity that exists for bringing the patient speedily, or otherwise, under its influence. "Sometimes," Dr. Kennedy remarks, "it is necessary to cause free vomiting in the first instance, or the ordinary doses produce no nauseating effect; in such cases the laudanum is better withheld, but may be added afterwards, if necessary. In other cases, the medicine acts too violently as an emetic, or produces purging; here increasing the quantity of the laudanum, and diminishing the doses, or allowing a longer interval to intervene between the doses, will be necessary."

The extract of belladonna, made into an ointment,¹ has been applied to the os uteri with good effect in a number of cases. It was introduced into the practice of the Paris Maternity, I believe, by the celebrated M. Chaussier, and since that time has been prescribed by most of the French obstetricians. It is necessary to use it with caution, as it is liable to produce head symptoms and depression of the pulse; and in one case, mentioned by Dr. Kennedy, in the paper just quoted, insensibility and stertor were induced by it.

The stramonium is a kindred remedy, which may be tried under the same circumstances. Many years ago, before I was aware that belladonna had been recommended or used by any one in the case under consideration, I was led to make trial of the stramonium in a very obstinate case of rigidity of the os uteri. The case occurred

¹ Ex. belladon. ℥ij, Aquæ fluv. ℥ij, Adep. suill. ʒj.

in the country; having exhausted the usual resources to no purpose, and observing the stramonium to grow in great abundance about the premises, it struck me that it might possibly affect the os uteri in the same manner that it does the pupil of the eye. A strong ointment was accordingly prepared from the leaves of the plant, and freely applied to the os uteri with the effect of rendering it less rigid and materially promoting its dilatation. Since that period I have occasionally used the stramonium and belladonna, but they have failed, oftener than they have succeeded, in procuring any marked relaxation of the os uteri. One or the other should, however, be tried when the means precedently recommended do not succeed.

Tepid baths and demi-baths have been much extolled by French writers; but in Great Britain and in this country they are hardly ever used. It is probable they have been slighted by us, or too hastily condemned. M. Capuron, in particular, speaks in terms of most decided commendation of them: "We have," says he, "derived great advantage from them under many circumstances, and prefer them to all other means, when it is necessary to relax the vulva, vagina, or even the os uteri."

Lastly. Should all the means above recommended fail, or but partially succeed, in overcoming the rigidity of the os uteri, and the cervix descend in advance of the head of the child, it is necessary *to raise and support the os uteri*. As this is a measure of considerable importance, I shall endeavor to explain how it is to be practised. The index finger is to be applied just underneath the anterior lip of the os uteri, and with its edge or palmar surface pressure is to be made, in the intervals of the pains, so as to push up the os uteri as high as possible, or the extremities of *two or three of the fingers may be used* in the same way. When a pain comes on, the tendency to descent is to be resisted, unless this be so strong as to require more force than it would be prudent to employ: in that case, the finger must gradually relax its counter-pressure and allow the descent to take place. But as soon as the pain goes off, the os uteri is to be pushed up again, and its descent is again to be resisted during the next pain. In this manner, acting with gentleness and caution, but, at the same time, with firmness and perseverance, the os uteri must be supported until it is sufficiently dilated to allow the head to execute its rotatory movement, and emerge from under the symphysis pubis.

The principle upon which this manœuvre acts does not appear to have been well understood, even by those who have practised it. The support given to the os uteri prevents it from prolapsing, to be *backed*, if the expression will be allowed, by the floor of the pelvis, and places it in a position that will permit a portion of the head to become insinuated within it during a pain. The finger is not used to stretch the os uteri, as many writers direct, but to hold it up that it may be dilated by the head, which can then be pushed, by the uterine contractions, lower than the level at which the os uteri is held. The head dilates the os uteri far better than the finger could, because it acts upon the whole extent of the cervix, whereas the finger could act only on the circle of the os uteri.

Dr. Hamilton describes a modification of cervical resistance, consisting in what he calls "an undeveloped band of the cervix uteri." This cause of protracted labor is discovered by the edges of the os uteri swelling during the pains, as if distended with air, and becoming relaxed in the intervals of the pains, and, notwithstanding strong labor throes, neither the membranes nor the child are brought in contact with them. "If," says he, "during the interval of the pains, the finger be carried up within the os uteri, the stricture of the cervix will be distinctly perceived." The resistance, offered by this contracted band of fibres, is capable of greatly protracting labor—Dr. Hamilton says for above thirty hours—and is productive of much suffering, with febrile excitement, nausea, and occasional tremors, resembling convulsions. I attended a female in two successive labors, in both of which this cause of difficulty was distinctly detected. She had borne a number of children before she became my patient, and it is probable that the same condition existed in all her labors, for they were tedious and attended with alarming symptoms, particularly with hemorrhage immediately following the birth of the child:

Dr. Hamilton's treatment of this obstacle consists in, "*first*, venesection, if the patient's health will permit; *secondly*, the administration of an opiate enema; *thirdly*, half an hour after the opiate, pressure on the resisting band of the uterus with the point of the finger during each successive pain. The finger is to be carried above the stricture, and the pressure is to be made from within outwards." The latter means alone promptly relieved it in both instances, in the female whose case I have mentioned.

Besides the resistance of the os uteri, which has now been con-

templated, and which may be esteemed *dynamical* in its nature, we occasionally meet with great contraction or total occlusion of the os, resulting from injury in a previous parturition or produced by morbid action, which offers a *mechanical* impediment to the initial stage of labor.

Two such cases have occurred to me since the first edition of this work, both the result of chronic inflammation of the os and cervix uteri. One of the patients had been treated by myself for the cervical disease, and the other by Professor Gross, now of the Jefferson Medical College, Philadelphia. In one case there was complete occlusion of the external orifice of the uterus at the time of parturition, and in the other, the agglutination of its lips left only a very small aperture, which barely admitted the smallest-sized probe. Both patients were in labor for many hours without the least impression being made on the occluded os: in the one, which had the small aperture, the liquor amnii was discharged; in the other, there was, of course, no discharge. In both cases, I dilated the vagina as much as possible with a four-bladed speculum, so as fully to bring the os uteri to view, when it was easy to see the trace of the obliterated orifice in a whitish line formed by the cicatrix caused by the adhesion of the *labia uteri*. Before withdrawing the speculum, an incision was made with a bistoury along this line, its whole length, and a little beyond its extremities, with a view of restoring an opening into the uterus, as nearly as possible of the size of the os uteri, beginning to be dilated by parturition. Its further dilatation, together with the expulsion of the child, was trusted to the natural powers, and in both cases the labor was happily terminated without more than ordinary assistance. Having had occasion to treat one of these patients for cervical inflammation, subsequently to delivery, I had several opportunities of inspecting the os uteri, which was as smooth and linear and as free from disfigurement of any kind, as it is ever seen after child-bearing.

CHAPTER XI.

THE COMMON TREATMENT OF THE SECOND STAGE OF LABOR.

THE same method will be pursued in discussing the treatment of the second stage of labor as in describing its phenomena, namely, I shall consider, first, the common treatment, or such as is appropriate to this stage, in all cases of labor, without regard to the presentation of the child; and, secondly, the special treatment, or that which is proper in the several presentations and positions.

The common treatment of the second stage, which falls under this chapter, will be considered from several points of view.

SECTION I.

THE ORDINARY TREATMENT OF THE SECOND STAGE OF LABOR.

The conduct of the second stage to a favorable issue imposes certain duties on the accoucheur, which he is not justifiable in neglecting in any case, although it be true that in a large majority of instances, no harm whatever would result from his inattention. Experience having taught us, for example, that women are least obnoxious to dangerous accidents, when the second stage pursues a certain course, it is our duty to secure, as far as possible, this most favorable course, in *all* cases, notwithstanding the possibility, or even probability, that no mischievous consequences would arise from its being allowed to deviate in *the* case under our management.

The accident to which a parturient woman is most exposed, at the close of the second stage, is uterine hemorrhage; and we know that this is not unfrequently caused by *the too rapid progress of the second stage*—the expulsion of the child immediately following the rupture of the membranes. Under such circumstances, the tonic

contraction has not time to perform its office; it is, indeed, paralyzed by the sudden emptying of the uterus, and the organ is consequently left in an entirely flaccid condition. Should the placenta be detached, in whole or in part, by the muscular contraction that expelled the fœtus, it is plain that blood must be poured out from the open mouths of the uterine arteries and veins, where it was lately attached. And there is never more risk of this perilously sudden expulsion of the child, than where the first stage has been protracted, and the uterus has acquired a degree of morbid irritability on account of the delay; nor under any other circumstances is uterine hemorrhage so much to be dreaded. As an instructive illustration of the danger attendant on the ejection of the child following too closely upon the discharge of the waters, I will give the substance of a case recorded by Madame Lachapelle: A woman, aged thirty-two years, habitually healthy, and the mother of several children, came to the hospital at eight o'clock in the morning, having had labor-pains for four hours. The os uteri was found dilated to the extent of fifteen lines, and the membranous pouch was tense. Dilatation progressed slowly, the membranes descending to the vulva, although the head of the child continued at the superior strait. The membranes finally giving way, a very large quantity of liquor amnii was discharged; the head suddenly cleared the orifice and instantly escaped through the vulva. The placenta was expelled with equal rapidity, much water following. The uterus remained contracted but for a moment; complete inertia succeeding, hemorrhage ensued, which could not be arrested by cold, or by the injection of vinegar into the uterus; the introduction of the hand and the tampon were equally unavailing, nor could the prodigal exhibition of stimulants, such as ether, wine, etc., prevent a fatal syncope, preceded by convulsive movements of the face.¹

In the natural progress of the second stage, the membranes rupture shortly after the uterine contractions assume an expulsive character, and then before the child can be expelled, the uterus is gradually prepared by the tonic contraction to safely revert to its vacant state. It is, therefore, with me a fixed rule of practice, *in all cases without exception, to rupture the membranes, when, the dilatation of the os uteri being completed, the pains become expulsive, or even in the absence of expulsive pains and with a view to excite them.* Had

¹ Pratique des Accouchements, tom. ii. p. 475.

this rule been acted upon, in the case cited from Madame Lachapelle, there cannot be a doubt, I think, that the result would have been different. The membranes can be easily ruptured in most cases, by pressing firmly against them with the extremity of the finger, during a pain, and our aim should be to push the finger through them while the pain is at its acme. If the simple pressure of the finger is not sufficient, we can often succeed by boring with it at the same time. I have not found it necessary to notch the finger-nail, like a saw, in the manner recommended by Dr. Gooch (an accoucheur's nails ought to be always closely pared); should the finger fail, it would be better to use a probe or a writing pen.

There is yet another reason for the practice here recommended, viz., the toughness of the membranes may be so great as to seriously retard labor by hindering the presenting part from engaging in the pelvis, and thus the sufferings of the patient are protracted, and the powers of the uterus may be so enfeebled that the child will not be expelled in good time, after the membranes give way spontaneously. Dr. Hamilton mentions a case (a fortunate one, but confirmatory of the fact just stated), where the os uteri was fully dilated on Thursday night, but notwithstanding strong and regular pains, the membranes were whole on Saturday morning: upon rupturing them, a few pains expelled the child.

Writers, almost unanimously, denounce the practice above recommended, and none more strenuously than Dr. Francis Ramsbotham. "It is desirable in practice," says he, "to preserve the membranous bag entire as long as possible; or, at least, until it has performed the whole of the office destined for it by nature; namely, the dilatation of the os uteri, the vagina, and somewhat of the external parts. When the membranes appear externally to the vulva, indeed, we may suppose that they have then effected all the good that can be expected from them; that their remaining entire may possibly be retarding the labor; and we may in that case venture to rupture them, provided the head present. *But it is one of the first axioms to be learned in obstetric practice, not officiously or unnecessarily to destroy the cyst, so long as any advantage can be gained by its dilating powers.*"¹ I agree with Dr. Ramsbotham that the membranes should be preserved, as a general rule, until they have performed their office; but do not believe that dilating the vagina,

¹ Process of Parturition, new Amer. edition, 1845, p. 92.

and "somewhat" of the vulva, is any part of that office, because, in the great majority of cases, they naturally give way shortly after the os uteri is dilated. I maintain, consequently, that to rupture them when the os uteri is dilated is but *intelligently* to imitate nature, instead of *blindly* following her in all her vagaries. Contrary, therefore, to what Dr. Ramsbotham has advanced, it is, I maintain, one of the first axioms to be learned in obstetric practice, to rupture the membranes, whenever their integrity can do no good but may do mischief.

Dr. Dewees erred, in my judgment, to the opposite extreme, which, though not so pernicious, is not to be commended. "Should the pains be efficient," says he, "and the os uteri well dilated, or *even easily dilatable*, and the membranes entire, let them be ruptured by the pressure of the finger against them, or by cutting them with the nail of the introduced finger."¹ The experience and tact of Dr. Dewees may have enabled him to pursue this course with safety; but those less highly favored, who may imitate him, will soon have reason to repent their rashness. It is not an easy matter to know certainly that the os uteri is *so dilatable* that it will yield readily to the presenting part of the child, when this is made to take the place of the membranes; and if it do not, the dilatation will be retarded, because no part of its body is so well adapted to promote it as the soft and pliant membranes. Nay, the process may be rendered much more painful as well as protracted, in consequence of the increased resistance of the os uteri, provoked by the ruder approaches of the head, should this part present.

In the conduct of the second stage, there is another matter that deserves to be carefully attended to, viz., *supporting the perineum from the time it begins to be distended until the child is completely expelled*. The primary object of giving this support is to prevent laceration of the perineum, a slight degree of which, it has been already stated, unavoidably occurs in nearly all first labors; but the laceration would, doubtless, be more considerable in such cases, and of more frequent occurrence in all labors, but for the precaution now recommended. To support the perineum, the palm of the hand is to be applied across it, with the index finger next the posterior commissure of the vulva, and the thumb extended along the outside of one of the labia—forming an arch with the index. The

¹ Midwifery, p. 182.

counter pressure, made by the hand, should be so regulated as to promote, rather than retard, the advance of the child, which is accomplished by bearing with most force upon the posterior part of the perineum and pressing the presenting part towards the symphysis pubis. Pressure, exerted in an opposite direction, would act as an impediment to the emergence of the child, and be much more likely to invite, than avert, rupture of the perineum.

In relation to several minor points connected with this part of the accoucheur's duty, writers differ considerably; and it appears to me that Dr. Hamilton attaches more importance to these little matters than they deserve. I cannot regard it as of any moment whether we apply the naked hand to the perineum, so much insisted on by Dr. Hamilton, or interpose a folded soft napkin. The latter I generally prefer, but if asked my reason for it, could, perhaps, assign no other than *voilà ce qui est à mon gré*; and I shall not find fault with others, because their taste is different, for *de gustibus non disputandum est*. It may be allowed, however, that in primiparæ, where the perineum is long on the stretch, and is become sore, dry and painful, it is commonly better to apply the naked hand and make a plentiful use of fine hog's lard, which undoubtedly soothes the parts and promotes their dilatation. Dr. Hamilton tells us that he has used as much as a pound of lard in a single case, and with great benefit.

Again. Whether the patient shall be placed on her back or her left side is, I think, a question hardly worth disputing about. In France and on the continent generally, women are required, by an absolute obstetrical decree, to lie on the *back*, when the time of delivery draws near, while in England they are as sternly pinioned on the *left side*. I commonly prefer the dorsal position, simply because I am most accustomed to it; but I never refuse to allow my patient to lie on the left side, and I have even had the hardihood to wink at her lying on the *right* side.

SECTION II.

ANÆSTHESIA IN PARTURITION.

Under the ordinary treatment of the second stage, the usual routine of which has now been considered, may be included all the solace as well as aid we may have it in our power to administer

and which is equally applicable to this stage in every case of labor without exception. Now, of all the boons that could be conferred on parturient females, it is evident that the greatest and most inestimable would be the annihilation of the pains and sufferings to which they are doomed. Could these be abrogated, without impairing the efficiency of the uterine contractions, so that their travail might be accomplished as an organic act, like defecation or micturition, it need scarcely be observed that their cup would be drained of its bitterest ingredient, and they might contemplate their accouchements with cheerful hope instead of anxious apprehension. The pangs of childbirth would be annihilated, whilst the "certain fearful looking for" of its fiery ordeal would no longer torment them.

Modern science has happily discovered such an antidote to pain—to all pain, but, as it seems to me, especially parturient pain—in the inhalation of the vapors of sulphuric ether and chloroform, by which a state of anæsthesia may be induced, which does not interfere with the expulsive contractions of the uterus. The world has been so long accustomed to consider pain as an essential constituent of labor that a demonstration was needed to expose the error, and such a demonstration has now been given in thousands of instances of painless parturition under the influence of etherization. It was doubtless this immemorial and universal prejudice that prevented the application of etherization to obstetric uses until several months after its introduction into surgical practice, and that still resists its general use by obstetrical practitioners. It cannot be that any well-informed physician is now deterred by apprehension of fatal or even injurious consequences;—for the safety of obstetric etherization is completely established, there being not a single authentic instance, so far as I know, of fatal termination that could be even plausibly ascribed to it. Nor is there any valid ground for the opinion that certain pernicious effects, such as convulsions, mania, flooding, &c., which have been laid to its charge, were really produced by it. I have been in the habit of employing etherization in my obstetric practice, for nearly ten years, in natural as well as in difficult labors, and during that period, must have given it in several hundreds of cases, and I am not aware that mischievous effects have followed in a single instance. I have occasionally known it to diminish the energy of the uterine contractions and lengthen the intervals between them, to such a degree

as to make it expedient to suspend its use for a time, or altogether to discontinue it. But in these exceptional cases, no harm resulted, and when the anæsthesia passed off—which it did in a short time—the labor resumed its course and progressed as though it had suffered no interruption.

The term "etherization" is here used to express the anæsthetic effects of inhalation of either chloroform or sulphuric ether, as being more euphonious than "chloroformization;" but it must be observed that chloroform is the agent which I have constantly employed, it being more convenient, and, in my opinion, equally as safe as sulphuric ether. The administration of chloroform should be reserved for the second stage of labor, because the pains are then most severe, and the nervous system is agitated in the highest degree. I have never used an apparatus of any kind for chloroform inhalation, but am accustomed to take a soft napkin, and fold it to a square, as large as the hand. About a teaspoonful of chloroform is to be sprinkled on the folded napkin, which is then to be retaken in the palm of the hand, rendered a little concave by flexing the fingers, and held over the mouth and nostrils, not too close at first, but closer as the patient becomes habituated to it, yet never in so close contact as to exclude the access of air. While the inhalation is going on, its effects must be watched, and as soon as tranquillity is induced, it should be discontinued, but resumed upon the recurrence of every pain which extorts cries from the patient. It is better, however, to anticipate the pains by causing her to inhale upon the first intimation of their approach, so as to nip them in the bud. Especially ought this to be done towards the conclusion of the second stage, when the perineum is distended, and the child is about to emerge. The full soporific effect of chloroform can then be well borne, and the child may be ushered into the world, without the consciousness of the mother. I have often known the child to be born while the mother was asleep, the sleep continuing for ten or fifteen minutes afterwards; and on awakening, the questions she puts concerning her labor, prove clearly her unconsciousness of what had so recently transpired.

But the relief afforded by etherization is not confined to the parturient state; it extends also to the puerperal state. I have often been struck with the remark, spontaneously made by patients who had been previously delivered without the benefit of chloroform,

that they felt very much better than after their former confinements, having little or none of the muscular soreness and stiffness, the fatigue and exhaustion which they were wont to feel—and I think I may safely say that their convalescence is altogether better. From observations of this kind, I am strongly inclined to believe that not only does etherization annul the pains of parturition, but also diminish the mortality attendant upon it. True, we have not as yet statistical evidence to substantiate this belief; but, if pain be—as I have endeavored to prove—an element of parturition, which, like all pain, is inimical to life, and which, when sufficiently intensified, may immediately extinguish life, it is reasonable to believe that its annulment may curtail the mortality of childbirth.

The employment of anæsthetics in midwifery is of recent date, and is by no means generally approved by authors in this branch of medicine. As I have ventured to indorse it, in strong terms, it may, perhaps, be expected that I should reply to the objections that have been raised against it; and this I shall now essay, in connection with a slight historical sketch of the subject.

Etherization was first employed to produce insensibility to the pain of capital operations in surgery. It was successfully used with this intention in the Massachusetts Hospital in the city of Boston, in October, 1846, in a case of amputation, and its fame rapidly spread over the country, and across the Atlantic—many of the first surgeons eagerly adopting it, and displaying a commendable desire of screening their patients from the pain and terror of the knife. It was not until the beginning of the subsequent year, viz., on the ever memorable 19th of January, 1847, that the bold and indefatigable Professor Simpson, of Edinburgh, applied it to midwifery, in the case of second labor of a deformed woman, whose pelvis was so much contracted in its conjugate diameter, that it was with great difficulty she was delivered of her first child by craniotomy. It being determined, in this her second confinement, to deliver by turning, she was made to inhale the vapor of ether for nearly twenty minutes, when a knee was easily seized, and the child's extremities and trunk readily drawn down, but extreme exertion was required to extract the head. The patient afterwards declared that she was quite unconscious during the whole period of the turning and extracting of the infant; she only remembered "hearing," but not "feeling" the head of the child "jerk" from her, to use her own expression. She quickly regained full consciousness, and talked

with gratitude and wonderment of her delivery, and her insensibility to the pains of it.

The prominent features of this case have been pointed out, not because they present anything that can now excite our surprise—so familiar have we become with the magical workings of the remedy of pain—but because it was the first instance in which mortal man, discarding the prejudices of countless ages, had dared to put forth his hand and pluck *pain* from a process, in which it is so inherent, so deeply rooted, that it might have been feared that its avulsion would mar the process itself, and become the occasion of great mischief to the mother and child. Indeed, such fears are still entertained by many, in spite of the clearest proof of their groundlessness, afforded by thousands of demonstrations, and are, at this time, more operative in retarding the advancement of the practice, than all other causes put together.

The first obstetric case in this country, in which anæsthesia was practised, was one of *natural* labor, under the care of Dr. N. C. Keep, of Boston, on the 7th of April, 1847, reported in the *Boston Medical and Surgical Journal*, on the 14th of the same month. Dr. Walter Channing, Professor of Midwifery and Medical Jurisprudence in the University at Cambridge, administered ether in the first case of *instrumental* labor among us, on the 5th of May, of the same year. He subsequently used chloroform and ether in a considerable number of cases of natural, preternatural, and instrumental deliveries, and embodied the results of his own observations, and those of many professional friends in and around Boston, in a volume, entitled *Etherization in Childbirth*, which must endure as a monument of his zeal and industry in the cause of science and humanity. It was not until the 20th of February, 1848, that anæsthetics were used in midwifery in Louisville, or, so far as I know, on this side of the Alleghany Mountains. The occasion occurred in my own practice, being a first labor, and the patient considerably advanced in years previous to her marriage. The presentation was natural, but owing to the inefficiency of the pains, and the resistance of the soft parts, it became necessary to resort to the forceps for her delivery. After the extraction of the child, which was alive and did well, there was difficulty with the after-birth, and it became necessary to introduce the hand into the uterus, to detach and remove it. Her sufferings being unusually severe, chloroform was administered for four or five hours before instruments were

she was so fully under its influence, at the time of delivery, as to be totally unconscious, either of the extraction of the child or placenta, nor did she awake until ten or fifteen minutes afterwards. No accidents occurred in the puerperal state, and her convalescence was, in every respect, satisfactory.

Though etherization in midwifery was very generally condemned, or feared by the practitioners of this city, at the time of its first introduction, they all, without exception, so far as I am aware, resort to it now; some rather reluctantly, perhaps, and in compliance with the importunities of their patients, more than in obedience to their own convictions of its necessity, or utility. But it must be confessed that the practice has rather crept, than fled, over the country at large, and has obtained a sure footing only here and there. The slow progress of obstetric anæsthesia with us is, I think, to be attributed mainly to the unmitigable opposition it has met with from Professor Meigs, whose writings and oral instruction have largely contributed to shape professional opinion and practice, and from Dr. Ramsbotham, of London, whose excellent work on midwifery has passed through several editions in this country, and is deservedly held in high esteem.

Believing that etherization in childbirth is one of the greatest benefactions of science, which has been made in this or any other age, and having enjoyed abundant opportunities of witnessing its triumphs, I should be recreant alike to truth and duty if I did not attempt to vindicate it against the objections which have been alleged by these high authorities in obstetric medicine.

No particular method or order has been observed by either Dr. Meigs or Dr. Ramsbotham in their impassioned arguments against etherization in labor, and we may, therefore, arrange them in such manner as may seem most expedient to ourselves.

1. The *naturalness* and *utility* of the pains of parturition are strongly insisted on by both as a valid reason for non-interference with them: both agree in calling these pains "physiological," in contrast with the pains of disease, which are "pathological," and seek to shelter them from molestation under a name. "I have been accustomed," says Dr. Meigs, "to look upon the sensation of pain in labor as a physiological relative of the power, or force; and notwithstanding I have seen so many women in the throes of labor, I have always regarded a labor-pain as a most desirable, salutary, and conservative manifestation of life-force." He also

enters into an arithmetical calculation to prove that the sufferings of a parturient woman are not, after all, very great, as they last, on an average, only about fifteen or sixteen minutes, "and no more," and are distributed among four hours, the average duration of labor. It is altogether an erroneous notion, he alleges, that there can be any great or hurtful suffering, in this short space of time, inasmuch as women are, in the intervals of the pains, generally "easy, complacent, and but too happy."

On this same point Dr. Ramsbotham observes: "I grant, to the fullest extent, that it is equally the physician's duty to relieve ordinary pain by all the means in his power, as it is to arrest fever or subdue inflammatory action,—pain being a great evil indeed, all animated beings strive to avoid it; this is an instinct implanted in their nature, as strongly as their earnest desire to escape death; yet, pain springing even from a morbid cause, is not to be removed at the expense of safety to life; how much less, then, the physiological pain superadded to labor! The analogy between the sufferings endured in labor, and pain from any other cause, does not hold good, because the first is attendant on a natural and healthy action, while in every other case bodily suffering depends on a diseased or deranged condition of the part affected; and the distress it occasions is generally in proportion to its intensity. Labor, indeed, is the only function of the body that, in the healthy state of the organs concerned, is performed with painful sensation; and, seeing this to be the case, it is a legitimate inference that this pain is superadded to that particular function, for some specific object, and with some wise intention, deeply as these may be hidden from human cognizance."

From all which Dr. Ramsbotham argues that *pain* must be looked upon as an *essential element* in the function of parturition, and if it be removed, the function is imperfectly performed, as wanting one of its chief characteristics.

The quotation from Dr. Meigs is taken from his reply to Dr. Simpson, setting forth the reasons why he had not administered chloroform to his midwifery patients, and why, furthermore, he must forever withhold it from them. In his rejoinder, Dr. Simpson demurs to this particular declaration of Dr. Meigs, and enters into a very ingenious argument from analogy to show that, granting it to be true that pain is the natural allotment of travailing women, this furnishes no reason why we should not strive to miti-

gate or abrogate it, just as we strive, and in many specified instances successfully, too, to ameliorate the hardships of humanity in many other respects. For the argument in full, the reader is referred to his Works. But instead of tendering a demurrer to this part of the pleading of Dr. Meigs, as Dr. Simpson has done, I shall put in the plea that pain, even to the amount computed by Dr. Meigs, is not the natural and inevitable concomitant of human parturition; but that, on the contrary, most of the pain, and all the anguish attending it, are factitious, being the necessary product of the deterioration of the female constitution in the hot-beds of civilization. The tender and delicate manner in which girls are reared among us; their confinement to the house, and the little exercise they take in the open air; their improprieties of diet; their transgressions of all the laws of health in the modes of dress prescribed by fashion; the crowded assemblies they frequent, and the late hours they keep; these and many other enervating influences to which they are subjected, all tend to repress the *muscular* and exalt the *nervous* system. No wonder that so many of them grow up pale and sickly, without strength to endure the trials that await them, but with sensibility keenly alive to everything that jars them.

It is not among such wrecks of womanhood that we must look for exemplars of human parturition, as it was originally intended to be, but among females inured to active exercise in the open air, and whose whole manner of living is characterized by the simplicity and regularity, exacted by nature as a condition of her favors. Such females are occasionally met with in our midst, and history informs us of multitudes, even whole races; and in them, it is well known that parturition is remarkable for the facility and celerity with which it is performed, the slightness of the pain attendant on it, and the rapidity of the recoveries which take place. Thus, we read, in Diodorus Siculus, that in Corsica, no care or attention was paid to the lying-in women; but, absurdly enough, as soon as they were delivered, the husbands were put to bed and nursed in their place.¹ A similar custom prevailed in Spain in Strabo's time. The women of the Galla, a nation on the confines of Abyssinia, we are told by Bruce, do not confine themselves

¹ For these historical citations, I am indebted to Dr. Bland's *Human and Comparative Parturition*. London, 1794.

even for a day after labor, but wash and return to their work immediately, and a similar account is given, by another historian, of the Abyssinian women, who retire by themselves, and are delivered with great ease and expedition. "The Spaniards in Brazil," says Hennepius, "who perform the office of midwives to their teeming consorts, receive the infant, tear the navel string, and wash and paint it. The lying-in woman does not meet with more indulgence than the infant; as soon as she is disburthened, she goes and washes herself, and immediately sets about her work, without suffering the least inconvenience from it." In another place, he says: "The wives of the Livonian peasants, and the savages of North America, use the same custom. The women retire to some private place when the time of their delivery is at hand, and return immediately after to their work." Sagnier and Brisson, in their account of their voyage to the coast of Africa, observe that "The Moorish women have no midwives, but are usually alone at the moment of delivery, laid on the ground under an indifferent tent. They have seen these women depart, even on the day of their delivery, to a camp at the distance of fifteen or twenty leagues."

In his "Inquiry into the Natural History of Medicine among the Indians of North America,"¹ Dr. Rush, speaking of the Indian women, observes that "Nature is their only midwife. Their labors are short and accompanied with little pain. Each woman is delivered in a private cabin, without so much as one of her own sex to attend her. After washing herself in cold water, she returns in a few days to her usual employments, so that she knows nothing of those accidents which proceed from the carelessness or ill management of midwives, or those weaknesses which arise from a month's confinement in a warm room." He had met with only one case upon record of their aiding nature in parturition, and in that instance, the aid consisted in stopping, for a short time, the mouth and nose, so as to obstruct the breathing, with the effect of inducing a general convulsion, followed by sudden delivery.

It is not necessary to multiply testimonies to prove the natural facility of parturition in primitive conditions of society. The law obtains not only among savages but among civilized nations where indolence, luxury, and fashionable dissipation are unknown. The Israelitish women, as Dr. Rush very properly remarks, were de-

¹ Medical Inquiries and Observations, vol. 1.

livered, even without the help of the Egyptian midwives, and we read of but two women who died in childbirth, in the whole history of the Jews: labors are equally safe and easy in Norway and Iceland, according to Pontoppidan and Anderson's histories of those countries. Even among ourselves, expeditious and comparatively painless labors are by no means unfrequent. It must, oftener than once, have occurred to every practitioner to meet with such cases as the following, recorded by Dr. Channing: The patient said to him, upon his arrival, "It is very rare for a physician to be present when I am ill; for I know too little about it to send in time, and the child is born without one.' She was sitting in her chair, and I felt her pulse. Said she, 'I have one of *my* pains now.' There was not the least intimation of this in any motion of the hand. Not a muscle of the arm moved, and the pulse beat as if nothing unusual were going on. I said I would visit a patient near by, and return to be ready to attend her. I went, and found her on the bed when I returned. She said the waters had come away, and she had gone to bed in consequence. I proposed to get what might be wanted after the child was born, a ligature, &c., when she said, in the most natural manner possible, that she thought I had better hurry; for she believed her child was born. And this was true."¹

The foregoing facts are sufficient to prove that human parturition is not of physical necessity more tedious, difficult, and dangerous than the same operation in other animals, as some have contended that it is, alleging as a reason for it the peculiar structure and form of the pelvis, necessitated by the erect position of the body. For this pre-eminence—the *erectus ad sidera vultus*—the tax, imposed by nature, is, say they, increased suffering and peril. But surely the resources of nature are not so limited that she cannot confer the dignity of looking upwards without the counterpoise of pain and anguish in the very act of producing the beings, who are to be invested with such mock preferment. And the facts that have been adduced are sufficient to justify the ways of Providence to man, by showing that physical suffering is the penalty of the violation of physical laws.

Obstetric writers do not agree in the definition which they have given of *natural labor*. Dr. Denman declares "that every labor

¹ Etherization in Childbirth, p. 76.

shall be called *natural*, if the head of the child presents, if the labor be completed within twenty-four hours, and if no artificial assistance be required." To this definition various amendments have been proposed; but no one, so far as I remember, has suggested immunity from pain, real or virtual, as one of the terms which ought to be embraced. I am, nevertheless, inclined to believe that no labor should be regarded as *truly* natural, which is not, in a good degree, free from such pain as we are accustomed to witness. Were Dr. Merriman's classification of labors generally adopted, I would, therefore, propose a new order in addition to the several orders admitted by him, and also materially change the definition of natural labor. He divides all labors into the two classes of *Eutocia* or Natural Labor, and *Dystocia* or Difficult Labor—the former comprehending only one order, viz: *Eutocia Simplex*, and the latter, as many as fifteen orders, as *Dystocia Diutina*, *Dystocia Anenergica*, *Dystocia Perversa*, *Dystocia Amorphica*, &c. Natural labor I would define to be that in which the vertex presents, which is accomplished in a few hours, without any really valuable aid from art, and is attended with little more pain than defecation or micturition. Such an expulsion of the fetus, and only such, fulfils my idea of archetypal labor, labor as it was originally constituted and as it still lingers in the world, notwithstanding all that human perversity has done to banish it. I would exclude from this class all labors, remarkable for the severity of the suffering with which they are attended, and assign them a place in a new order of *Dystocia*, viz: *Dystocia Dolorosa*; a numerous order, drawing into its vortex nearly all the rest, seeing that in by far the greater number of cases, however they may differ in other respects, preternatural pain is present, and it may be fairly presumed that the organs concerned are really in a semi-pathological state, if not actually diseased. This doctrine was boldly avowed by Dr. Rush, when he wrote, "The philosophers, in describing the humble origin of man, say that he is formed '*inter stercus et urinam*.' The divines say that he is 'conceived in sin, and shapen in iniquity.' I believe it to be equally true, and alike humiliating, that he is conceived and brought forth in disease."

Many obstetric writers, and among them Dr. Dewees, would seem to have entertained similar views, from their bestowment of the epithet, "spasmodic," upon the expulsive contractions of the uterus. No matter how fluently they may speak of natural labor,

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in connection with expulsive efforts of the uterine muscles, so violent and so excruciatingly painful as to merit the appellation of "spasmodic," they could not really persuade themselves that a natural function may be spasmodically and yet healthily performed. It is a contradiction in terms.

Here, then, is our answer to Drs. Meigs and Ramsbotham, and to all others who refuse to give their obstetric patients the benefit of chloroform, because the pains are "physiological." The pains of parturition are morbid adjuncts to its muscular throes, and as such they are in no wise useful, and only serve to complicate the process. There is, therefore, the same necessity and justification for resorting to anæsthetics to annul the pains of morbid parturition as of any other function, which may be similarly deranged.

2. Drs. Ramsbotham and Meigs agree in repudiating etherization in midwifery on the ground that it is a *hazardous* remedy. Dr. Meigs offers a strong dissuasive from it, which, I doubt not, has effectually deterred many a practitioner, by coupling this alleged hazardousness with the supposed gratuitousness of it—in the following powerful appeal: "Should I exhibit the remedy for pain to a thousand patients in labor, *merely to prevent the physiological pain, and for no other motive*—and if I should in consequence destroy only one of them, I should feel disposed to clothe me in sackcloth, and cast ashes on my head for the remainder of my days. What sufficient motive have I to risk the life or the death of one in a thousand, in a questionable attempt to abrogate one of the general conditions of man?"¹ I have already endeavored to show that the pains of labor, at least in a majority of the cases that come under our cognizance, belong to the same category as other pains, which all admit require therapeutical intervention. It is the alleged *hazardousness* of etherization which we have to consider here.

What can avail us in this branch of our investigation but clinical observations, sufficiently numerous to afford full opportunities of studying the effects of etherization? Can experiments upon animals throw any really valuable light on the subject? What but the actual trial of them is the source of all that we know or can know of the effects of remedies, their safeness or their dangerousness? If we appeal to experience to enlighten us on the question that now occupies us, we learn that, notwithstanding the countless multitudes of parturient women who have been placed un-

¹ Letter to Dr. Simpson.

chloroform and ether, in Europe and America, it is extremely doubtful whether there has yet been a single disastrous consequence. In his letter to Dr. Meigs, Dr. Simpson boldly and unequivocally declares, "No accidents have as yet happened under its use, though several hundred thousand must have already been under the influence of chloroform." *Several hundred thousand women in anæsthetic labor, without an accident! What a testimony! And that too from a man who is an able statistician, and not wont to round either his numbers or periods. How does Dr. Meigs meet and attempt to turn aside this argument? By counter experience? Not at all; unless this may lie concealed in the following *constructio prægans*: "I am a witness that it is attended with alarming accidents, however rarely." What the "alarming accidents" were, or when and where, or whether in obstetric or dental practice, is not disclosed: but it may be safely concluded that the estimable author never *witnessed* a death from chloroform, administered to a patient in labor, else the world would have heard of it.*

It would seem, from his own account of the matter, that Dr. Meigs was led to take up his antagonistic position by reading numerous reports in the *Comptes Rendus* of the French Institute, and accounts of experiments contained in various journals, which show, as he thinks, that "there is no ascertained law of progression in the activity or power of the anæsthetic agent, and no man knows, when he begins to administer the vapor, upon what part of the brain it will proceed to exert its benumbing power. M. Flourens has shown, that all the other parts of the brain may be safely suspended of their forces, provided the medulla oblongata be unattacked by the agent, and that as long as the medulla oblongata retains its energy it is capable of recalling the other bulbs to life and activity through its own force, provided the further inhalation of the letheon is arrested. Hence he calls the medulla oblongata the *vital tie* (*le nœud vital*), since it binds the rest of the encephala with its 'silver cord.'"

Were anæsthetic agents justly amenable to the objection here urged—did they display the capriciousness here attributed to them—no sane practitioner would venture to touch them. If we could not know, in any case, but that the whole force of the agent would be immediately expended upon the medulla oblongata, without a moment's warning, such as gradually decreasing and presently

extinguished sensibility, and cessation of voluntary motion, with sleep—the effects of the anæsthetic on other portions of the brain—then, indeed, it would be utterly unsafe to administer it, in any case or for any purpose; for, respiration is dependent on the aforesaid medulla oblongata, and it is tolerably certain that our patients can't live without breath. Instead of marching through the brain and attacking its several parts, after the whimsical fashion ascribed to them by Dr. Meigs, anæsthetics pervade the entire cerebral mass, as they impregnate the whole of the circulating fluids, and the sedation caused by them is felt by all its parts, according to their respective susceptibilities. If their exhibition be carried beyond safe bounds, the different parts of the brain become locked in their fatal letheon embrace, in an order not, perhaps, well ascertained; but this we know: the medulla oblongata is the last, never the first, to succumb. We need never fear that the *nœud vital* will be loosed, unless we rashly push the remedy beyond all reasonable limits. Were there any just grounds for such an apprehension, is it not strange, nay, is it not miraculous, that it should not have been realized even once out of the hundreds of thousands of cases in which the hazard has been madly run?

Dr. Ramsbotham insists that the anæsthetic state must be carried to an alarming degree, even to the *fourth* stage of narcotism, according to Dr. Snow's division of its phenomena, ere *perfect freedom* from pain can be procured. This stage, the last but one, and that the *commencement of dying*, is characterized by "relaxation of the voluntary muscles, together with complete insensibility to external impressions, so that no pain is felt, even on the infliction of severe personal injuries. Yet, although reflex movements cannot be excited by touching even the most sensitive part of the frame, still, some functions of the spinal cord remain, as the sphincters continue contracted, and, according to most of its advocates, the action of the uterus in labor is not materially interfered with. The breathing is not unfrequently attended with some degree of stertor." The individual seems, to the common eye, to be sinking into the sleep of death, and very little, as Dr. Ramsbotham remarks, is the patient removed from that last sleep. "Two or three more sniffs voluntarily allowed—a trifling intermission of attention on the part of the person charged with the administration of the vapor—and the fatal gulf is crossed; that bourn is gained from which indeed no traveller returns." This is truly a terrifying picture, and well designed to frighten the inexperienced. To soften somewhat

its repulsive features, it should be observed that it is *chirurgical anæsthesia* which is here portrayed—that state of complete insensibility, unconsciousness, and passivity of the voluntary muscles, which the surgeon so much desires, perhaps actually needs, in order that he may undisturbedly prosecute his operation upon the living as he does his dissection upon the dead. But a degree of anæsthesia considerably short of this, is sufficient for almost all obstetrical uses. Sensibility may be annulled, or at least obtunded, so that the parturient pains shall not be felt, or exert any depressing influence on the economy, without destroying consciousness, though its correctness may be impaired. Nothing is more common than for patients, after it is all over, to declare that, while under the influence of the chloroform, they heard everything that was spoken by the attendants, though they themselves had neither the power nor disposition to reply. Or, they say that they were conscious of the pains, though they *suffered* none, or fancied that the pains were being borne by another.

There is, therefore, no need, in midwifery practice, of pushing etherization to the last degree compatible with life, in order that its comforting and salutary effects may be obtained; but even supposing it were otherwise, and that the fourth degree of Dr. Snow must be reached in every case, it may be confidently affirmed that there is no real danger incurred, except by the most inexcusable carelessness or temerity. To justify this remark, it need only be observed that anæsthetics, taken by inhalation, are immediately absorbed, and expend their whole force on the nervous centres at once; in the next round of the circulation, or in a few moments at most, they are eliminated from the system by the various emunctories. The case is altogether different from that of any narcotic; opium, for instance, taken by the stomach, which continues to be absorbed after the brain is affected by it, perhaps to a dangerous degree. Not so with ether or chloroform inhalation; but when a certain stage of anæsthesia has been produced by them, if they be withdrawn, the patient is not liable to become more and more affected by them, but the reverse. We may hence make this practical deduction: that if chloroform be not urged beyond the degree necessary to annul pain and tranquillize the patient, there is positively no risk whatever in its administration, and that, so far from its being a hazardous remedy, it is really the safest and most manageable of all the agents at our disposal, indued with equal potency.

No more satisfactory proof of this could be desired than the fact that only one alleged fatal result of chloroform in midwifery has been reported by Dr. Ramsbotham as the fruit of numerous inquiries, made with all due diligence, if we may be permitted to judge by his invective against the practice. But it is more than problematical whether death, in that instance, was caused by chloroform; for it is not pretended that the remedy was used lavishly, and the patient herself expressed, after the labor was over, much gratitude for the relief afforded her by it. It was not until an hour and a half had elapsed that she complained of dyspnoea, attended with lividity of the face, which was relieved by the means employed, and in three hours and a half she lay down to rest; but the dyspnoea returned in half an hour, followed by convulsions and "almost immediate death." When it is considered that this lady had taken chloroform in two previous labors, and that the fatal symptoms first showed themselves several hours subsequent to delivery, it must appear much more reasonable to ascribe her death to concealed hemorrhage, some organic disease, or sudden deliquium, than to chloroform. Indeed, Dr. Snow, commenting on this case, contends that death was not the consequence of the inhalation, not only because the symptoms did not show themselves until some time after the drug was administered, but "they do not coincide in the least with the known effects of chloroform." We may therefore conclude that etherization is still without an obstetric victim; and the fact being thus, there has been a great waste of fine declamation on the part of Drs. Meigs and Ramsbotham.

The discussion might be here dropped; for, if the pains of parturition are morbid in a vast majority of cases, occurring among us, and if it is perfectly safe to assuage them by chloroform, whether they be pathological or physiological, the only formidable objections to etherization have been met and refuted. But I cannot dismiss the subject without alluding to one or two of the minor objections brought forward by the distinguished authors, whose opinions I am striving to controvert. One of these objections I would fain pass by in silence, were there not reason to fear that it may have its weight and serve to shame patients themselves from a resort to their best refuge. The objection, *pro pudor!* is, that etherization is equivalent to drunkenness. "I cannot avoid the feeling of astonishment," cries Dr. Meigs, "which seizes upon me when I read the details of cases of midwifery that have been treated

during the profound *Drunkness* of etherization. To be insensible from whiskey, and gin, and brandy, and wine, and beer, and ether, and chloroform, is to be what in the world is called *Dead-drunk*. No reasoning—no argumentation is strong enough to point out the ninth part of a hair's discrimination between them—except that the volatility of one of the agents, or its diffusibility as a stimulant narcotic, enables it sooner to produce its intoxicating effect, which is sooner recovered from."

Why are other inebriants, opium, for example, not included in this short lecture on temperance? It is a royal inebriant, and causes the most gorgeous pageants to flit before the imagination of its thrice happy recipients; and yet what price could tempt Dr. Meigs, or any other humane practitioner, to forego opium in the treatment of innumerable diseases? Suppose it were ascertained that by administering a dose of opium, at the approach of labor, the patient could be transported, in idea and in effect, to a dreamy sort of *elyseum*, where her young would be brought forth without pain, and with only imperfect consciousness, could Dr. Meigs find it in his heart to refuse his patients, even all of them, the *Donum Dei*, and incontinently preach them a sermon on *Temperance*? The objection is evidently far-fetched, and would have never occurred to him except in the objective mood. It is moreover invalid. The effects of etherization are widely different from those of whiskey or gin: with little or no previous exhilaration, the patient speedily passes into a state of insensibility to pain, with consciousness intact, or else perverted or abolished, according to the degree of anæsthesia, and on recovering from it, she immediately regains her intelligence, and her moral perceptions are as lucid as before. No obscuration of the head, or defilement of the heart need be apprehended from etherization as from drunkenness, produced by spirituous liquors, which degrades its miserable victim even in her own estimation. Who ever felt ashamed of having been anæsthetized?

The extreme susceptibility of the female system to the action of anæsthetics, during pregnancy and labor, "when the nervous system is in so irritable and highly excitable a condition," is mentioned by Dr. Ramsbotham, as an objection to their employment in parturition. Granting the premise, to the fullest extent, I would deny the conclusion. This very nervous excitability, on the contrary, only the more loudly calls for the calming influence of etheri-

zation, not only for the purpose of allaying the more intolerable anguish it brings along with it, but of preventing the consequences that may be dreaded, especially puerperal convulsions, of which etherization is, perhaps, at once the best prophylactic and remedy. Be this as it may, however, I have been long impressed with the belief that chloroform is specially woman's comforter, and is peculiarly adapted to soothe the perturbations, mental and physical, of parturition; and I am equally persuaded that it is better borne, and may be more freely administered, than in surgical cases. The reason of this may be presumed to be the high degree of tension, and unusual excitement of the nervous system, consequent to labor, which must be subdued before the anæsthetic proceeds to exert its other influences upon the nervous centres. Chloroform, in other words, is given in midwifery to *relieve*, in surgery to *prevent* pain, and more of the remedy is required in the former, than in the latter case. Then, again, it should be observed that every returning parturient contraction is counteractive of the effects of the anæsthetic, and recalls the patient, more or less perfectly, to sensibility and consciousness—a no inconsiderable safeguard against the depression of the vital powers, liable to ensue after surgical operations. Account for it as we will, I am satisfied that anæsthetics are safer in obstetric than in surgical practice, though I should be sorry to be debarred from it in either; and in the surgical operations that fall within the province of obstetrics, their employment is peculiarly felicitous, as it not only saves pain, but also greatly facilitates the performance of the operations themselves. In none of these, nor, indeed, in the whole range of surgery is this remark more true, than in reference to the operation of turning in bad cases of shoulder presentation, where the waters have been completely drained, and the uterus is rigidly contracted upon the child. Here the introduction of the hand is not only difficult and excessively painful, but also hazardous, as it may cause rupture of the uterus. In hour-glass contraction of the uterus, with imprisonment of the placenta in one of its compartments, etherization renders it comparatively easy to dilate the stricture, and complete the delivery, which would otherwise have been difficult, and cruelly painful.

In instrumental deliveries, also, whether by the forceps or crotchet, etherization is as valuable as an auxiliary, as in any other branch of surgery. True, it has been objected by Dr. Meigs, that the sensibility of the patient is our best director in a forceps ope-

ration, inasmuch as we are warned by it against inserting the blades of the instrument in a wrong direction. He does not scruple to affirm that to the interrogatory, "Does it hurt you?" the patient's reply, 'Yes,' or 'No,' is worth a thousand dogmas and precepts, as to planes and axes, and curves of Carus." The reason assigned for the transcendent value of such a guide, is the impossibility of *absolutely* knowing the precise degree of inclination which the patient may give to the plane of her superior strait, while in pain—an inclination to be modified by every movement of her body and limbs.

If a knowledge of pelvic planes and axes and curves of Carus be really of so little avail, and we have at best to *feel* our way, in the most important operations of obstetric surgery, the student might well ask to be excused for not bothering himself about them. But they are not without their practical application to the matter in hand—as Dr. Meigs is very well aware—whilst the substitute, suggested in the strait of argumentation, is, as every practical man very well knows, totally worthless, nay, positively injurious. Let any accoucheur take the sensibility of the patient as his guide in delivering by the forceps, and frequently and anxiously inquire whether she is hurt? It may be confidently predicted that he will be compelled to desist from the operation, because it is not possible to apply the instrument, much more to act with it, without more or less pain. Strange to say, Dr. Meigs will have it that even this pain is a "physiological pain," and on this ground he prays to have it exempted from molestation by anæsthetics! I suppose he means that the extraction of the head of the child by the forceps, is not more painful than its expulsion by the natural forces, an opinion we sometimes hear expressed in the lying-in chamber, to dispel the fears of the patient. But it is not supported by reason or observation. Not by reason, for it rests on the assumption that art is equal to nature, which can never be true in any case, and least of all, in the article of childbirth, in nothing pertaining to which can art do more than imperfectly to imitate nature. Art can seize the foetal head with its iron hands, and drag it through the passages *secundum artem*; but the operation, even when most skilfully conducted, is not like the propulsion of living force, nicely graduated to the resistance to be overcome, and perfect in all its appointments. Greatly more pain, and vastly more risk of contusion, or laceration, attend the artificial than the natural operation, and not a single

argument can be alleged for anæsthesia in common surgery that is not at least as applicable to operative midwifery.

The great achievement of modern surgeons, is the eradication of pain from the track of the knife, by the administration of chloroform, or ether; but, if it shall be found that not only is pain prevented, but death is warded off by the same beneficent agency, their triumph must be admitted to be much more complete. Were it proved beyond all question that, whilst etherization annuls the pain of surgical operations, it increases their mortality, it could no longer be defended. If, on the other hand, it can be shown that the mortality is diminished, the recoveries being more numerous after the same operation, performed under the same general circumstances, except that the patients were put under the influence of chloroform or ether, great must be the prejudice or perversity that will reject it. Now, the statistics of different British hospitals, showing the mortality of the major amputations, with and without chloroform, which have been collected and collated by Dr. Simpson, appear to prove conclusively that the proportion of recoveries is greater where the patients had been anæsthetized. For the full details of these interesting researches, I must refer to Dr. Simpson's Works, contenting myself with observing that the most formidable of this class of operations, viz., amputation of the thigh, was stripped of its mortality, in a very sensible degree; it appearing from the reports of different British hospitals, that 107 out of 284 operations proved fatal, without chloroform, whilst only 37 out of 145 were fatal to patients in an etherized state, which is in the proportion of 38 in 100 of the former, and 25 in 100 of the latter. We have not sufficient statistical data to prove incontestably that the mortality of midwifery operations is diminished in the same ratio by etherization; but it cannot be reasonably doubted. Meanwhile, Dr. Channing has collected the statistics of 51 cases of instrumental, preternatural and complicated labor, treated with ether or chloroform, among which were nine cases of presentation of the shoulder—all the mothers recovered, and six of the children were born alive—which is more favorable, I think, than the general results of such cases.

SECTION III.

THE CAUSES OF MORBID PROTRACTION OF THE SECOND
STAGE OF LABOR, AND THEIR TREATMENT.

The second stage of labor may be protracted as well as the first; and as delay is confessedly most injurious here, both to the mother and the child, there can be no doubt as to the propriety of expediting it, when this can be safely done, or delivering artificially, when the natural resources are inadequate, in such time as will be most advantageous for all concerned. The most usual causes of protraction, in this stage, are, 1. Inefficient action of the uterus; and, 2. Impotent action of the uterus. To one or the other of these states of the parturient organ may be referred every case of labor, retarded in the second stage, except such as are owing to malposition of the fœtus, or deformity of the pelvis.

1. INEFFICIENT ACTION OF THE UTERUS.

This condition is indicated by the feebleness or irregularity of the pains, and the little or no effect produced by them, in advancing the child, notwithstanding the absence of any assignable obstacle—the presentation being favorable, and the parts in a healthy state. It may be the continuance of a corresponding condition that had existed in the first stage, or it may manifest itself in the second, although the first may not have been particularly protracted.

In the *treatment* of this condition, the most signal good effects may be often derived from bloodletting, especially where there is any undue excitement of the heart and arteries, as shown by the force and fulness of the pulse, by heat of the surface, headache, thirst, etc. If the bowels be confined, a large dose of castor oil or a stimulating saline enema will often succeed in arousing the uterus to more vigorous action. But the remedy, which is most usually resorted to for this purpose, is the *secale cornutum*, or *ergot*. Administered in the dose of from ten grains to a scruple finely powdered, and repeated once or twice, if need be, at intervals of twenty or thirty minutes, it seldom fails to excite powerful uterine contractions, which promptly expel the child. If all the requisites for an easy delivery exist, the vagina is relaxed, the vagina

and vulva relaxed and moist, the presentation natural or such as to offer no great impediment to the birth of the child, that is, the vertex, face, or nates; and, lastly, if there be no disproportion.

These requisites for a prompt termination of the labor are so many *conditions* which must exist, else it will be altogether improper, and may be ruinous to the child or mother, to administer ergot. As there is reason to believe that this powerful article is daily employed without such restraints, and that sad havoc is committed by it, the consideration of its *modus operandi*, with its necessary consequences, may serve to inspire us with salutary caution in its use.

From the exposition that has been made of the changes induced in the uterine circulation, by the parturient contractions, it is evident that if these contractions were not alternated with intervals of repose, the foetus would be inevitably destroyed, in every case of parturition, before its expulsion could possibly be effected. Such unrespired contractions of the uterus, as we have supposed, are, it is very well known, produced by ergot; when it is exhibited and takes effect fully, the uterus is urged to one long and unceasing effort until its contents are evacuated. A radical change is, therefore, induced in the mode of uterine contraction, which is tantamount to wresting the process of parturition from the hands of nature. No respite from her sufferings is allowed the mother,—no breathing time for the foetus. What wonder, then, if the former is more exhausted by the labor, and the latter ushered into the world completely asphyxiated—its countenance swollen and livid, and its vital organs engorged, or oppressed with extravasations of blood!

This ergotic contraction of the uterus may, moreover, produce fatal compression of the child's brain, by the too rapid moulding of the head to the parturient passage, where there is any disproportion, or even unusual resistance, in the soft parts. Under such circumstances, nature, if permitted to perform her work, would proceed cautiously and methodically—content to obtain the desired accommodation, in a gradual manner.

It is strange that many writers and practitioners deny that any such pernicious consequences ever result from the administration of ergot. If such a position be taken after sufficient opportunities to witness its effects, the attempt to convince them of their error were hopeless. But, for the benefit of the unprejudiced and inexperienced, the following extracts are offered, from an interesting paper by Dr. J. B. Beck, entitled "Observations on Ergot," pub

lished in the *Transactions of the Medical Society of the State of New York*, vol. v.

"Dr. Ward, of New Jersey, whose experience with this article appears to have been extensive, and who speaks of it as a valuable agent in many cases, nevertheless admits the danger which attends the child from its use. 'In all the cases,' he says, in which I have given it, unless the child was expelled very soon after the powerful contractions came on, it suffered very much, and would lie for some time without breathing.' Again, he says, 'From my own observations, with regard to the ergot, as well as from other correct sources of information, I am led to conclude that, in most cases, after giving it, unless the child is expelled in forty minutes after the powerful contractions come on, it will be born dead.'¹

"The late Dr. William Moore, a veteran practitioner of obstetrics in this city, after detailing some cases, gives his opinion of ergot in the following terms: 'It appears to be injurious to the child at all times; for in every case in which I have seen it exhibited, the child has been still-born, and in the greater part of them it was not possible to restore it to life.'²

"Dr. Holcombe, of New Jersey, says: 'More children, I am satisfied from what I have seen and heard, have already perished by the injudicious use of ergot, during the few years which have followed its introduction into the practice of this country, than have been sacrificed by the unwarrantable use of the crotchet for a century past.'³

"Dr. Davies, of London, reports ten cases in which the ergot was used. In four, the child was still-born. In a fifth, the child was apparently still-born, but soon recovered. In all the still-born cases, it appears that the child was not delivered until upwards of an hour had elapsed after the administration of the ergot. In the first, two hours elapsed; in the second, a little more than an hour; in the third, six hours; in the fourth, a little over an hour.⁴

"Mr. T. Chavasse, of Birmingham, states that in eighteen cases in which the ergot was used, the children were still-born."⁵

To these testimonies I shall only add that of John Patterson,

¹ *New York Med. and Phys. Journal*, vol. iv. p. 212.

² *Compendium of Midwifery*, by Samuel Bard, M. D., p. 214, fourth ed.

³ *Philadelphia Journal of the Med. and Phys. Sciences*, vol. xi. p. 318.

⁴ *New England Journal of Med. and Surg.*, vol. xv. p. 18.

⁵ *Transactions of the Provin. Med. and Surg. Association*, vol. iv.

Esq., of Aberdeen, copied from the *Edinburgh Medical and Surgical Journal*, into *Braithwaite's Retrospect of Practical Medicine and Surgery*, No. 1, p. 133. His testimony is adduced, not because it is needed to strengthen the evidence already collected, but for a purpose that will presently appear. "In eight cases where I used the medicine in half-drachm doses," says Mr. P., "and closely watched its action, it fully answered my expectations, by acting strongly in less than five minutes after it was administered; and I will venture to say that, if properly used, given in proper doses, and the medicine fresh (which it seldom is), it never will disappoint the medical attendant as to its stimulating effects. In every one of these cases there was, in the symptoms produced, a uniformity very surprising; all the patients expressed their feelings in the same language, viz., that they never felt themselves in a similar state, as their pains were never away. Could the action, therefore, of this medicine be in any way regulated by the accoucheur, I am satisfied that, to a great extent, it would supersede the use of instruments; but, until that can be accomplished, it has that great disadvantage, and will always require to be given with extreme caution. Out of these eight cases in which I used the ergot, I lost three children, than which no stronger evidence need be adduced of its extreme danger. In the works which I have read in reference to this medicine, I have been struck at finding so little allusion made to its bad effects upon the child—very few instances being recorded of its fatal effects. In the three cases alluded to, I satisfied myself, before its administration, that the children were not only alive, but apparently strong and healthy; but so soon as the action of the medicine commenced, these impressions gradually became less sensible to me and the mother. On these three occasions, I regretted very much that no inspection was permitted. In two of them in particular, the conjunctiva was literally gorged with blood; and I have little or no doubt but that death was occasioned by the uninterrupted pressure of the uterus upon the brain. In that way, and by premature separation of the placenta before birth, produced by the same action, I doubt very much if more deaths are not occasioned than by the use of instruments; at least my experience leads me to that conclusion."

Braithwaite dissents from the opinion which Mr. Patterson advances with respect to the *modus operandi* of ergot on the child, and ascribes its death rather to the want of proper oxydation and decarbonization of its blood. In a word, his explanation corre-

sponds precisely with that which I have given. Now, it is proper that I should say explicitly, that I have publicly taught this, and with as great emphasis as I could, for the last twenty years, viz., since the first session of the Medical Institute of this city (1837-8), as numerous pupils might testify, and, therefore, I did not derive it from Braithwaite, whose *Retrospect*, No. 1, was not republished in this country until 1844, nor published in Great Britain, I believe, until 1840. Whether it was received from any other writer I will not positively affirm, but my impression is that it was not. I do not, however, claim any great merit for it: it is, in truth, but a very simple deduction from the physiology of parturition, and the peculiar action of ergot on the womb.

But the destructive tendency of ergot, as already intimated, is not limited to the child. When prematurely or incautiously administered, it may cause rupture of the uterus, by goading it to exert a degree of force incompatible with its integrity, but yet insufficient to overcome the obstacles that may oppose it. Especially is this true in cases of disproportion between the size of the child and that of the pelvis, and when there is unusual resistance of the os uteri and perineum.

Mr. Patterson, in the article referred to, in Braithwaite's *Retrospect*, states that he has not, in a single instance, found that injury has been done to the mother, "thus giving the ergot in one respect," says he, "a great advantage over the forceps," and many writers agree with him in this opinion, while none, as it seems to me, are sufficiently aware of the danger to be apprehended in regard to the mother.

That rupture of the uterus has been often caused by the exhibition of ergot, I cannot doubt, after a careful examination of cases that have been reported in the medical journals. One journal published in this country, in a single month (April, 1841), not to refer to others, contains two cases, in which fatal rupture of the uterus was owing to the use of ergot, though the true cause of the accident does not appear to have been suspected by the reporters. It may be useful to give an abstract of these cases—premising that the title of the journal referred to, as well as the names of the parties concerned, are suppressed, lest offence should be given, and I be accused of a spirit of ill-natured personal criticism, which does not at all actuate me.

The first occurred in the practice of —, at the time one of the

editors of the journal. The patient, who had given birth to a dead child two years previously, was taken in labor about four o'clock, P. M., Friday, March 16th; seven hours afterwards the os uteri was well dilated, the head presenting in the first position; the protrusion of the scalp indicated its compression on account of the small size of the pelvis, and but slow progress was made for the next five hours; the head became jammed in the pelvis, and was stationary for the next eight hours, when twenty drops of the wine of ergot were administered "in the hope that more efficient contractions of the uterus might perhaps mould the head of the child to the cavity in which it was impacted:" the ergot having no effect, in an hour and a half, an attempt was made to deliver with the forceps, which failed on account of the pelvis being so absolutely filled up with the head, that "it was not possible to introduce the smallest-sized catheter into the bladder:" the patient was next bled, and *got a scruple of powdered ergot*; this was at four o'clock, and at six, *the pains being strong*, forty drops of laudanum were given, shortly after which *the alternate contractions of the uterus entirely ceased*, and she was attacked with *pain in the epigastric region and vomiting*; an attempt to deliver with the forceps was again made, with no better success than at first, when it was determined to deliver by embryotomy, which was accomplished with great difficulty, and "literally with main force." It is not necessary to pursue the subsequent history of the case; suffice it to say that the patient died, and a *post-mortem* examination revealed the existence of rupture of the uterus, with extravasation of blood into the abdominal cavity, and intense peritoneal inflammation.

Now, who can doubt but that goading the uterus with ergot, to overcome the insurmountable obstacle, offered by the contracted pelvis, was the cause of its rupture? Ergot was altogether inadmissible under the circumstances, nor was the case a proper one for the forceps. Had the head been perforated, instead of attempting to "mould it," by ergot, the woman's life might have been saved, and the child would have fared none the worse.

The second case, entitled "Utero-Vaginal Rupture," is communicated by ——. The patient was in labor with her third child, and had complained of slight pains during the whole of the day before the doctor was called: the os uteri was found to be but partially dilated, although it was very easily dilatable; he ruptured the membranes, which failing to improve the labor, **ten grains of**

ergot were given with the effect of increasing the pains, but these soon beginning to languish, the dose was repeated, shortly after which she had a *few very severe pains*. The action of the uterus then gradually declined, and the os uteri became less dilatable, for which it was judged proper to bleed her, but *she did not bear the abstraction of blood well*, the loss of eight ounces rendering her pulse "weak and frequent;" four hours after the bleeding, the os uteri was more dilated, but the pains were still weak and inefficient; an anodyne was given, and she was left for the night; at nine o'clock next morning, it was reported that she had passed a *very restless night*, and had complained much of pains, but few of which the patient thought efficient: on examination it was found that the os uteri was fully dilated, the breech presenting, and advanced three-fourths of an inch to an inch lower than at last examination: ineffectual attempts were made with the hand to bring down the feet, and ergot was again administered, but did not produce the least effect. It was now determined to deliver with instruments; the feet were with difficulty brought down with the blunt hook; the body was soon expelled and the arms brought down, but when the head came into the pelvis, the patient was so much exhausted, that it was deemed prudent to defer its extraction until the patient was revived by stimulants; the head was then delivered with the crotchet, but not without extreme difficulty, and there was not the least subsidence of the abdominal tumor until the delivery was nearly completed. It is needless to follow the further details of the case: the patient died the next day after delivery, and the autopsy disclosed metro-peritonitis, effusion into the abdominal cavity, with coagula of blood, and transverse rupture of the left side of the neck of the womb, extending into the vagina.

The reporter remarks that it would be interesting to determine at what time the laceration happened; but as there was "no violent screaming at the time of its occurrence, followed by vomiting of dark-colored fluid, ghastly countenance, oppressed breathing, fainting, etc.," he is at a loss to come to any satisfactory conclusion. It does not appear to me that there is the least uncertainty on this point: the symptoms, enumerated by him, do not always follow rupture of the uterus, as his own case shows; but the declension of the uterine action, succeeding to the few violent pains produced by ergot, and the prostrate condition of the system, evinced by the inability to bear the
ven eight ounces of blood,

indicate with sufficient clearness that the uterus was ruptured by the "few violent pains;" and this indication is confirmed by the total failure of every means resorted to, to restore sufficient uterine contraction.

A little reflection, but much more, a little practice, will satisfy any one that it is not an easy matter to decide confidently that all the conditions exist, which will justify the exhibition of ergot, and it is, therefore, gratifying to know that, when there is doubt upon this point, we have other resources. The manipulations which I have recommended in the first stage, may also be usefully employed in the second, with marked effect. The anterior margin of the os uteri, although it be sufficiently dilated to allow the foetus to pass, may be commonly felt behind the pubes, and the finger is to be insinuated between it and the presenting part of the child, in the absence of pain, and to press it upwards, performing, at the same time, semicircular movements, as already explained. When a pain comes on, the finger is still to retain its place, and continue its operations, unless the cervix contracts with such force as to compel it to give place, in which case it is to be withdrawn, to be reintroduced when the pain subsides, and act as before.

It is, however, sometimes the case that the head is so low down in the pelvis, and the os uteri so amply dilated, that its margin cannot be felt; still the manipulation, somewhat varied, is capable of exciting the uterus to more vigorous contraction. The vagina and rectum receive nerves from the hypogastric plexus, and the stimulus of pressure with the finger upon the posterior wall of the vagina, arouses the expulsive contractions of the uterus, diaphragm, and abdominal muscles, through the same medium that orificial irritation operates. To accomplish this, the finger is to be carried up as high as possible, between the head of the child and the posterior wall of the vagina, with its feeling surface directed posteriorly, and then slowly withdrawn in a zigzag line, making pretty firm pressure as it moves. This may be repeated, at short intervals, until more powerful uterine contractions are excited, which I have known to occur very promptly, and with the effect of speedily terminating lingering labor. There is yet another means of exciting more efficient action of the uterus, preferred by Madame Lachapelle, which I have often practised with good effect, viz., pressure upon the posterior part of the labia pudendi and anterior commissure of the perineum, by two or three fingers introduced

within the vulva. "By pressing thus upon the transverse perineal and levator ani muscles," says this author, "especially when the head is in the vagina, I unequivocally obtain advantageous results: a tenesmus is excited, which forces the woman to bear down, at the same time that it increases sympathetically, the spasm of the uterus."¹

To guard against the abuse of these manipulations, I may say of them, as of those recommended in the first stage, that they are not intended to *dilate*, but to *excite*; in the language of Madame Lachapelle, "as dilatations, their effect is more hurtful than useful, but as excitations, they are capable of rendering the greatest services." Notwithstanding this explanation, I do not flatter myself that ignoramuses will not abuse this valuable resource, or that the ill-natured will cease to slander it by sneering at "official irritation," and by prating about "rubbing down the vagina," "stretching the vulva," &c. Such we must ever leave to their folly and spleen.

2. IMPOTENT ACTION OF THE UTERUS.

The terms "inefficient" and "impotent," are not unfrequently used synonymously; it is, therefore, necessary that I should explain the sense in which I employ them. By the former, I mean "inadequately exerted," though the ability to act exists in full vigor; by the latter, "inadequately exerted," because the ability to act more vigorously is destroyed. The former is the *inertie par torpeur*, the latter the *inertie par épuisement*, of Madame Lachapelle. It is only necessary to observe further, in the way of explanation, that "impotent action of the uterus" is equivalent to the "powerless," "difficult," and at least two orders of the "laborious" labors of systematic writers. The matters it includes are, therefore, of great practical interest, and challenge the most careful examination of the accoucheur.

We shall, in the first place, inquire into the actual condition of the uterus, when it is brought into this impotent state, and the influence of this upon the contiguous parts, and the general system. Its condition appears to be analogous to that of the muscles of voluntary motion, when these have been inordinately exerted; that is, there are *swelling* and *stiffness, soreness to the touch, and painfulness*

¹ Premier Mémoire.

upon any further exertion. One who takes a long and fatiguing walk, without being accustomed to pedestrian exercise, brings the muscles of his legs into this condition; and the accoucheur experiences it in the muscles of his arm, after every case of extraordinarily difficult turning, no matter what may be his practice in such performances.

In reference to the muscles of voluntary motion, it is well known that these symptoms are produced by the engorgement of their tissue, resulting from the unusual or prolonged exercise, and that this engorgement may run into inflammation, if exercise be persisted in. Inflammation, ending in suppuration, is not unfrequently thus produced in the femoral muscles of soldiers, after forced marches. The deranged balance of the circulation is caused by the increased afflux of blood to the muscles continuing after they have lost the power of vigorous contraction; as the contractile power becomes enfeebled, the blood is less and less perfectly expelled from them, while in action, until its accumulation amounts to engorgement.

That the muscular fibres of the uterus, when exhausted by the long continuance or severity of the parturient contractions, are in an analogous condition, may be inferred from the similarity of the symptoms, as already mentioned. Let us look at these more particularly. The uterus, as far as it can be examined by the finger, has lost its natural properties: the cervix, instead of being cool, moist, and pliant, feels hot, dry, and stiff—this stiffness differing altogether from the rigidity which arises from preternatural activity of its fibres, already noticed as a cause of protracted first stage. The stiffness, of which I am speaking, is connected with tumidity, and gives the impression of the tissue of the part being stuffed, so that its natural pliancy is destroyed. Both the neck and body of the organ, as felt through the abdominal parietes, are sore to the touch, and the parturient contractions are in themselves painful; that is, while they last, the woman complains of suffering, diffused over the whole extent of the uterine globe, which is not much harder than during the intervals.

These contractions have no effect as to the advancement of labor—the presenting part of the child remaining stationary, and becoming swelled on account of its being begirded by the rigid circle of the os uteri.

The impotent action, exerted by the uterus in bad cases of ex-

haustion, is often revealed to an experienced practitioner, by the altered expression of the pains, and the behavior of the woman during their continuance. The pains are irregular in their recurrence, last but a short time, and are accompanied with little or no bearing-down effort; they inspire the patient with no courage or hope; hence she endures them impatiently and doggedly.

This morbid state of the parturient function never exists, however, without producing more or less local and constitutional disorder. The pressure of the presenting part of the child upon the soft parts lining the pelvis, and the organs contained within it, disturbs their circulation and innervation, and hence they become congested, and not unfrequently inflamed—the inflammation, like that produced by a similar cause in other parts, having a marked tendency to ulceration and sloughing. Hence, the patient may escape from the danger that threatens her, but have an extensive fistulous communication between the vagina and rectum, or bladder. The stomach is disordered, and the patient is distressed with nausea and vomiting; fever is kindled, the pulse being permanently accelerated, accompanied with thirst, heat of the surface, flushing of the cheeks; the nervous system is affected, and the mind begins to wander.

The state of the uterus and maternal system, in impotent labor, is fraught with danger to the child, and, if the struggle be so protracted as to jeopard the mother, its life is commonly forfeited. The observations of Dr. Collins, in the Dublin Lying-in Hospital, led him to the conclusion that where the patient has been properly treated, from the commencement of her labor, the death of the child takes place, in protracted and difficult cases, before the symptoms become so alarming as to call for delivery on her own account.¹ The changes of the uterine circulation, described in a former chapter, are not, it is probable, so great here as in energetic or *ergotic* labor (the blood is not so perfectly excluded from the uterine tissues during the parturient contractions); but there is a permanent lesion of the uterine circulation, viz., engorgement, which unfits it for arterializing the foetal blood in a healthy manner; and, besides, although the muscular contractions be impotent, the tonic contraction is in full exercise, and keeps up constant pressure on the child's body,

¹ Practical Treatise on Midwifery, Boston, 1841, p. 17.

which is so much the more injurious, as the amnion is drained of its waters by dribs.

It is always desirable, and sometimes practically useful, to know certainly whether the fœtus be alive or dead; and we may as well here as elsewhere, inquire whether such knowledge is attainable. Various signs of the life or death of the child, during labor, have been enumerated by authors, but they are all more or less fallacious, with the exception of those furnished by auscultation. It is true that if the head presents, and no swelling be formed upon it, notwithstanding the labor has been long protracted, and has become impotent, more especially if, at the same time, its integuments are flabby and slippery, and bones loose and disjointed, offering their sharp angles or edges—we may conclude certainly, not only that the child is dead, but that it died before labor commenced; for had it been alive, then such a cranial swelling would necessarily have been formed, by the long continuance and severity of the labor. But the existence of this swelling does not prove that the child is, but only that it *was*, alive since labor commenced. We are, indeed, told that if the child be alive, this swelling is tense and elastic, whereas, if the child be dead, it is flabby and crepitant, and the bones are loose and disjointed; but some time must elapse after the death of the child, before the swelling will exhibit these altered characters, in such a marked degree as to leave no doubt, and it may be that, during this intervening time, we are most anxious to solve the question of the child's life or death.

It is not necessary to waste more time in considering other signs, either in head or other presentations, that have been commonly relied on; suffice it to say, they are all deceptive, or only occasionally available. How valuable, then, is the aid which we can derive from auscultation, and how important is it that all who practise obstetrics should seek an experimental knowledge of it! The tree of this knowledge does not, as some vainly pretend, grow only in foreign climes; it does not spread its branches only about large hospitals, but its fruit may be gathered as well everywhere—in the private mansion, and even in the solitary hut. A little patience and perseverance are necessary to train the ear so as to detect at first the sounds it is in quest of: but these, once discovered, are ever afterwards easily recognizable.

On applying the ear to the abdomen of a woman in advanced pregnancy, if the fœtus be alive, the *action of its heart* can be dis-

covered by the sounds emitted from it. These sounds, compared by Kergaradec to the ticking of a watch, may be recognized as cardiac by their resemblance to those of the adult heart, with which they cannot be confounded, on account of their much greater frequency. The action of the foetal heart is much more easily discoverable in the second stage of labor, because the liquor amnii being discharged in whole or in part, it is brought nearer to the walls of the mother's abdomen. The examination being made in the interval of the pains, a practised ear will not unfrequently hear the cardiac sounds the instant it comes in contact with the abdomen.

If it be discovered that its heart is in action, the evidence of the life of the child is, of course, complete. But if we fail to make this discovery, it has been questioned whether the evidence of its death is quite as satisfactory. The proof is, it is true, of a negative character, and it is certainly possible that the child may be alive; and yet, owing to its peculiar situation in the uterus, we may not succeed in detecting the action of its heart. I cannot but believe, however, that if a careful examination of every region of the abdomen, occupied by the gravid uterus, discloses no trace of the heart's action (supposing, of course, that the examiner has the requisite experience and tact), the foetus has lost its vitality, or, at least, the probability of this is too great to justify us in adopting any method of delivery based on a contrary supposition. The foetus is therefore dead, to all *practical* intents and purposes. Under certain circumstances, the cessation of the cardiac sounds is as conclusive proof of the child's death as ocular examination could afford. I mean where, in the early part of the labor, we can distinctly hear these sounds, but discover that they grow less and less audible as labor progresses, until they become entirely extinct. My own practice is to seek an early opportunity to apply my ear to the abdomen in every case of labor; and then, if the labor should be protracted, I have a sure index of the child's condition, which should always be taken into estimation when we are deliberating as to what measures shall be adopted.

There is another auscultatory sign of the child's life or death, which, though of inferior value to the one just considered, is worthy of some attention. I allude to the *placental souffle*. While the child continues alive, the general tone of the uterine circulation, on which its welfare so intimately depends, is maintained; but when it is dead, the motive being lost that had excited it to a high rate of vital

activity, the uterus falls into a lethargic state, and neither its circulation, innervation, nor muscular contraction, is performed with as much vigor as before. No wonder, then, if the placental souffle should become faint or altogether extinct, after the death of the fœtus, and this is, as far as my observation goes, generally true.

Dr. Kennedy's more enlarged observations are to the same effect. In the majority of cases, according to him, this sound ceases, and in the instances in which it continues, it is impaired and differs from the usual sound: "It is observed," says he, "to be more abrupt, of shorter continuance, wanting its protracted terminating whiz, and generally confined to a circumscribed spot. In some cases it is even little more than a pulsation, such as is observed on applying the instrument (stethoscope) over one of the large arteries.¹

But although the placental souffle is annihilated or greatly modified by the child's death, we oftener fail to detect it than the cardiac sounds, though the child may be alive. We should hardly be warranted, therefore, in drawing a positive conclusion from this *alone*; but undoubtedly it may serve to corroborate the proof afforded by the absence of the cardiac sounds: while, on the other hand, should the placental souffle be discovered, full and distinct, we should hesitate to affirm the child's death, even though we fail to hear its heart.

I cannot dwell longer on the signs of the life or death of the child, but must proceed to notice the *causes of uterine impotency*. According to the doctrine which I have endeavored to maintain, whatever is capable of seriously protracting the first stage of labor, may be reckoned a cause of impotency in the second stage. Of the causes that strike at the second stage through the first, I have already spoken, and need not repeat what has been said. But I may be allowed, I hope without a breach of charity, to say here, that if the doctrine referred to be sound, the *indirect* causes of this class are all those expectant practitioners who consider it treason against nature to *stir a finger* in contravention to any of her vagaries in the first stage. In plain terms, it is my decided conviction that mismanagement of the first stage is a fruitful source of impotency in the second.

Dr. Churchill, in his chapter on "Powerless Labor," admits our doctrine within a certain range, by no means a limited one, where he says: "Women of a *weak constitution*, especially in their first confinement, not unfrequently find the uterine powers fail, after

¹ Observations on Obstetric Auscultation, New York edition, 1843, p. 242.

some hours of endurance, and that without our being able to restore them. These are the cases, and these only, in which there is anything to fear from a prolonged first stage; *for the exhaustion produced by it, and which in healthy women is of no consequence, may be the cause of inefficient (impotent) action in the second.* In women of an *irritable nervous* temperament, there is also occasionally a failure of uterine powers in the second stage."

Mismanaged first stage is not, however, the only cause of impotent second; for,

First. Although there may have been no injurious delay in the first stage, the action of the uterus may be simply *inefficient* in the second; and if this *inefficiency* is allowed to continue, it will more certainly and rapidly end in *impotency* than in the first stage. Here again, with my views of the subject, I am constrained to believe that the mischief that results is generally chargeable to the inefficiency of the practitioner; for had he required the uterus to use its powers to the best effect, instead of dallying with them, it might have been prevented.

Secondly. The first stage may have been performed in good time, and the uterus may act well in the second, but, notwithstanding, have its powers exhausted by the extraordinary resistance of the perineum and orificium vaginæ, by the malposition of the child, or by its relative large size. Malpositions belong to the special phenomena of the second stage, and will be hereafter considered; but the relative large size of the child, regarded as an obstacle to labor, may be considered here. By this phrase, I mean too great magnitude of the child, not as compared with other children, or with the capacity of other pelves, but with the pelvis of its mother. The child may, in this sense, be large, although it be *under* the ordinary dimensions, or it may be small, although *larger* than common.

The relative large size of the child is often wrongfully accused of being the cause of delay in the second stage. The accusation is easily made, and, no matter how false, the touch is readily suborned to prove it. The diagnosis of disproportion between the child and the pelvis is not so palpable as might be supposed; for, except in extreme cases (where there is actual deformity), the touch cannot estimate it, so as to enable us to determine whether it is really the cause of difficulty, much less to decide that the child cannot be made to pass by vigorous contractions of the uterus. The only tangible evidence, upon which I place the least reliance,

is the head remaining stationary, notwithstanding the pains continue regular and strong, and the gradual approximation, and eventually the overlapping, of its bones, together with an extraordinary degree of flexion, bringing the posterior fontanel nearly or quite to the centre of the pelvis. This is evidence which is only attainable in head presentations, and in its absence we must be content with probability. All the signs, enumerated by authors, are entitled to no more weight, and most of them belong to all impotent labors, by whatever causes induced. Thus, the pelvis being so filled with the presenting part as to leave no space for the introduction of the finger between them, or for the passage of a catheter into the bladder; retention of urine, acute pain, on pressure in any part of the abdomen, hurried pulse, and failing strength, while the progress of the head is arrested—mentioned by Dr. Collins as signs of disproportion—all these are observable in any bad case of difficult labor. The progress of the head is stayed by the want of sufficiently potent uterine contractions; while the engorgement of the uterus and pelvic viscera, together with the swelling of the child, as effectually fills the pelvis as disproportion ever does. There is one other sign, given by Dr. Collins, which is, perhaps, entitled to more weight, viz., the continuance of regular and strong uterine action for twelve or twenty-four hours after the os uteri is dilated, or nearly so, without any progress: but here the want of progress may be owing to other causes, malposition, for instance.

It is not intended to deny the reality of too great relative magnitude of the child as an obstacle to labor, which is occasionally met with in practice; but when this occurs, it derives all its importance from its power to wear out the energies of the uterus and bring it into the impotent state, which so many other causes may, and in fact much more frequently do, produce. In confirmation of this remark, it may be confidently affirmed that, had the uterus the inexhaustible energy which some seem to suppose, it would triumph over any case of disproportion that could occur, by compressing the yielding parts of the foetus and moulding them to the parturient passage. None can doubt this, who has witnessed the rapid strides of a vigorously contracting uterus, in the face of disproportion, malposition, or any other obstacle that can be surmounted by force. I conclude, therefore, that it is of much more importance to husband the resources of the uterus, and bring them into requi-

sition at the proper time, than to busy ourselves in trying to measure the child and pelvis.

In the *treatment* of uterine impotency, but little reliance is to be placed in the remedial measures which are appropriate to inefficient action of the uterus. Bloodletting is seldom indicated, and if used largely with a view to make a decided impression on the system, is not free from danger, on account of the general exhaustion of the vital powers. Nor is any effect, either salutary or otherwise, to be expected, as a general rule, from the administration of ergot. The reason is obvious; ergot is an excitant of the uterus, but it cannot restore the lost excitability of the organ, much less can it restore its tissues to their healthy condition; and until this is done it is not possible for the uterus to be aroused to its wonted energy of contraction. In the incipient stage of the affection, the remedy may succeed; but when it is confirmed, it were a waste of time to expect any benefit from this quarter. If those who are in the habit of prescribing ergot were always careful to distinguish between cases of mere inefficiency and decided impotence, they would be less frequently disappointed in their expectations from the article, and we should hear less of the uncertainty of its operation. This medicine will, I am persuaded, seldom fail to excite the uterus in a decided manner, in any case proper for its use, viz., where, the conditions already specified existing, the uterus is in a state of torpid inertia; but it cannot reach inertia from exhaustion.

Not much more promising are the fingers, employed in the various ways already described, for the purpose of stimulating the uterus. They, like the ergot, may succeed in the commencement, but not in the confirmed stage, of impotent labor. What, then, is to be done? Shall the case be allowed to take its course, or shall we interpose, and at what time, and under what circumstances, will artificial delivery be justifiable? These are important questions; much of the future comfort of the patient, nay, her life itself and that of her offspring, will depend upon the manner in which they are answered in each particular case; and yet, in a discussion like this, it is impossible to answer them otherwise than in a very general manner: for, from the nature of the subject, much must be left to the sober judgment and experience of the practitioner. If, on the one hand, nature be trusted to, she may, after a painful and protracted struggle, prove victorious, or (for she abhors the entombment of the child in its mother's womb) a dead child may be

ushered into the world as a prelude to the mother's departure from it. If, on the other hand, we have recourse to delivery, harm may result from its being too long deferred; or, if we resort to it early, and any accident happen, we may be reproached for our precipitancy.

Looking at the subject in a general light, I would say that *time* is no criterion to govern us. The march of time is not uniform in its effects on labor, any more than it is on the persons of the sex; in the lapse of a given number of hours, some women will be brought into a perilous condition, while others, under similar circumstances, as far as we can judge, will be in no manner of danger. In forming our opinion as to the necessity of artificial delivery, our attention should be directed to the evidences of uterine impotency; in proportion as these thicken, the necessity of delivery becomes more and more urgent. It is not wise to wait until the urgency is extreme; and in general, the earlier the woman is relieved by delivery the better, provided this can be done with facility and safety. Suppose, for example, the head of the child is presenting and has ceased to advance, while the uterus has evidently become impotent: suppose, moreover, this head is within easy reach of the forceps, and can be delivered without risk or additional pain to the mother—what would be the use of waiting until we are driven to the operation? But if delivery be not so easily and safely practicable, prudence requires that it should be deferred until the necessity of it is more pressing—so pressing that, in our judgment, it is better to incur whatever risk the operation may involve, than wait longer.

The mode of delivery, instrumental or manual, depends upon the presentation of the child, and will be considered as a part of the special treatment of the second stage, upon which we are next to enter.

CHAPTER XII.

SPECIAL TREATMENT OF THE SECOND STAGE
OF LABOR WHERE THE VERTEX PRESENTS.

VERTEX presentation being, as we have seen, most conducive to the spontaneous and easy expulsion of the child, requires the interposition of art less frequently than the other foetal presentations. The child is not always expelled, however, by the natural efforts, in such time as is most compatible with its and the mother's welfare, and it may, therefore, become necessary to render assistance appropriate to the circumstances of each individual case.

SECTION I.

MANUAL AID IN VERTEX PRESENTATION.

It was formerly the established practice of accoucheurs, in vertex cases, to lay hold of the head as soon as it is within reach of the hands, and extract the shoulders without delay, lest the child should be suffocated by its detention in the passage. Mauriceau, for example, directs that when the head is expelled as far as the ears or thereabouts, the midwife is to seize it with both hands, applied upon the sides of the head, some of the fingers being insinuated under the jaw, and then the occasion, offered by the first good pain, must be embraced to bring forth the child, by drawing its head.¹ He gives particular directions as to the manner of exerting this extractive force, which must not be always in a right line, but often from side to side, in regard to the head, in order that the shoulders may sooner and more easily take its place, after it has passed, and be made to follow without delay.

Baudelocque does not consider it more expedient to take hold of

¹ Livre II. Chap. 7.

the head with the hands than to pull it forth by the ears, which the vulgar imagine the accoucheur is always careful to do; but he allows that when the head is almost born, it should be assisted by raising it towards the pubes or insinuating the index finger under one side of the lower jaw; and directs that after its disengagement, the face should be turned towards one of the thighs of the mother, that towards which it tends. We are next, according to this celebrated author, to inquire into the situation of the shoulders, relatively to the inferior strait; push one of them towards the sacrum, and bring the other under the pubes, when they are not naturally thus placed, and then extract them, together with the rest of the trunk, by cautiously pulling upon the head.¹ M. Baudelocque is careful to forbid, as unsafe, the application of great force in this manner, when the size of the shoulders offers any considerable obstacle; but advises instead that the index of each hand be introduced under the axillæ, and used as blunt hooks. We must not forget, he emphatically adds, to place the shoulders in the situation already indicated, before we attempt to extract them, for those of the smallest dimensions cannot pass out transversely, without extreme difficulty.

The manipulation recommended by Mauriceau, which appears at one time to have been generally practised, was, doubtless, part and parcel of the pragmatic midwifery in vogue, and must be presumed to have been often pernicious in its results. To the writings of Mr. Charles White, of Manchester, England,² we are largely indebted for such an exposure of its absurdity and danger, as has consigned it to merited reprobation. In the chapter of his popular work on "Natural Births, particularly of the Secundines, and the prevention of after-pains," he shows the folly and risk of such practice, by contrasting it with the operations of nature, when she is permitted to pursue her own course unmolested. According to nature's process, the shoulders are caused to make such turns as best adapt them to the dimensions of the pelvis and soft parts; whereas, when art interposes, in the manner deprecated, the shoulders are pulled along transversely, offering violence to the vagina, and unduly distending the womb and its ligaments, thus producing, as Mr. White had reason to believe, "inflammations, prolapsuses, retentions of

¹ L'Art des Accouchements, par. 825-7.

² Treatise on the Management of Pregnant and Lying-in Women, second edit., London, 1777.

urine, and a train of disagreeable symptoms." "This improper and too hasty delivery of the shoulders, in natural labors, occasions," he adds, "the retention of the secundines, and is in some manner the cause of after-pains; for, the womb being improperly stretched out, and the body of the child prematurely delivered without a natural pain, the womb, instead of contracting regularly from its fundus, is thrown into spasmodic strictures, either at its mouth or across its middle." There is no difficulty in perceiving how such an irregular contraction of the uterus, or, what is perhaps fully as often the case, atony or a flaccid condition of the organ, the consequence of its being too suddenly emptied, may be followed by retention of the placenta, and likewise flooding, if it be wholly or partially detached from the uterus. Of the fact that such a procedure is likely to be followed by unusually severe after-pains, there can be no reasonable doubt; but Mr. White's explanation of the manner in which these are caused cannot be readily admitted. He ascribes them to the closure of the mouths of the uterine sinuses or veins, before they could have an opportunity of gradually contracting and of discharging themselves of the blood which they contained, "the serous part of which drains away and leaves the crassamentum behind in the sinuses, which grows the more fibrous the longer it remains; and, the parts being irritated by this extraneous body, endeavor to disburthen themselves by what are called after-pains." I rather judge that these after-pains result from contractions of the uterus, provoked by the presence of large coagula in its cavity, the product of internal hemorrhage, permitted by the flaccid or irregularly contracted state of its parietes, following such hasty delivery.

The foregoing considerations ought to suffice to settle the conduct of the practitioner in ordinary cases of labor with vertex presentation; it should be a maxim with him that nature must be allowed to do her work in her own good way, seeing everything had been ordered with admirable foresight, to have it accomplished with the greatest safety and the least suffering to mother and child. It does, nevertheless, not unfrequently happen that some assistance may be usefully given, with a view to promote the passage of both the head and shoulders, in vertex cases; and to deny this, and dogmatically to affirm the universal sufficiency of nature, is to humiliate art without exalting nature, unless it be vainly imagined that she is exalted by the incense of blind adoration.

Let us inquire, then, what may be safely done to favor the release of the head, when it is pressing on the perineum, but its exit is unduly delayed. The delay may arise from the resistance of the soft parts at the outlet, or from the inadequacy of the parturient powers to cause the head to execute the movement, by virtue of which it clears the vulva. The execution of this movement (extension), it has been shown, requires a degree of uterine force, of which they alone have any just conception, who have carefully studied the mechanism of labor. In either case, firm and properly directed pressure on the perineum will avail much in promoting the birth of the head, by aiding the movement in question. The pressure should be, of course, from the extremity of the sacrum towards the symphysis pubis, and so managed as not only to push the forehead of the child in that direction during a pain, but as much as possible in the intervals of the pains, so as to retain whatever advantage is gained. The patient lying on the back, both hands, with the extremities of the fingers directed towards the sacrum, may be employed in raising the head, as it were, towards the pubes. By acting thus I have often succeeded in having the head expelled by a few pains, notwithstanding it had made no advance for hours previously, and there appeared to be no prospect of its expulsion by the unaided efforts of nature. Of Baudelocque's manœuvre, slipping a finger or two under the jaw, much more of Mauriceau's, laying hold of the head, for the purpose of making traction upon it, I have no experience.

In relation to the passage of the shoulders it must be remembered that a short respite usually ensues after the expulsion of the head, in the most natural cases; during which the tonic contraction is at work, reducing the uterus to the diminished volume of its contents. We should, therefore, be satisfied to support the head, and wait awhile for the resumption of expulsive efforts. If this respite should, however, be protracted, or if the child be in a suffering condition, from pressure upon its neck interrupting the return of blood from the brain, and producing engorgement and lividity of its face, the interposition of art is not only proper but imperiously demanded. Under such circumstances, the practitioner should get two fingers (one is hardly sufficient) under one of the axillæ, and use such extractive force as may be necessary to advance the shoulders. If the shoulders be found situated nearly transversely in the pelvis, one axilla (that which is most forwards if they be not directly

transverse, either if they be transverse) is to be drawn towards the pubes, and then they are to be brought through the vulva, in a manner as exactly imitative of the mechanism as possible. In rendering this assistance, it is important to observe that it must be conformable to nature in other respects besides her mechanism; this might be exactly copied, and yet the woman be left in a most perilous condition. Our extractive force must be cautiously applied, and alternated with intervals of rest; and we must be careful to have the co-operation of the natural efforts, or at least be sure that the uterus is in a contracted state. To pull away the child while the uterus is altogether passive would be hazardous in the extreme; but no such hazard is incurred by a prudent and well-instructed practitioner, for it almost uniformly happens that his efforts are seconded by those of nature—the introduction of his fingers and the displacement of the shoulders serving to excite a renewal of the suspended contractions of the uterus. Of pulling on the head as a means of acting upon the shoulders I have no experience; but it seems to me that it is not free from danger, as far as the child is concerned, while it cannot enable us to conform the transition of the shoulders so accurately to the mechanism as the method I have advised and often practised.

After the birth of the head, it is not at all uncommon to find the umbilical cord coiled once or more around the neck of the child. My attention has been particularly directed to this, among other points, and I find that the cord is around the neck in a much larger number of vertex cases than I had previously supposed, or than is suspected by those who have made no particular inquiry concerning it.

It was, at one time, very generally believed that such a disposition of the cord may operate as a serious impediment to the expulsion of the head, the shortened cord retracting the head upon the subsidence of each pain; and it was even deemed necessary, in some instances, to divide it with the scissors, to allow the head to emerge. Dr. Smellie, who recognized this as an obstacle to delivery, advises a different method of overcoming it. In one of his numbers,¹ quaintly entitled, "*How to behave when the Birth is obstructed by the Navel-string, etc.*," he recommends one or two fingers to be introduced into the rectum, before the pain goes off, to press upon

¹ V. of Section III., Chapter II., Book III.

the forehead of the child at the root of the nose, taking care to avoid the eyes; "this pressure," says he, "detains the head until the return of another pain, which will squeeze it further down, while the fingers, pushing slowly and gradually, turn the forehead half round outwards, and half round upwards. By this assistance, and the help of strong pains, the child will be forced along, although the neck be entangled in the navel-string; for, as the child advances, the uterus contracts, and consequently the placenta is moved lower; the funis umbilicalis will also stretch a little, without obstructing the circulation." Although Dr. Smellie recites some cases, in one of his Collections, in which labor was apparently obstructed by this cause, there is reason to doubt its reality, nor can any assistance that may have been rendered by his anal manipulation be adduced in its support, for the efficacy of pressure, as practised by him, may be explained upon a quite different principle. The alternate advance and recession of the head may, much more reasonably, be attributed to the resistance of the perineum, aided, perhaps, by the elasticity of the foetal cranium; and this resistance may be overcome, in a shorter time, by the head being made to press uninterruptedly upon the soft parts of the pelvic outlet.

When the head is expelled, there is still reason to doubt whether the cord, by encircling the neck, can hinder the expulsion of the remainder of the child; but, under such circumstances, both mother and child are undoubtedly exposed to serious accidents. The cord may be lacerated, the placenta may be torn loose from the uterus, or, if its attachment be strong enough, the uterus may be inverted, and, finally, the child may be lost, by the ligature of its neck intercepting the return of blood from its brain. I have not met with any instances of flooding or inversion of the uterus from this cause, but I have known the cord to be lacerated, and the child's face to be swollen and livid. It should, therefore, be an invariable rule of practice, in vertex cases, to ascertain, as soon as the head is born, whether the cord is around the neck or not; if it be found there, it should be gently pulled and slipped over the head, if a coil of it can be sufficiently loosened to allow this: but if this cannot be done without too great stretching, it may be pushed over the shoulders, as they emerge from the pelvis. Where several circles of the cord surround the neck so tightly as to choke the child, it will be proper to divide it at once with the scissors, and hasten the birth, as much

as is compatible with the safety of the mother, lest it should be lost from hemorrhage or asphyxia.

Labor may be protracted, in vertex cases, in consequence of the occiput being turned towards the posterior part of the pelvis, especially if the occiput should rotate into the hollow of the sacrum; and it has, therefore, been deemed an important practical precept to secure the turning of this part of the head towards the pubic arch. For this purpose, we are directed to press upon the coronal region of the head, near the anterior fontanel, with two fingers, and push it towards the sacrum, to convert a *third* into a *second*, and a *fourth* into a *first* position of the vertex. From the observations already made in a previous chapter, it may be gathered that I do not highly appreciate this manipulation. If, however, it should happen that no tendency to this desirable mutation is manifest, although the time when it usually occurs has arrived, it is the duty of the practitioner to interpose, and do what he can to have it accomplished. He ought not, and, if he is wise, will not, pretend to more vigilance than nature, and make premature efforts to direct her movements.

A far more serious cause of protracted labor, peculiar to vertex presentations, consists in the permanent contraction of the cervix uteri about the neck of the child. This was formerly described by authors as contraction of the os uteri upon the child's neck, after the head had passed through it and is lodged in the vagina; but Baudelocque was doubtless correct in assigning the upper extremity of the uterine neck (the cervico-uterine orifice) as the seat of this permanent contraction. Numerous observations have proved the remarkable proneness of this part of the uterus to contraction, whenever the cause that distends it is removed. Thus, it is truly remarked, by Madame Lachapelle, that, for a certain time after natural delivery, the external orifice, as well as the entire neck, is found soft, lax, and open, while the internal orifice is small and contracted; and, in speaking of the difficulties that may be encountered in the operation of version, she says that she has often met with contraction here, consequent upon the escape of the waters, as the only obstacle to the introduction of the hand.¹

This condition of the cervico-uterine orifice offers an impediment to the advance of the shoulders of the child, and, of course, the

¹ *Pratique des Accouchements, Deuxième Mémoire.*

head is retained in the cavity of the pelvis, and cannot be expelled or extracted until the impediment is removed. It is characterized by the head making no progress, although the pains be strong and regular, the os uteri dilated, and the pelvis amply capacious, or if the head be forced lower during a pain, it is retracted as soon as the pain declines. It cannot, however, be certainly discovered except by a tactual examination, in order to which the head must first be raised, by the entire hand, above the brim of the pelvis; and then the fingers may be pushed up between the os uteri and head, at the base of which the stricture will be detected, if it exists.

Premature rupture of the membranes may be reckoned the most common, if not the sole, cause of the abnormal contraction we are considering. When this untoward event occurs, the liquor amnii is liable to flow or dribble away before the head can stop the os uteri by engaging in it. The uterus being thus deprived of its waters, the tonic contraction brings its parietes everywhere into contact with the surface of the child's body, but more especially and with greater rigidity, at the cervico-uterine orifice, for the reason already stated. To this cause alone it is attributed by Smellie; and in all the instances described by him, it is particularly mentioned that the membranes had long been ruptured, the waters drained off, and the labor lingering.

The treatment consists in the dilatation of the contracted portion of the uterus by the fingers, insinuated between it and the neck of the child. This can be accomplished only by first elevating the head above the superior strait, for there is not room in the excavation to receive the hand between it and the pelvic walls. When, therefore, the diagnosis is established, in the manner already explained, we should proceed at once, without withdrawing the hand, to remedy the difficulty. The stricture being dilated, the hand should be suddenly withdrawn, upon the access of a pain, that the shoulders may take its place, and prevent a recurrence of the accident.

Should labor be long delayed by this obstacle, it is evident that the parturient powers may become so exhausted, that the case may be mistaken for one of simple impotent action of the uterus, and, under this impression, a practitioner might attempt to deliver with the forceps. Smellie records a very interesting case of this kind, in which the woman had been five days in labor, and had been neglected by the surgeon and midwife. She had lost a great deal

of blood, was very weak, and the head of the child was low down in the pelvis. Smellie tried to deliver with the forceps, but was surprised that he did not succeed, because the head was not large, and the instrument was easily introduced, and firmly fixed. Being foiled in this method, he opened the head, and tried to extract it with the blunt hook on the inside of the skull, assisted by his fingers; but could not, with all his strength, bring it along. "However," says he, "by extracting the *occipital* and one of the *parietal* bones, I had room to introduce my hand, so as to find with my fingers the under part of the *uterus* strongly girt or contracted round the neck of the *fœtus*; this I gradually dilated; then bringing down one of the arms, and pulling at that, and the shattered bones and scalp, with both my hands, I at last extracted the child with greater ease than I expected."

SECTION II.

INSTRUMENTAL AID IN VERTEX PRESENTATION.

The parturient powers may, as we have seen, prove insufficient for the expulsion of the child, in such time as best comports with its and the mother's safety, and it then becomes necessary to resort to various instruments that have been devised by art to terminate the labor. The use of instruments may, also, be demanded on account of accidents, such as convulsions, or flooding, occurring in the progress of labor. Instrumental delivery, in vertex presentation, shall therefore next claim our consideration; and in discussing this subject I purpose to limit my remarks to the use of the *obstetric forceps* and the *crotchet*, the only instruments much employed in the practice of this country.

1. DELIVERY BY THE FORCEPS.

The forceps is an instrument consisting of two branches, which are separately introduced within the organs of the mother, and then joined together, to embrace the child's head and extract it. Its use is compatible with, and is, indeed, designed to save, the life of the child, while the mother is secured against the danger of longer con-

¹ Collection xxxi., Case vi.

tinuance of her travail. A short description of it is necessary to enable the reader to comprehend the directions which are to be given for its employment.

The *branches* of the forceps I shall, after M. Dugès, designate *right* and *left*, because the former is held in the right hand when it is being introduced, passes up on the right side of the pelvis, and, in the great majority of cases (viz., in the occipito-anterior positions), is applied upon the right side of the head, and *vice versa* with regard to the latter. We distinguish, as belonging to each branch, a blade, handle, and intermediate part, which serves to lock them, when they are properly brought into apposition. The *blade* (*cuisse* of the French) is broad, concave on one side, convex on the other, and fenestrated in its whole length; the *handle* is round, straight, or slightly curved, and of various lengths in different forceps; the *lock* is formed by a conical pivot or screw on one branch, and a mortise or notched hole in the other to receive the pivot. The pivot belongs to the *left* branch, and the mortise or hole to the *right*, and these articular contrivances have given names to the branches themselves—the left being called the *male*, and the right the *female* branch, by Baudelocque, Dewees, and many others.

No instrument used in midwifery or surgery has undergone so many modifications as the forceps; its varieties are almost innumerable, but they may all be referred to only two kinds, viz: the *short* and the *long*; the former, whose blades are straight, being intended to seize the head after it is fully engaged in the pelvis; the latter, whose blades are curved upon their edges, adapting them to a higher range, and fitting them to grasp the head of the child, whilst its bulk is detained above the brim of the pelvis.

Some writers advise the accoucheur to equip himself with both kinds of forceps, esteeming the short kind to be safer than the long in the class of cases to which it is adapted, and which, too, are most frequently met with in practice. But I am not satisfied of the propriety of the advice, as I think it is a good rule to provide no more instruments than are actually needed, and am very sure that the long forceps will answer just as well as the short, where the head has entered the cavity of the pelvis, whilst it alone is suited to the delivery of the head from the superior strait. For these reasons I prefer the long forceps, and seldom make use of any other.

The long French forceps, slightly modified by Dr. Dewees, was

formerly in most common use in the practice of this country, but it is a cumbrous instrument, weighing about twenty-six ounces avoirdupois, and measuring eighteen and one-half inches from the extremity of the handle to the points of the blades. The forceps which I have had constructed for my own use is much lighter, weighing but fourteen and one-half ounces, and being only fourteen inches in length. It differs, also, from the French forceps in the greater curve of the edges of its blades, which can be passed above the superior strait without depressing the handle so much as to hurt the perineum. To compensate the loss of power arising from this increased curvature, the handle is slightly curved in the opposite direction. The handle is, moreover, composed of wood, and has several notches to give a more secure hold, and prevent the hand that grasps it from slipping.

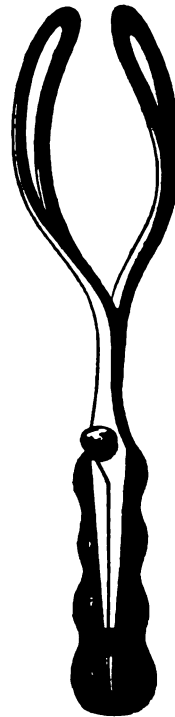
The annexed drawings (Figs. 75 and 76) will serve to convey a better idea of my forceps than any description which I can give.

Fig. 75.



Miller's Long Forceps: right branch.

Fig. 76.



Miller's Long Forceps.

Each branch, considered singly (Fig. 75), has a handle, *a*, 5.1 inches long, a shank, *b*, 2.1 inches long, and a blade, *c*, 6.8 inches from the shank to its tip. Its fenestra measures 5.6 inches, extending nearly the whole length of the blade, and being widest near its point, where it measures an inch.

When the branches are joined together, and the handles are in contact, the greatest width between the blades is 2.9 inches, while their points are a full inch asunder. The blades cannot be brought so close together as in the French forceps, and do not, of course, require to be so much separated in embracing the foetal head; the handles are, consequently, closer to each other, and are not too large to be conveniently taken hold of. When the instrument is placed on an horizontal surface, the perpendicular elevation of the points of the blades is 3.4 inches, which indicates the degree of curvature of their edges; in the French forceps it is only 2.7 inches. On the whole, my forceps resembles those of Drs. Ramsbotham and Simpson, the principal difference being the greater curvature of the blades—the pivot and mortise lock, instead of the grooved lock of the old English forceps—and one shank resting upon the other, instead of their being apart and parallel.¹

In treating of forceps operations, the method which I shall pursue will be, first, to make some general observations on this mode of delivery, and then describe the operative procedure, appropriate to the different situations of the head.

General Observations.—Delivery by the forceps must not be attempted while the parturient passages are rigid and unyielding, and especially while the os uteri continues to be contracted, so that any considerable portion of its circle can be felt by the finger. In the majority of cases, indeed, in which it is necessary and proper to resort to this mode of delivery, the head of the child has descended into the pelvic excavation, and the os uteri is so widely dilated that but a small portion of it can be reached by the finger. It is then neither in the way of the instrument nor is it likely that any injury will be sustained by it. Where the head has only partially entered the pelvis, a portion of it being detained above the superior strait, the os is not so fully dilated, and it may not be always easy to determine satisfactorily whether the requisite degree

¹ My obstetric forceps are made, of excellent quality, by Fred. Siegel, Surgeon's Instrument Maker, Third Street, between Jefferson and Green, Louisville, Ky.

of dilatation exists to justify the operation. If the whole of the os uteri can be felt, no matter how large its circle may seem to be, or even if the half of it can be easily reached by the fingers, there will be danger of lacerating or contusing it by the application of the forceps. But if only a small portion of it can be felt in front, pinched between the head of the child and the symphysis pubis, while on the sides of the pelvis it is nearly beyond reach, the blades of the instrument may be safely introduced and locked.

When it is judged expedient to deliver with the forceps, suitable preparation must be made for the operation. A mattress must be provided for the patient to lie on, as the sinking of her hips in a feather bed would be inconvenient, and she must be placed in a proper position, with the pelvis near the side or foot of the bedstead. As to the "proper position," there is a diversity of opinion and practice—the French directing the patient to be placed on the back, while the English strenuously insist on the preferableness of their universal "obstetrical position," viz., on the left side. For my own part, I have never attempted to deliver with the forceps, the patient lying on her side; but, it seems to me, that the dorsal position is far more convenient, and permits the operator to recognize more accurately the relations of the head to the cardinal points of the pelvis. Baudelocque, Dewees, and others, direct that the hips should be so near the edge of the bed, that the perineum may be free, the feet being supported on stools, or on the laps of assistants: but this is not necessary, provided the blades of the forceps possess sufficient curvature, which the French do not, and hence the necessity of the position directed by Baudelocque and Dewees. It will be sufficient, if her hips are placed so near the side of the bed that, her lower extremities being strongly flexed, her feet rest on its verge, and, if necessary, her pelvis can be raised by a cushion or a folded quilt. If there is any distension of the bladder, the urine must be drawn off with the catheter; and if the bowels are loaded, they must be relieved by a purgative injection.

It need hardly be added that the patient must be placed under the influence of chloroform in the degree usually deemed necessary as a preparation for any capital surgical operation.

The operation may be divided into two parts; 1st, the *introduction and adjustment* of the branches of the instrument, and 2d, *traction* with it, when properly adjusted, to extract the head. In the first part of the operation, the object to be attained is to

apply the blades of the forceps upon the sides of the head opposite to each other, being careful to have their concave edges turned either directly or obliquely forwards, as regard the mother, according to the situation of the head. The left branch is, as a general rule, to be introduced first; the practitioner takes this in his left hand, and holding it near the lock, between his thumb and fingers, as a pen is held, in writing, he presents the extremity of the blade to the vulva, his hand being perpendicularly over the right groin of the patient. As this branch passes up along the left side of the pelvis, the hand is moved towards the left side until it reaches midway between the thighs of the patient, while at the same time it is depressed in a very decided manner. The first movement is in accommodation to the curvature upon the face of the blade, whose extremity glides from left to right over the convexity of the head: the second is to accommodate the curvature of its edge, which must correspond with the curved axis of the pelvic canal. Two fingers, or preferably, when practicable, all the fingers of the right hand, previously well-lubricated, are to be introduced as high up as possible, between the head and pelvis, to serve as a conductor of the blade, to prevent its contusing the vagina, and to insure its passage into the cavity of the uterus.

Should any difficulty be experienced in the introduction of the blade, it is to be surmounted by address, never by force; if the vulva be rather contracted, dilate it with the fingers; if the progress of the blade be arrested, vary the direction of its extremity, and advance it gently with a wriggling motion. When its introduction is satisfactorily accomplished, it should be given in charge to an assistant, instructed to resist any displacement, which the uterine contractions may tend to produce.

The practitioner then takes the right branch in his right hand, and introduces it in the same manner, *mutatis mutandis*, as the left. That it may lock with its fellow, it is requisite that it be placed precisely in opposition to it. Should this be found to be not the fact, it must not be forcibly twisted into its proper place, for such an attempt might inflict serious violence on the child's head, and also upon the uterus; but it should be partially or wholly withdrawn, and another direction given to it. Proceeding after this manner, repeatedly varying its line of march, if need be, we shall at length safely obtain the desired position, and have no difficulty in locking the instrument.

The instrument, being properly applied, is to be taken hold of with both hands, one at the lock, and the other near the extremity of the handles, the forefinger of the former being at liberty to examine, from time to time, the progress we are making. The handles are to be pressed together with sufficient firmness to clasp the head and prevent the slipping of the blades, when extractive force is used, but not so powerfully as to compress the head, much less to contuse it or fracture its bones. On this point, a young practitioner needs to be cautioned, and he should keep a constant watch upon himself, as he will be very apt to use *compressing*, proportioned to the *extractive*, force he finds it necessary to exert. The extraction now commences, and this is to be performed, from first to last, in conformity at once with the nature of the instrument and that of the process it is intended to expedite.

On the first topic, it must be considered that the forceps is not merely a tractor, but it is also a lever—a double lever of the first kind—the prop being at its pivot, the resistance, viz., the head, at the blades, and the power at the handles. It is as a lever, more than a tractor, that we use the forceps; consequently, while we draw towards us, or in the direction of the axes of the pelvis, with moderate force, we move it from side to side, or, as the phrase is, from handle to handle. The head is, therefore, brought along, by describing a succession of slight curves, in alternately opposite directions, of which the pivot is the centre, and no more traction is employed than is necessary to preserve the advantage gained by the lever. In moving the instrument to and fro, the operator should be careful not to exceed the limits to which he may safely venture, for it is evident that a reckless swinging of it will necessarily contuse the organs of his patient, and may be followed by the most deplorable consequences. It is, however, proper to observe, for the encouragement of the prudent, that no danger need be apprehended from this source, except from inexcusable negligence or temerity.

The duty of imitating the process of labor suggests, in the first place, that our extractive efforts should be made with intervals of rest. The artificial force ought not to be of longer duration than the natural, nor its respite shorter; it ought not to be put forth, in all its intensity, in the beginning, but be gradually augmented to the required degree; and we should act in concert with the pains, if they continue to recur with their wonted frequency, though with

inadequate force. It suggests, in the second place, that we follow the mechanism of labor, by causing or assisting the head to perform whatever movements remain to be executed, in order that it may emerge easily and safely from the pelvis. When, finally, the head is made to distend the perineum, our extractive efforts must be greatly mitigated, if not altogether intermitted, lest the perineum be torn by its too hasty delivery. The handles of the forceps are now to be held by one hand, which is more than enough to exert all the force that can be needed, while the other hand is employed in supporting the perineum, as in natural delivery. By some authors we are directed to take off the instrument, at this stage of the operation, as the stronger pains and more powerful efforts of the patient, which usually occur, are sufficient to insure the expulsion of the head; but my own practice is to leave it on, as its presence can do no harm, and it might be wanting: I have, indeed, usually continued to make slight tractions with one hand, while with the other, the perineum is supported until the head is born.

When the head is extracted, the rest of the child may be expelled by the contractions of the uterus; but it is not unfrequently the case, especially where labor has been much protracted, that it is necessary to assist in the manner explained in the first section of this chapter.

These general observations being premised, we have now to consider the special application of the forceps; 1. Where the head fully occupies the pelvic excavation. 2. Where the head is only partially engaged in the excavation, a portion of it being above the brim of the pelvis.

1. *Delivery by the Forceps, the Head having passed the Brim, and become fully engaged in the Pelvis.*—Dr. Dewees enumerates as many as *eight* different positions of the head, requiring different procedures on the part of the operator; but I do not perceive the utility of such multiplication, which appears to me calculated to embarrass rather than to assist us at the bedside. An acuteness of tact, enjoyed but by few, is necessary to the recognition of these various positions; and in a considerable number of cases, no acuteness will enable a practitioner to detect them with certainty. Such will, not unfrequently, be his inability if he is called in late, and solely on account of the difficulty of the labor, when the swelling of the head and the approximation of its bones may have obliterated the marks, which usually serve to indicate its position. It would, then, be

fortunate for him, if it were only needful to pay attention to as many of these positions as he can satisfactorily discriminate, and this, I believe, is the fact with regard to them. There are but *three* positions, or, as I shall designate them, *situations*, of the head, which need be discriminated in reference to forceps operations. These are, (1.) When the length of the head corresponds to the antero-posterior diameter of the inferior strait; (2.) When the length of the head corresponds to the left oblique diameter of this strait; (3.) When the length of the head corresponds to the right oblique diameter of the strait. By the length of the head is not, of course, meant its greatest occipito-frontal dimension (for it is in a state of greater or less flexion), but only its length in distinction from its breadth across the parietal bones.

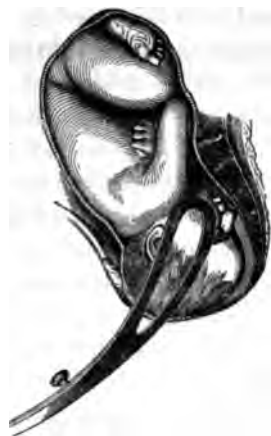
It will be perceived, on a moment's reflection, that the second *situation* includes the first and third *positions* of the vertex, and the third *situation* includes the second and fourth *positions* of the vertex, while the first *situation* is only the product of the several vertex positions, after rotation has taken place. These situations of the head may, it has been already intimated, be discriminated in practice, under any circumstances, whether the commissures and fontanelles can be felt or not. The diagnosis is made out by attending to the completeness or incompleteness of the occupancy of the different points of the pelvis. The pelvis will be found most completely filled, in whatever direction the length of the head may be placed, while a marked vacuity will be observed in the direction of its breadth. Nor is this anything more than the mechanism of labor might, *a priori*, have led us to expect. In the direction of the length of the head, the pelvis is plenarily occupied, because no greater flexion of the head takes place than is exacted as the condition of its entrance and descent, while the breadth of the head is rarely, if ever, so great as the dimensions of the pelvis. To distinguish the situation of the head, we have, therefore, only to push up a finger, or, if necessary, all the fingers, behind first one acetabulum and then the other; a plenum opposite to the left acetabulum and a vacuum opposite to the right discloses the second situation of the head, and *vice versa* in regard to the third; while the first situation is characterized by vacuities on both sides of the pelvis, and full occupancy of the concavity of the sacrum.

(1.) *Application of the Forceps in the First Situation of the Head, or where its Length corresponds to the Antero-Posterior Diameter of the*

Inferior Strait.—In this situation of the head, the forceps is more easily applied than in either of the others, and less is to be done by its instrumentality. It only remains that the head execute its extension movement, that it may be released from its confinement. But it does not follow, that, because apparently but little is wanting, the forceps will be seldom needed. On the contrary, my own experience has satisfied me that the forceps will be as often required in this, as in any other situation; nor should we be surprised at the necessity of it, when we remember the disadvantageous lever represented by the head.

Everything being prepared for the operation, as already directed, the left branch of the forceps is to be taken in the left hand and introduced along the left side of the pelvis, conducted by several fingers of the right hand, until the handle is brought parallel with the axis of the vagina. This is to be held by an assistant, while the right hand introduces the right branch along the right side of the pelvis, under the conduct of the fingers of the left hand. When the handle of this branch is brought nearly parallel with that of the

first, its notched hole easily receives the pivot, and the branches are locked, without difficulty. It will now be observed that the handles of the instrument are more or less elevated above the horizontal plane on which the patient lies, and the pivot is vertical. The cut, Fig. 77, copied from Cazeaux, represents this first situation of the head in its most usual variety, viz., with the occiput towards the pubes, and the forceps applied to its sides in the direction of its axis.



Vertex Presentation : application of forceps in first situation of head.

The left hand takes hold of the shanks, and the right, of the handles, and the operator proceeds to extract, in the manner already described, and in the direction of the axis of the inferior strait. As he progresses, it will be observed that the head advances differently according as the occiput is towards the pubes or the hollow of the sacrum. In the first case, the occiput will easily emerge from under the symphysis, and rise towards the mons veneris, to make room for the

forehead and face to pass out over the perineum. In the second case, the occiput moves over the inferior part of the sacrum and the coccyx, and comes out before the anterior edge of the perineum, when it falls backwards to allow the forehead and face to pass out under the pubes.

This observation will teach him, if he did not know it before, whether the occiput or the forehead is towards the pubes; and the manner of using the forceps, as the head is delivered, will be varied accordingly. If the occiput be towards the pubes, the handles of the instrument must, as the extraction proceeds, be raised towards a perpendicular, until at last they are even inclined towards the patient's abdomen, when the head is clearing the vulva. If the forehead be towards the pubes, the handles are raised, as the occiput is brought out before the perineum, and they are depressed as the head is clearing the vulva. The movement of the head, in both instances, strongly tends to impart such directions to the handles of the forceps, but it is right, not only to obey this tendency, but to increase it, or, in other words, to make tractions in conformity to it.

(2.) *Application of the Forceps in the Second Situation of the Head, or where its Length corresponds to the Left Oblique Diameter of the Inferior Strait.*—The head being placed obliquely in the pelvis, in this situation it is evident that its sides cannot be embraced by passing the blades of the forceps directly along the sides of the pelvis. They are, therefore, to be passed as follows: the left branch is held by the left hand, with its handle more elevated than in the first situation, and not quite so much inclined towards the right groin; the fingers of the right hand, introduced along the left sacro-schiatic ligaments, conduct its blade, which, as it ascends, is to be directed across the sacrum. To do this, the handle must be lowered in a greater degree than in the first situation, while, at the same time, it is inclined towards the left thigh, towards which the pivot also inclines, instead of being vertical. The right branch is introduced under the right ramus of the pubes, and passes behind the right acetabulum, its handle and articular hole inclining towards the left thigh, in conformity with the corresponding parts of the left branch, when the pivot is readily received and the instrument is then locked. This coaptation is not, however, always easily effected. It may happen that the second blade is not inserted exactly opposite to the first, and then, their articular parts not having

the same inclination, will not lock. In that case, the direction of the second blade, and sometimes of both, must be varied until they are made to join without force.

Fig. 78.



Vertex Presentation: application of forceps in second situation of head.

The drawing, Fig. 78, taken also from Cazeaux, shows the application of the forceps in this second situation of the head, it being a third vertex position; and it will be observed that the instrument is held towards the right ischio-pubic ramus, whereas it would be inclined towards the left ischio-pubic ramus, were the vertex in its first position, which is but the other variety of my second forceps situation. In both, viz., in first and third vertex positions, the length of the head corresponds to the left oblique diameter of the pelvis, and if its sides be seized by the blades, the application of the forceps is *essentially* the same in either case—the pivot is directed obliquely to the left thigh of the mother.

But in order that the forceps may be applied *precisely* right, the position must be known, that the handles may be held towards the left side of the pubic arch, in the first position of the vertex, and towards the right side, in the third position. Such precision is not, however, indispensable to the success of the operation; which is, practically, governed by the *situation* more than by the *position* of the head. The instrument is now to be firmly grasped with both hands in the manner directed for the first situation, for the purpose of raising the handles and at the same time turning them over towards the symphysis pubis, until the pivot is made to assume a vertical direction. The object of this manœuvre is, to rotate the head preparatory to its extraction. It is usually accomplished with facility, and then either the occiput or the forehead is brought under the symphysis pubis, according as it was a first or third vertex position. The rotation being accomplished, the head is to be extracted as already explained under the first situation.

(3.) *Application of the Forceps in the Third Situation of the Head, or where its Length corresponds to the Right Oblique Diameter of the Inferior Strait.*—The same necessity of introducing the blades of the forceps

obliquely, instead of directly on the sides of the pelvis, exists in this as in the second situation. The left branch is introduced under the left ramus of the pubes, its blade is conducted behind the left acetabulum, and as it glides over the head in that direction, the handle, which was held high at first, is lowered so as to incline towards the right thigh, its pivot having also the same inclination. The right branch is then introduced before the right sacro-ischiatic ligament of the pelvis, and crosses the sacrum, its handle being depressed and carried towards the right side, as it enters, until it is brought to lock with the other branch.

To articulate the branches is not quite so easy in this as in the second situation, for the right branch is under the left, and must be placed above it, before the hole can receive the pivot. A little management will, however, obviate this slight difficulty.

The branches being joined, the right hand takes hold near the lock, and the left near the extremity of the handles, which are to be raised and turned over towards the symphysis pubis, until the pivot is vertical. The object here, as in the second situation, is to rotate the head, which brings the occiput or forehead under the symphysis, according as it is a second or fourth vertex position. After its rotation, the head is to be extracted, as in the first situation.

The precept to rotate the head, in the second and third situations, notwithstanding its importance, must not be pertinaciously enforced in all cases, in defiance of the difficulties that may attend it. There are cases, and Baudelocque tells us he met with seven or eight, in which the head cannot be made to rotate without employing more force than would be at all justifiable, as dangerous contusion of the maternal parts, or injury of the child's head, might be the consequence. In such instances, it is better to follow the advice of Baudelocque, and bring out the head in its diagonal position. Considering that in the occipito-posterior positions of the vertex, it is more desirable that the occiput should rotate under the symphysis pubis than into the hollow of the sacrum, the suggestion was made long ago, and has been lately revived by Dr. Simpson, the distinguished Professor of Midwifery in the University of Edinburgh, that where the forehead is towards one of the acetabula, it should, in forceps deliveries, be rotated into the hollow of the sacrum instead of the pubic arch. But though this might, in some cases, be safely executed, I doubt whether it would be proper, as a gene-

ral rule, to attempt it; for, notwithstanding the decided propension to such a movement, in ordinary and healthy parturitions, yet where the natural powers are enfeebled (as they mostly are when the forceps is used), art may take the shortest route, and turn the occiput towards the sacrum, the rather because nature is not altogether unused to it, and the forceps will not be required to describe so large a segment of a circle—an exercise not quite so innocent within the genital organs as upon paper.

2. *Delivery by the Forceps when the Head of the Child is partly above the Superior Strait.*—It may become necessary, on account of hemorrhage, convulsions, or some other complication, to terminate labor by the forceps, before sufficient time has elapsed for the uterine contractions to push the head entirely through the superior strait, though the os uteri may be amply dilated. But in by far the greater number of cases, the immediate occasion of forceps delivery, whilst the head is so highly situated, is uterine exhaustion supervening to long-continued but unavailing efforts to overcome the difficulty offered by defect of proportion between the size of the head and the capacity of the maternal pelvis. This defect may proceed either from a slight degree of contraction of the pelvis, particularly of its superior aperture, or from an inordinate size of the head. In either case labor is protracted, and before the head can be fully accommodated to the diminutive aperture, by undergoing a gradual alteration in its shape, the parturient powers may be so far enfeebled that its further progress is arrested.

When the pelvis is under the average size, it is obvious that the greatest impediment to the entrance of the foetal head will be met with between the pubes and sacro-vertebral angle, because the antero-posterior diameter is naturally shorter than the transverse or oblique diameters, and because, also, the bi-parietal diameter of the head is *immediately* applied to it; whereas want of room in the transverse dimensions of the pelvis may be compensated by flexion of the head, which displaces its occipito-frontal diameter and substitutes the cervico-bregmatic. As this latter diameter does not exceed the bi-parietal, it is evident that the pelvis can never be so completely filled from ilium to ilium as from sacrum to pubes, and hence the importance of ascertaining whether there is sufficient space between the symphysis pubis and promontory of the sacrum to permit the head to pass safely for the foetus. It is generally allowed that if the sacro-pubic diameter be less than **three inches**,

the child cannot be extracted alive by the forceps. It must not be hastily concluded that the pelvis is *deformed*, when it is found that the sacro-pubic diameter is much shorter than common, as some writers appear to teach—for, though short, it may be *proportionably* as long as the transverse or oblique diameters. To constitute true deformity of this species, there must be morbid contraction in the sacro pubic diameter alone, which may certainly occur, but is, I apprehend, unfrequent among our country women, and I much doubt whether it is really as common anywhere as has been believed. Dr. Simpson, for example, in his paper *On the Mode of Application of the Long Forceps*, observes: “But the common reason for the employment of the long forceps is morbid contraction of the brim of the pelvis in its most general form, and from its most general cause, viz., in the conjugate or antero-posterior diameter, *from projecting forwards of the promontory of the sacrum.*” It is implied in such a statement as this that the brevity of the conjugate diameter is the only deviation of the pelvis from its natural size, and this involves necessarily an alteration of its figure. If such a deformity be a “common reason” for the employment of the long forceps in Scotland, it is not so in the United States, so far as my opportunities of observing have enabled me to decide.

It is obvious that any mechanical obstacle may exhaust the energies of the uterus, and be followed by the same consequences; and I have long been of the opinion that preternatural rigidity of the os uteri may offer such an obstacle. This conclusion may be deduced from the observation, which I have frequently made, that the difficulty under consideration is much the most frequently met with in primiparæ, in whom, also, the os uteri is more apt to be rigid and unyielding; and it is confirmed, by the additional observation that the same women, whose first labors are embarrassed by this cause, may give birth to their subsequent children, not only without difficulty, but with uncommon facility.

Whether the contracted aperture, through which the head must be forced, be that of the superior strait, or of the rigid os uteri, nature attempts to overcome the obstacle (and often succeeds) by altering the shape of the foetal head—elongating its axis, and flattening its occipito-frontal and bi-parietal diameters, thus forming it into a cone, of which the posterior fontanel is the apex. In this moulding process, the bones of the cranial vault are made to overlap each other, while the teguments that cover them become

swollen and congested. Such a process must necessarily be tedious, and while it is going on, the inexperienced practitioner may be beguiled with the hope that the labor is drawing to a close, when its termination is, perhaps, far distant. The delusion may be dispelled by introducing all the fingers into the vagina, when it will be found that, notwithstanding the puckered and swollen integuments of the child's head may have reached the vulva, the inferior part of the pelvic cavity is not really occupied, but the bulk of the head lies above the superior strait.

Should the symptoms of powerless labor, described in Chap. XI., supervene to this situation of the head, whilst at the same time the child is alive, as certified by auscultation, delivery by the forceps is indicated, and ought to be resorted to without unnecessary delay. We shall be guilty of unnecessary, nay, of mischievous delay, if we wait until a high degree of engorgement of the uterus and vagina has taken place, much more, if actual inflammation be established, as evinced by dryness, heat and tenderness of the parts, together with febrile reaction. If delivery be so long deferred, there is too much reason to fear that it will be followed by gangrene and sloughing of the genital mucous membrane, if not of the deeper-seated tissues, connecting the genital organs with the bladder and rectum—deplorable accidents, which are often falsely attributed to injuries inflicted by the instrument itself. Several cases of sloughing of the entire mucous membrane of the vagina, resulting in its total obturation by cicatrization, have fallen under my observation, which were wholly remediless by surgical operation; and in some of them, there was reason to believe that the havoc extended to the uterus, also, inasmuch as menstruation was destroyed. In one of these cases of apparently complete solidification of the uterus and vagina, the patient, a primipara, was allowed to continue in labor three or four days, and when I was called in, there was burning heat, and the most exquisite tenderness of the sexual organs, cessation of uterine action, rapid, feeble pulse, thickly coated tongue, thirst, and general prostration. Though I delivered immediately, the patient was not rescued from the sad fate which, I plainly foresaw, awaited her; she perfectly recovered, however, her general health.

The method of operating, recommended by Baudelocque in this higher situation of the head, does not differ materially from that which has been already described as proper after the head has

fully entered the cavity of the pelvis. He strenuously insists on the propriety of applying the blades of the forceps upon the lateral surfaces of the head, and to accomplish this, one blade must be carried under the pubes and the other before the sacrum, inasmuch as the head is placed nearly or quite transversely, with the occiput towards one side of the pelvis and the forehead towards the other. Whether this is an operation, which may be easily or safely performed, does not require much consideration to determine.

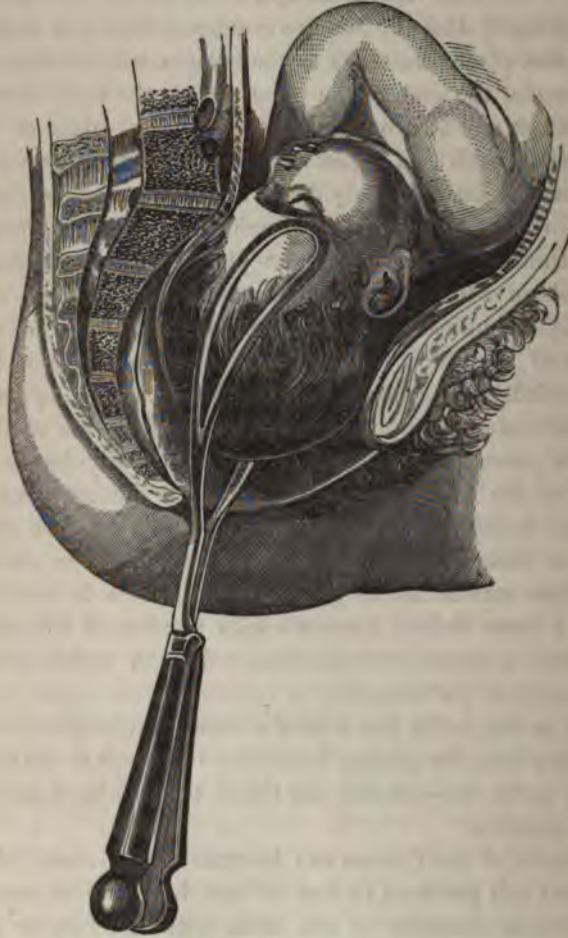
In the first place, inasmuch as the occiput will be almost certain to rotate under the arch of the pubes, when the head clears the superior strait, it will be necessary that the concave edges of the blades be directed towards this region of the head, which presupposes, of course, that we can infallibly discover whether the occiput is towards the right or left side; but such accuracy of diagnosis is not always attainable. In the second place, the introduction of the branch, which is to be placed under the pubes and which is the right or left branch according to the position of the head, is both difficult and hazardous: Baudelocque himself says it "requires care, knowledge and dexterity." This branch is to be introduced, in the first instance, into the posterior lateral region of the uterus, before the sacro-iliac symphysis, until the blade closely embraces the side of the forehead, and then it is to be brought forwards and lodged under the symphysis pubis. To execute this movement, it is pushed over the face and temple of the child by the fingers, that served as its guide, acting on its convex edge and pushing it from behind forwards with respect to the pelvis. In making such a circuit over the head, *within the uterus*, there is certainly danger of its contusing or lacerating that organ, nor are the soft parts at the outlet free from the same risk, for the handle must, at the same time, be greatly lowered—"as much as we can," is the direction given us—causing the shank to push back the perineum as far as possible.¹

The blades of the forceps can be much more easily placed over the occiput and forehead or face of the child, and consequently in the transverse diameter of the brim, with the further advantage that then their concave edges will be turned towards the pubes, and no injurious pressure will be made on the perineum. This is the mode of application recommended by M. de Leurier, and practised

¹ See Plate XI. of Baudelocque, representing the forceps applied in this manner in which the instrument is pushed back so as nearly to touch the os coccygis.

by Drs. Ramsbotham and Simpson, which I have, myself, also, adopted. Dr. Ramsbotham has published a beautiful drawing, showing the application of his long forceps after this manner, a copy of which, Fig. 79, is here exhibited. This figure represents the head in its most usual position, its forehead turned towards

Fig. 79.



Vertex Presentation: first position; the blades of the forceps applied to the forehead and occiput.

the right sacro-iliac symphysis, and the occiput towards the left acetabulum—the blades of the forceps being placed at the sides of the pelvis, one upon the right brow, and the other upon the left side of the occiput. The mode of operating does not differ materially from

that described, as appropriate to the first situation of the head in the pelvic excavation, only the blades of the instrument penetrate more deeply within the maternal organs, and the handles need to be more depressed, in order that the blades may follow the direction of the axis of the superior strait, as they glide over the head. It is not requisite to depress the handle of my forceps so much as that of the French forceps, because the curvature of the edges of its blades is greater, and, for the same reason, it is not necessary to have the patient's nates project beyond the bed, nor is the perineum liable to be contused, or lacerated by the pressure of its shanks.

The patient, then, being placed in the usual position, with her pelvis slightly raised by a cushion of any kind, the left branch of the forceps is to be introduced first, and conducted by the fingers of the right hand, observing to keep the point of the blade in contact with the head, and making sure that it enters the cavity of the uterus, instead of impinging against the utero-vaginal *cul-de-sac*. When fully insinuated, it will be found that the whole of the blade and a part of the shank, are buried in the organs, and the pivot is either perpendicular, or slightly inclined towards the left side. The right branch is next to be introduced in the same manner, and should it happen that its mortise is turned directly forwards, while the left branch looks obliquely to the left side, they may be adjusted, and made to lock, by passing two fingers of the right hand underneath the convex edge of the left blade, and working it over the head towards the pubes, until its pivot is made perpendicular. I have always found it easier to effect the desired apposition of the branches in this manner, than by withdrawing either branch, and re-introducing it.

The prints made by the blades of the forceps upon the child's head, observable after its birth, indicate clearly that one of them is placed upon the eyebrow and the other, behind the opposite ear, as is most commonly the case, or else one is placed upon the root of the nose and the other, upon the occiput. In no case have I ever known the blade reach so high as the face, for the head is, as already stated, much elongated, and it is, in fact, seized by its cervico-bregmatic rather than its occipito-frontal diameter. There is, therefore, no danger of injuring the child's features, and the marking on the eyebrow disappears in a few days after birth.

I have offered my objections to the application of the forceps upon the sides of the head, when it must be delivered from the

superior strait, notwithstanding the sanction of that method by Baudelocque, whose opinions are generally authoritative. It is but fair that the objections of that great accoucheur against M. de Leurie's operative procedure should be considered, and this appears to be the more proper because they have not, as it appears to me, been correctly apprehended by Dr. Ramsbotham. The main objection alleged by Baudelocque, according to Dr. Ramsbotham, is, that "the head being compressed one way, it must be lengthened in the other," and thus the head be more firmly wedged between the pubes and sacrum. But in the paragraph¹ cited by Dr. Ramsbotham, M. Baudelocque only says that this consequence must follow, *if it be true* that compressing the head in one direction, obliges it to lengthen in another, *according to the opinion of M. de Leurie*; which opinion, however, he does not adopt. So far from adopting it, he expressly asserts the contrary, and gives the details of a number of experiments on the heads of children, who died shortly after birth, going to prove that the most powerful compression with the strongest forceps, reducing the diameter to which the instrument was applied by several lines, did not lengthen the head in any other direction. And the conclusion which he reached, was, that the cranial cavity is absolutely diminished in proportion to the reduction obtained by the compressive action of the forceps. When these results of his experimental observations were applied to the question before us, Baudelocque reasoned thus: by the application of the forceps to the forehead and occiput, the length of the head is reduced and the brain compressed in that direction, whilst its breadth is *reduced* at the same time, by the pressure of the sacrum on one side, and the pubes on the other, consequent to its forced descent. In this way, argues Baudelocque, the brain of the child is subjected to a double compression, and the hazard to which it is exposed is greatly enhanced. The argument is irresistible, if it be allowed that experiments made on the dead child, apart from its mother, may elucidate the passage of the living child through the maternal pelvis. But herein consists, as I suspect, the fallacy of the argument of the great Frenchman. Though it may be true that the forceps can diminish the size of the head only in a very limited degree, by the *direct* compression of its blades, whilst the form of the head undergoes no change at all from such compression, yet the *indirect* effects, under the influence of the mechanism of labor, may be

¹ Par. 1804.

very great and such as are well calculated to promote delivery. It is, in truth, doubtful whether any advantage is to be gained by the compressing action of the forceps, under any circumstances of labor. The experiments of Baudelocque show that the greatest possible compression, such as no child could endure and yet live, is capable of reducing the head only in a slight degree, whilst it is too suddenly applied to allow the cranial bones time to yield in such a manner as to protect the brain against the violence. Even in cases of disproportion, then, such as we are now considering, it may be concluded that the action of the forceps is that of a *tractor* rather than a *compressor*, and that, no matter how the instrument is applied, its principal office is to supply the deficiency of the uterine contractions, whilst the head is moulded to the shape and dimensions of the pelvic canal, which it is made to traverse, not by the forceps, but by the pressure of the walls of the canal itself. Inasmuch as the axis of the head is kept all the more nearly parallel with the axes of the pelvis, because of the narrowness of the canal, this moulding must consist in the reduction of all the diameters and the extension of the axis of the head; in other words, it is made to resemble a sugar-loaf, the apex of which is at the summit of the occiput, just as we see it, when it is spontaneously expelled in cases of difficult first labors.

The moulding of the head, spoken of in the preceding paragraph, has taken place, in a greater or less degree, in every case of parturition, rendered laborious by disproportion or by inordinate rigidity of the os uteri; but it is not completed, and hence the necessity of proceeding slowly with the extraction by the forceps, lest the brain of the child suffer from compression, and, what is of more consequence still, the maternal parts be fatally contused or lacerated. Never is it more necessary to be mindful of the axiom—*Sat citò si sat benè.*

2. DELIVERY BY THE CROTCHET—CRANIOTOMY.

This mode of delivery consists in opening the head of the child, and more or less completely evacuating the brain, preparatory to its extraction by a sharp hook, called a crotchet. The operation itself is denominated *craniotomy*, and involves, of course, the destruction of the child, if it be alive when it is judged necessary to resort to so disagreeable an alternative. It is, however, chiefly in

cases of protracted labor, where the child is evidently dead, having fallen a sacrifice to the long continuance of ineffectual contractions of the uterus, that this mode of delivery is resorted to, and then it is preferable to the forceps, because, the bulk of the head being diminished, it can be extracted with less danger of injury to the mother. Under such circumstances, the operation is not only legitimate, but it would be cruelty to the mother to decline it and have recourse to the forceps in its stead. There is reason to fear that aversion to the use of instruments in midwifery, which is so general and which can scarcely be deemed reprehensible, leads many practitioners to defer delivery by the crotchet, not only until the child is dead but until inflammation is actually set up in the genital organs of the mother. No wonder, then, that the results of the operation should be less successful than might have been expected—the statistics collected by Dr. Churchill giving a mortality of 52 in 251, or about 1 in 5, which is less favorable than delivery by the forceps. This excessive mortality must, I think, be attributed to the pernicious effects of procrastination rather than to the operation itself, and it may be hoped that it will be greatly abated by the more general study of auscultation, with a view to the determination of the all-important question of the life or death of the child during labor. Could it be known with satisfactory certainty, in cases of difficult labor, that the child is no longer living, the accoucheur would not hesitate to deliver by craniotomy: this certainty may be attained by auscultation, and then, as a general rule, the sooner delivery is accomplished the better for the mother.

But it is not only in cases of difficult labor, wherein the child has lost its vitality, that it may become the bounden duty of the obstetrician to resort to the perforator and crotchet to procure delivery. It is my firm conviction that a parturient woman may be brought into such an extremity of danger, from which there is no rescue except by delivery, that craniotomy ought to be promptly practised, without staying to institute too nice an inquiry into the condition of the child. Suppose that, in the very commencement of labor, there is an onset of *puerperal convulsions*, which are repeated with nearly every returning pain, the patient becoming less and less sensible during the intervals and the os uteri dilating so slowly that many hours must probably elapse before the child will be expelled by the natural powers, enfeebled by the grasp of the direful eclampsia. Suppose, moreover, that we have vainly essayed to

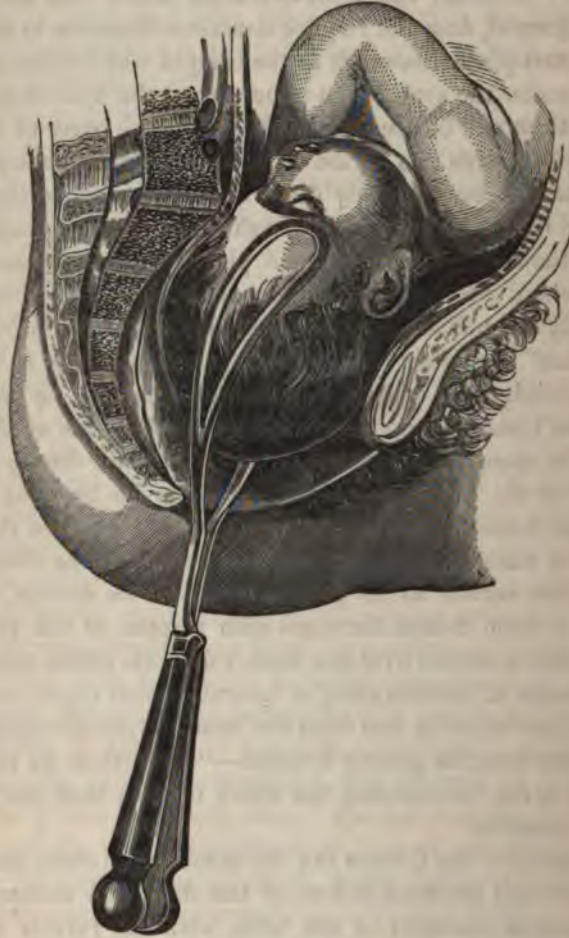
relax its hold by bloodletting, repeated again and again; by purging, by nauseants, by cold applications to the head—in short, by all the means which therapeutics has placed at our disposal—we must either sit calmly by as idle spectators of the fearful struggle, not knowing but that the next fit may overwhelm the patient, or we must interpose and do what we can for her, by lightening the heavy burden under which she is groaning.

Much has been written concerning the *pathology* of puerperal convulsions, and many necroscopic examinations have been made with a view to its elucidation, and yet, except in a few plethoric individuals, where effusion of blood has taken place within the brain, no lesion has been discovered which could satisfactorily account for the fatal termination. The most plausible solution of the phenomena, from the slight commencement up to the completion of the convulsive paroxysm, is afforded by the application of Dr. Marshall Hall's theory of the excito-motory function of the *spinal marrow*, according to which neither the cerebrum nor cerebellum is implicated, but the true spinal system, and more especially the medulla oblongata. Morbid irritation of the uterus as well as of other organs, propagated to this system through the incident nerves, is radiated over the whole of the voluntary muscles and the muscles of respiration; nor do even the involuntary muscles escape, as the uterus and heart. The disease consisting in *morbid irritation* only, of an important branch of the nervous system, emanating in most instances, it is probable, from the uterus and its annexes, it ought not to excite our surprise that the scalpel of the morbid anatomist has failed to discover palpable lesions, commensurate with the violence of the convulsive explosion. The same is often true of many other affections of the nervous system, equally violent and inscrutable, though not so dangerous, as, for example, hysteria and epilepsy, to the latter of which puerperal convulsions are closely akin.

This glance at the pathology of this truly alarming complication of labor may serve to direct our treatment of it. Concerning the propriety of delivery, there has been much difference of opinion among the most highly esteemed obstetric authors—some attaching so much consequence to it as to insist on its accomplishment even before the os uteri is naturally opened, whilst others hold it in such slight esteem as, in a manner, to overlook it, and concentrate their attention on other means of combating the convulsions. Amongst these means, bloodletting holds the foremost place, and is emphati-

by Drs. Ramsbotham and Simpson, which I have, myself, also, adopted. Dr. Ramsbotham has published a beautiful drawing, showing the application of his long forceps after this manner, a copy of which, Fig. 79, is here exhibited. This figure represents the head in its most usual position, its forehead turned towards

Fig. 79.



Vertex Presentation: first position; the blades of the forceps applied to the forehead and occiput.

the right sacro-iliac symphysis, and the occiput towards the left acetabulum—the blades of the forceps being placed at the sides of the pelvis, one upon the right brow, and the other upon the left side of the occiput. The mode of operating does not differ materially from

that described, as appropriate to the first situation of the head in the pelvic excavation, only the blades of the instrument penetrate more deeply within the maternal organs, and the handles need to be more depressed, in order that the blades may follow the direction of the axis of the superior strait, as they glide over the head. It is not requisite to depress the handle of my forceps so much as that of the French forceps, because the curvature of the edges of its blades is greater, and, for the same reason, it is not necessary to have the patient's nates project beyond the bed, nor is the perineum liable to be contused, or lacerated by the pressure of its shanks.

The patient, then, being placed in the usual position, with her pelvis slightly raised by a cushion of any kind, the left branch of the forceps is to be introduced first, and conducted by the fingers of the right hand, observing to keep the point of the blade in contact with the head, and making sure that it enters the cavity of the uterus, instead of impinging against the utero-vaginal *cul-de-sac*. When fully insinuated, it will be found that the whole of the blade and a part of the shank, are buried in the organs, and the pivot is either perpendicular, or slightly inclined towards the left side. The right branch is next to be introduced in the same manner, and should it happen that its mortise is turned directly forwards, while the left branch looks obliquely to the left side, they may be adjusted, and made to lock, by passing two fingers of the right hand underneath the convex edge of the left blade, and working it over the head towards the pubes, until its pivot is made perpendicular. I have always found it easier to effect the desired apposition of the branches in this manner, than by withdrawing either branch, and re-introducing it.

The prints made by the blades of the forceps upon the child's head, observable after its birth, indicate clearly that one of them is placed upon the eyebrow and the other, behind the opposite ear, as is most commonly the case, or else one is placed upon the root of the nose and the other, upon the occiput. In no case have I ever known the blade reach so high as the face, for the head is, as already stated, much elongated, and it is, in fact, seized by its cervico-bregmatic rather than its occipito-frontal diameter. There is, therefore, no danger of injuring the child's features, and the marking on the eyebrow disappears in a few days after birth.

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From the very nature of the disease, and the circumstances in which its attack is made, we should expect that there can be no security for the mother except by delivery. Originating in the peculiar condition of the womb during parturition, nothing but a total change of this condition, such as delivery brings about, can be expected to put a stop to the convulsive paroxysms. With every returning uterine contraction, the equilibrium of the circulation is disturbed, and irritation is propagated anew, from the cervical nerves to the true spinal system, and thus the disease must be kept up, in spite of all the resources of ordinary therapeutics. This is, in effect, admitted by the most sanguine advocates of the lancet, even by Gooch and Dewees, who advise delivery by the forceps, so soon as it is practicable. Now I go a step further, and contend that, when the mother is placed in the fearful jeopardy supposed in the outset of these remarks, it is lawful, nay, it is our imperative duty, to deliver by craniotomy, whether we have complete assurance of the death of the child or not. For this operation, it is not necessary that the os uteri should be so largely dilated as for delivery by the forceps, or even by turning the child, and hence it enables us to evacuate the uterus, and abrogate the cause that sustains the convulsions, many hours earlier than it would be possible to apply the forceps.

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relax its hold by bloodletting, repeated again and again; by purging, by nauseants, by cold applications to the head—in short, by all the means which therapeutics has placed at our disposal—we must either sit calmly by as idle spectators of the fearful struggle, not knowing but that the next fit may overwhelm the patient, or we must interpose and do what we can for her, by lightening the heavy burden under which she is groaning.

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of blood: apparently much relieved; lay quieter; one o'clock P. M., had had two or three fits; very restless; moaned every few minutes; desirous of getting from the bed; bled her 3xij. Examined, and found the head low in pelvis, and delivered with the forceps.

"She had two or three fits after delivery; and remained insensible to everything for forty-eight hours. She now began to show some signs of returning sensibility; was bled twice in the interval; cold was applied to the head, and legs blistered; she was purged freely by senna tea. After this, she gradually recovered her senses. She was left completely blind for two weeks; she then began to see imperfectly, but it was six weeks before she could distinctly discern objects. It may not be amiss to observe the child was living."

In this case, notwithstanding that the patient lost in the first six or seven hours of her illness, one hundred and twenty ounces of blood, and about one hundred and forty altogether, the fits were not subdued or even mollified until she was delivered with the forceps. Dr. Dewees informs us, it is true, that she could not have been ransomed from death by a smaller sacrifice of blood, but others may be permitted to think differently. But it is not this case alone that testifies to the insufficiency of bloodletting to control parturient convulsions; all experience, with only an exception here and there, bears the same testimony, as might easily be shown by a reference to obstetric records. Bloodletting, then, is futile as a remedy for puerperal convulsions; by which, to speak more precisely, I mean, it has no power to arrest them. It is, nevertheless, of great value, and must be considered quite indispensable as a means of protecting important vital organs, particularly the brain, against the dangerous congestions which are consequent to the convulsions, as evinced by the swollen veins and turgid features during the paroxysm. Having depleted to a sufficient extent to put the vessels in the best possible state to bear the stress laid upon them by the successive convulsive paroxysms, the lancet has performed all that it can do, and we must look to other resources for the salvation of the patient. The lancet has performed all that it can, did I say? Nay, verily, it can do more; and, if pushed to an injudicious length, it may redouble the violence of the paroxysms, and assure the destruction of the patient. There is a limit to the detraction of blood, which cannot be transcended even in health, without in-

voking convulsions, and if this limit be unfortunately passed in the treatment of convulsive diseases, so as to superadd this particular morbid effect of excessive loss of blood to the original malady, not all the powers of earth can snatch the patient from her inevitable fate. Let any who may be inclined to distrust this assertion, candidly consult a valuable and instructive paper on "Puerperal Convulsions," in the *American Journal of the Medical Sciences*, vol. xix., by Dr. Denny, of Ellicott's Mills, Maryland, wherein will be found abundant evidence of its truth. Dr. Denny set out with Dr. Dewees' axiom in regard to bloodletting as his pole-star in the treatment of puerperal convulsions; and yet his eyes were soon opened to discover its mischievous effects, and he candidly acknowledges that he bled several of his patients into their graves. It cannot be doubted that like fatal consequences have ensued from its too implicit adoption by other practitioners, who have not had the sagacity to perceive their fatal mistakes, or the moral courage to confess them.

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endeavoring to enforce. It is not recommended to have recourse to craniotomy in every case of parturient convulsions so soon as the operation is practicable. Not so; for it may be that there is no such urgent and instant necessity as to justify the operation. But if it be otherwise, and there are just grounds for our worst apprehensions, whilst, from the tedious manner in which the dilatation of the os uteri is going on, it is wholly uncertain how long we must wait before delivery can be accomplished by the forceps, then the perforator should be used, even if the child be alive. I know that this advice, weighed in the balance of cool and dispassionate reason, sounds harsh, perhaps cruel; but I know, also, that it is in accordance with the utterances of the best instincts of humanity, for I have never known an instance, where the mother was placed in this sad dilemma, and the husband was informed of it, in which he did not instantly cry out, in the genuine language of the heart, "Save the child, if it be possible; but if not, let its life go for the life of the mother. Do anything to save my wife." It is only a whining sentimentalism that condemns such a sentiment.

Fortunately, it does not often fall to the lot of any practitioner to be placed in a position where he is the minister of this natural sentiment: for, however well convinced he may be that he is discharging his duty to God and to man, his situation is a most painful and trying one, for which he can never be adequately rewarded. It may serve to assuage somewhat the poignancy of his feelings to remember that more than half of the children would be born dead, or putrid, even were the perforator not resorted to; and that, of those which are born alive, many are imbecile, and survive the birth only a short time. Thus, only 14 of the 32 children were born alive, whose mothers were attacked with convulsions during labor, in the Dublin Lying-in Hospital, under the superintendence of Dr. Collins, the perforator being used with 8; 25 of the children were still-born in 36 cases of convulsive labor, recorded by Dr. Merriam, the head being perforated in 8; in 26 cases, detailed by Dr. Ramsbotham in his *Practical Observations*, vol. ii., 18 of the children were still-born, besides 3 of which no statement is given; 5 were delivered by the crotchet.¹

As an exemplification of the practice here recommended, I shall make no apology for introducing a case of parturient convulsions to

¹ *Practical Treatise on Midwifery*, by Robert Collins, M. D.

which I was called by Dr. Lewis Rogers, reported in the *Louisville Journal of Medicine and Surgery* for 1838. Though several similar cases have occurred to me, I have not full notes of them. I first saw the patient, Elizabeth Hill, at 2 o'clock in the morning. She was 14 years of age, and had been taken in labor of her first child the preceding evening, and, shortly after labor commenced, was attacked with convulsions. She had frequently complained of headache for several weeks past, and was attacked with vomiting two days before labor set in. The report goes on to say:—

“She had ten or twelve fits before we saw her; pulse, though excited, not particularly full or strong; articulation and intelligence suspended during the intervals; deglutition very imperfect; no marked throbbing of the carotids; countenance changeable, alternately flushed and pale. On examination, the os uteri was found high up, and barely beginning to dilate. She was bled to about 18 or 20 ounces; stimulating saline enemata; nauseating doses of tartarized antimony. The convulsions continuing, in an hour and a half the orifice in the arm was opened, and about half as much blood as at first abstracted. No impression being made on the fits, an effort was made to deliver by turning,¹ the os uteri having dilated considerably, though, as was feared, not sufficiently to allow of delivery. The attempt proved abortive, and the membranes were punctured, with the hope that the relaxation, consequent to the discharge of the liquor amnii, might abate the convulsions. This was done at 6 o'clock in the morning, and we left the patient to procure instruments, directing the continuance of the tartar emetic. Returning at 8, we found the patient worse; pulse between 150 and 200 in the minute, too rapid to be distinctly numbered; convulsions persisting; labor not advancing; the left eye injected; respiration spasmodic.

“It was now determined to deliver, and as the os uteri would not still permit the introduction of the hand, craniotomy was the only resource; the head was opened at the posterior fontanel, and delivery accomplished in a short time without any difficulty; the placenta was thrown down by uterine contractions, or apparently by the struggle of the abdominal muscles and diaphragm, the respiration being very laborious. It being now manifest that she was greatly

¹ The attempt to deliver by version was, as I now think, and as the best writers agree, improper: because the irritation which it excites only aggravates the convulsions, whilst there is but small hope of saving the child by it.

exhausted, she had toddy and several doses of laudanum, of 30 to 40 drops each.

"Two o'clock P. M. There has been no return of convulsions since delivery; the patient has lain quiet, and has not spoken, though there is manifest sensibility; pulse 150, weak; directed tea panada for nourishment, and to take *calomel*, 20 grains at bedtime.

"27th, 8 o'clock A. M. She became restless at 8 in the evening, and continued so all night; the head was incessantly in motion from side to side, on the pillow; medicine had operated four or five times, bringing away small serous discharges, of a yellowish color, mixed with white flocculi; bladder has not been relieved; catheter introduced, and a pint of urine drawn off. Prescription.—The head to be shorn, and have cold applications to it, dry cups to nucha, *calomel* 25 grains, to be followed in six hours by castor oil and turpentine.

"5 o'clock P. M. The patient has had two evacuations, green, and more consistent; intelligent, puts out tongue when requested; has not spoken; restlessness continues; pulse rather improved, though still very feeble; the forehead and cheeks exhibit remarkable redness, ascribed by attendants to chafing by the arms, passed unceasingly over the face; no heat about the head. Prescription.—Catheterized, but little urine flowed; *calomel*, 15 grains, to be followed by oil and turpentine.

"28th, 8 o'clock A. M. Medicine has operated freely, patient much better; pulse 120, soft; intelligence perfect; complains of some pain in the head, and of abdominal soreness; fur on tongue loose; passed urine twice in night. Prescribed *calomel*, 15 grains.

"6 o'clock P. M. Had two small evacuations; tongue still furred; pulse as in morning. Prescription.—*Calomel* 10 grains, *rhubarb* 15 grains.

"29th, 8 A. M. The night was passed quietly, though she slept but little; temperature natural; no headache; slight dry cough, with hoarseness, remains of catarrhal affection which she had before her confinement; bowels moved three times by medicine, dejections green and slimy; has appetite, and desires solid food; urine passed frequently and freely; complains of heavy sensation about the womb, and says, 'the doctors have not taken away her child;' pulse 120, fuller and stronger. Prescription.—Quiet; demulcents; panada and chicken water; genital ablutions.

"6 o'clock P. M. Reported to have had some fever and head-

ache; pulse 125, more feeble than in morning; has had six consistent, green, slimy discharges, through the day. Prescription.—No medicine, regimen as before.

“30th, 9 o'clock A. M. Slept well, complains of some headache; coloration of face diminished, and expression natural; pectoral soreness and annoying cough, with mucous expectoration; no alvine evacuation; urine passed freely; appetite good; no abdominal tenderness on pressure, but complains of the heavy sensation about the womb; pulse 120, stronger. Prescription.—Continue demulcents; more nutritious diet, chicken soup; to have common enema, if bowels are not moved during the morning.

“6 o'clock P. M. She feels much better; no pain in the head; cough less troublesome; tongue cleaning; has slept; bowels moved three times by the injection; discharges more natural; pulse 120, feeble. Prescription.—Continue regimen.

“31st. Continues to mend.

“April 1st. Still improving; pulse 100; bowels free.

“April 2d. Still mending; discontinued attendance; recovered.”

When it is necessary to perform the operation of craniotomy, the patient should be made to lie on the back, with the hips near the edge of the bed, and a piece of oil-cloth must be placed under her to protect the bedding against being wet and soiled by the blood, &c. A vessel of some kind must also be provided to receive the contents of the cranial cavity. But, above all, the woman ought to be put profoundly under the influence of chloroform, not only to nullify pain, but also to allay the involuntary writhing which is so constantly present in the intervals of the fits, and embarrasses the operator. It is, moreover, desirable that there should be no recurrence of convulsions in the midst of the operation, and nothing so effectually controls them as chloroform. Indeed, there is reason to believe that anæsthetics will be found to be the best remedy for puerperal convulsions. “Very recently,” says Dr. Churchill, in his late valuable work *on the Diseases of Women*,¹ “it has been proposed to administer anæsthetics, so as to produce insensibility, in hopes, at the same time, of calming the convulsions; and certainly, so far as we can fairly judge from the cases on record, it appears a most valuable and successful remedy. Dr. W.

¹ A new American edition, revised by the author, with notes and additions by D. Francis Condie, M. D. Philad., Blanchard and Lea, 1857, p. 721.

Channing, of Boston, U. S., has used ether in ten cases; six mothers recovered and three children, a larger proportion than when ether was not used.¹ Mr. Turner, of Mansfield, administered chloroform in a case of convulsion after delivery, with perfect success. When given on the approach of a fit, it arrested it at once. The patient recovered.² Dr. Keith gave it in convulsions during pregnancy. It quieted the fits, and when labor came on, the patient was placed completely under its influence, and kept so until delivery. She recovered well, and with no recurrence of the attacks.³ In a case related by Mr. Morris, it was equally beneficial.⁴ In a case which occurred at Gosport, the inhalation was continued for three hours, after the patient had had thirty-three fits, and the success was complete.⁵ Dr. Shekleton, the late master of the Dublin Lying-in Hospital, has tried it in nine cases; in five the convulsions were completely arrested, and in four they were lessened in intensity and frequency.⁶ Dr. Aldhill has published six cases, in two the fits were arrested, and in four mitigated in severity. M. Braun used it in seven cases, and M. Meissner in one, and all recovered.⁷ Mr. Bolton had recourse to it after bleeding and opium had failed, and with great success.⁸ I have tried it in a case in which convulsions set in before labor, with great benefit."

The operation itself may be divided into two parts: 1st. The perforation of the foetal skull, and the evacuation of the brain so as to allow the cranial bones to collapse. 2d. The extraction of the empty head, and of the body and extremities of the foetus. The instruments requisite for its performance are, 1st, a good perforator; 2d, a crotchet, or sharp hook; 3d, a blunt hook. These are delineated in the annexed figures:—

The *perforator*, represented in Fig. 80, is Smellie's scissors, a front view of the instrument, and a side view of its point, taken from Dr Ramsbotham.

Smellie's scissors differs from the common domestic scissors, in the shortness of the blades, and the greater length of the handles. It has, also, shoulders or rests at the distance of an inch from

¹ On Etherization in Midwifery, pp. 307, 330.

² *Lancet*, Jan. 12th, 1850, p. 53.

³ *Ed. Monthly Journal*, Aug., 1850.

⁴ *Ibid.*, May, 1849, p. 767.

⁵ *Med. Times*, March 23d, 1850, p. 229.

⁶ *Dublin Journal of Med.*, Aug., 1852, p. 100.

⁷ *Medical Circular*, May 2d, 1855.

⁸ *Lancet*, Jan. 29th, 1852, p. 108.

the point, and each blade has two sharp edges by which it cuts, either in opening or shutting. For the operation of craniotomy, the internal sharp edges are superfluous, and accordingly Dr. Den-

Fig. 80.



Perforator.

Fig. 81.



Crotchet.

Fig. 82.



Blunt hook.

man dispensed with them. Either instrument will answer the purpose, but I have most frequently used Denman's perforator, even in cases of impacted shoulder presentation, when it becomes necessary to open the chest, and where Dr. Ramsbotham gives a decided preference to Smellie's scissors. Dr. Wallace Johnson added a slight curve to the point of the perforator, to prevent its pricking the fingers, along which it is conducted to the head of the child, which it is well enough to adopt.

The *crotchet*, Fig. 81, is a beak-shaped hook, with a sharp point, designed to take hold of the bones of the skull to enable us to apply extractive force. Its point should not be too sharp, lest it cut loose from the bones, nor too dull to become infixed in them.

The *blunt hook*, Fig. 82, which is, as we shall find, of service in

many other obstetric operations, may sometimes be substituted for the crotchet, in extracting the head, and is not liable, like it, to do injury to the patient or operator, should it chance to slip.

Many other instruments have been devised to further this operation, such as drills and trephines to make the opening into the cavity of the cranium, and forceps of different kinds, to extract the head after it is mutilated. But I have never employed any of them, and am well satisfied with the old trio—the perforator, crotchet, and blunt hook.

In performing the first part of the operation, the point of the skull selected for perforation ought to be that which is nearest the centre of the os uteri or vagina, whether a commissure be found there or not, and this being determined, two fingers of the left hand, well oiled, must be passed up the vagina until their extremities touch this point. There they are to be steadily held, whilst the perforator is slid along the groove between them, with its point turned from the fingers, until it reaches the skull. The extremities of the fingers are then to be separated to make room for the point and cutting edges of the perforator, which is to be pushed between them by a semi-rotatory motion through the skull to the full depth allowed by the shoulders of the instrument. The operator then takes firm hold of one of the handles by its ring, whilst an assistant takes hold of the other and separates it as widely as may be required to make a free incision in the bone, or in the commissure or fontanel, as the case may be. If the incision be through membrane only, a single one will be sufficient; but if it be through bone, a second incision, crossing the first, ought to be made to give free access to the interior of the skull.

The drawing, Fig. 83, represents the manner of proceeding in this first part of the operation; the point of the perforator is seen penetrating the head, guarded by two fingers of the left hand, and the assistant's right hand has taken hold of one ring of the handle. I have sometimes dispensed with assistance, and enlarged the opening myself, by inserting the first phalanx of the second finger into one ring and the thumb into the other, and then abducting the thumb, in order to separate the handles.

When a sufficient opening is made, the perforator is to be thrust deeply into the cerebral mass, in different directions, for the purpose of breaking it up, and the fragments may then be removed by the finger, if not expelled by the collapse of the bones under uterine

contraction; or the crotchet may be introduced through the opening, instead of the finger, by which the brain may be more completely broken up. The crotchet must be conducted by two fingers

Fig. 83.



Application of the Perforator.

of the left hand to the aperture made in the cranium, observing to turn its beak towards the fingers, and when its work of disintegration is finished, its point should be fixed on the inside of the head, near the aperture. The operator is now prepared to apply extractive force, and in doing so, he must be careful to plant the points of the fingers that had served as a guide, on the outside of the head, opposite to the beak of the instrument, in order to guard against injury to the vagina, &c., should it slip or tear out. The extractive force ought to be gradually and steadily applied during the pains, or at intervals in imitation of them. This hold of the crotchet and the manipulation connected with it are represented in the cut, Fig. 84.

If the bones of the cranium possess considerable firmness, and no

great obstacle to delivery exists, the head may be extracted by this simple hold; but should the instrument tear out, or should there be difficulty in moving the head, other holds must be taken, and such as will accomplish the object with the greatest facility.

The reader cannot have failed to observe that, in delivering by the forceps, the operator is governed, from first to last, by the mechanical laws that preside over the passage of the head; and that his success must depend upon his knowledge of those laws, and his conformity to their requirements. This is universally acknowledged; but it is not so generally known or considered, that, in delivering by the crotchet, close imitation of nature's movements is just as essential to the safety of the operation as when the forceps is employed. To what but to efforts, not imitative but counteracting, can we ascribe the tremendous

difficulty experienced by some practitioners in extracting the head, even after it is perforated, and the brain removed, although no marked deformity of the pelvis exists? I have listened to the recital of cases, in which so much difficulty was encountered, that the operator's own strength and *weight* too were not sufficient to cause the head to *budge* (I ask pardon of Noah Webster), and he was compelled to call upon the midwife to lock her hands around his waist, and be clasped in like manner by a third person, in order that, by "a long pull, a strong pull, and a pull all together," the child might be brought to light! No wonder that we so often hear of those deplorable cases of fistulous communications between the bladder or rectum and vagina, while such barbarous midwifery is tolerated, and men will undertake what they are not qualified to perform.

Practitioners ought not, however, to be severely censured for not

Fig. 84.



Application of the Crotchet.

doing what writers have generally failed to inculcate—the sum of their instructions in regard to the extraction of the head amounting to this: that the crotchet must be infixed wherever the firmest hold can be had, or on some one part without regard to its eligibleness, and the head be pulled along in the direction of the pelvic canal. To show that this is a fair statement of their instructions, let us look into authors, whose writings are most extensively diffused, and have contributed most to fashion the obstetric practice of our day.

Dr. Smellie directs the fingers of the right hand to be introduced above the os uteri and over the head, to conduct the crotchet, held with the left hand, with the point towards the child's head, which is to be fixed "*above the chin, in the mouth, back part of the neck, or above the ears, or in any place where it will take firm hold.*"¹

Dr. Denman directs the crotchet, guided by the left hand, to be carefully introduced into the opening in the head, "and, fixing the point of the hook as far from the edge of the bone as its curvature will allow, I begin," says he, "to pull moderately by the handle held in my right hand, guiding at the same time the hook of the crotchet with the fingers of the left, if it should happen to tear away the bone, or slip."² With his characteristic caution, patience, and perseverance, Dr. Denman would continue to make tractions upon the head by this one hold, upon the principle that a degree of force, inadequate to overcome the resistance at first, will eventually succeed, "the resistance gradually diminishing, and the force remaining." Again, in cases of very great difficulty, where all the bones of the cranium have been brought away successively, and nothing of the head remains but the basis of the skull, with the integuments, Dr. Denman recommends the crotchet to be introduced again, "and fixed upon the basis of the skull, on any part where we can get a firm hold, and this assuming a more convenient direction, will be readily brought down. I have not found, in cases of this kind," he continues, "that I have acted from a preference for fixing the instrument in this or that part, or in this or that manner; but giving myself time to reflect, the exigence of the case has dictated what I ought to do, so that I am not solicitous about any particular method."

According to Dr. Burns, the crotchet is to be introduced through

¹ Midwifery, vol. i., book iii., chap. 3, sec. 7, number 4.

² Introduction to the Practice of Midwifery, chapter xii., sec. 8.

the aperture of the cranium, "and fixed upon the petrous bone, or such projection of the sphenoid bone, or occiput, as seems to afford a firm fixture."¹ Where the pelvis is so small as to require the head to be broken down, and nothing left but the face and base of the skull, he directs, of course, that this remnant be so placed as to bring its smallest diameter through the pelvis, by converting the case into a face presentation, with the root of the nose directed to the pubes.

After stating that the crotchet may be applied either externally or internally, but that the latter, being the safer, is, on the whole, the better mode, Dr. Blundell observes: "I cannot designate or mark out to you, any one particular part of the head, as a bearing point, on which the instrument may be placed; but I may observe, that passing it into the cranial aperture with the right hand, and guiding it with the left, you may move it about *until it fastens on some part*, either of the basis cranii, or of those bones which form the other parts of the receptacle for the brain."² The plain English of Dr. Blundell's direction is, that you must get hold of the head wherever you can.

Dr. Rigby advises that the crotchet be passed into the cranial cavity, and fixed upon *some portion of the skull*, affording a sufficiently firm hold for the purpose, the best spot being the petrous portion of *one or the other* of the temporal bones. We should never, according to him, try to fix it upon the "thin bones," that is, those composing the cranial vault, lest it slip or tear away, and he is equally opposed to Smellie's method of fixing it on the outside of the head.³

Dr. F. Ramsbotham prefers the very hold repudiated by Dr. Rigby, and directs the crotchet to be fixed on the internal surface of the skull, whenever there is sufficient resistance to afford the necessary purchase, advising a finger of the left hand to be kept upon the head externally, exactly opposite the spot on which the extremity of the instrument is fixed within, to receive its sharp point, should it break through the bone, or slip from its hold.⁴

Dr. Lee directs the point of the crotchet to be fixed on the inside

¹ Principles of Midwifery, American edition, with notes by J. C. James, M. D. 1823, volume i. p. 465.

² Lectures, p. 279.

³ Midwifery, p. 260.

⁴ Process of Parturition, new Amer. edition, p. 213.

of the head *behind*, meaning on the part which corresponds with the hollow of the sacrum, at as great a distance as possible from the opening in it made by the perforator, and the fingers of the left hand to be so arranged as to form a double crotchet; and if the point of the crotchet tear away, he advises that it be placed upon *another part of the bones of the head.*¹

But let us look into the work of Dr. Dewees, who had undoubtedly more influence in shaping and regulating the practice of this country, than all the British authorities whom I have quoted. After expending sixteen pages on a critical disquisition, of no practical value, he observes, very briefly, that "the mode of performing embryulcia is sufficiently simple, if we merely regard the opening of the head, and the breaking down the texture of the brain; but the extraction of the bones in a confined pelvis, is replete with difficulty," and then, having explained the manner of opening the head, he says, "the point of the crotchet is to be fastened *in the nearest portions of bone.*"²

It might have been expected that Dr. Dewees, who gloried in being a follower of Baudelocque, would have at least equalled his great prototype, in the propriety and precision of his directions for extracting the head. What says Baudelocque? "To obtain the success we propose, it is not a matter of indifference where the crotchet is applied. In fixing it upon the superior margin of the orbit, or upon the petrous portion of the temporal bone, as the greatest number of ancient and modern practitioners have done, the head is made to advance by presenting its greatest diameter, and is thrown upon the back, or one of the shoulders of the child; it cannot then be extracted without mutilating it, and evacuating the brain, even though its size be not disproportioned to the pelvis. It is upon the occiput that the crotchet must be implanted, when the head is the presenting part, and upon the superior maxillary bone, or the forehead, when we are obliged to use the instrument in cases of preternatural presentations, after the trunk is delivered. In acting thus, we shall cause the head to descend, offering one of its extremities, and only its smallest diameter, throughout the whole of the operation. We must, moreover, have regard to the particular direction which the head should follow, in each of its positions,

¹ Lectures on the Theory and Practice of Midwifery, p. 306.

² Midwifery, p. 561.

in order that the head may traverse the pelvis with the least possible difficulty."¹

I have translated the whole of Baudelocque's paragraph in relation to the extraction of the head with the crotchet, because I believe it is worth more than all that has been written on the subject, and, for one who understands the mechanism of labor, embodies all that need be said concerning it. Its value might be illustrated in a great variety of ways, with one of which only I shall content myself, leaving the thoughtful reader to supply as many others as he pleases. Suppose it becomes necessary to deliver with the crotchet, in a case of occipito-posterior position of the vertex: if the point of the instrument be infixed into the anterior part of the base of the skull, who does not perceive that by drawing upon it, the opposite to nature's movement will be forced on the head? The extra flexion will be defeated, and a degree of extension be produced, bringing the occipito-frontal diameter down into the pelvis first; and, if the mad attempt be persisted in, and brute force usurp the place of skill, subsequently the axis itself of the head. Who can think of the head being thus dragged through the pelvis, without shuddering, and wondering if the bladder and rectum can preserve their integrity, in spite of such enormous violence?

I will only observe, further, in concluding these remarks upon the operation of craniotomy, that notwithstanding the marked preference which most authors manifest for applying the crotchet upon the interior of the skull, it is generally most advisable, in difficult cases, to apply it exteriorly, because we can thus obtain the firmest hold, and apply it more readily to such part of the head as may be demanded by its particular position, and also by what remains to be executed of its mechanism.

The blunt hook may, as already intimated, sometimes be substituted for the crotchet, by passing it through the aperture made in the skull, and acting with it on the cranial vault, but more frequently getting it inserted in the foramen magnum of the occipital bone. It is of use, also, in extracting the shoulders of the child, should there be difficulty in their passage, which the fingers cannot surmount.

¹ L' Art des Accouchements, par. 1924.

CHAPTER XIII.

SPECIAL TREATMENT OF THE SECOND STAGE
OF LABOR, WHERE THE NATES PRESENT.

SECTION I.

MANUAL AID IN NATES PRESENTATION.

THERE is something in a name, and that of "preternatural" having been affixed to nates presentations, has influenced, in no small degree, the conduct of practitioners in their management of such cases. The Father of Medicine considered nates presentation so unnatural that he inculcated, from theoretical considerations, it may be presumed, the practice of turning the child in order that its head may be made to present—an operation which it is easier to describe than perform: *Sunt enim facta verbis difficiliora.*

Practical men, finding it difficult, often impossible, to execute the orders of the venerable father, fain took these presentations as they found them, but convinced of their malignity, lent a helping hand to rid their patients of them as speedily as possible. It is not long since it was the established practice to bring down the feet as soon as they could be seized, and extract the child by drawing upon its legs. Thus, Mauriceau directs that where one or both feet present no other cause for interference existing, the accoucheur should introduce his hand into the entrance of the uterus, get hold of the feet, and bring them out. This is to be done as soon as the os uteri is sufficiently dilated, or not being dilated, as soon as it can be with the fingers; and then he goes on to give directions for the proper performance of the operation of *extracting the child.*¹ In a subsequent chapter,² treating, among others, of breech presentation, he says that when this is foremost, if it be small, or the pelvis of the mother large, it may come forth in this situation, *with a little*

¹ Des Maladies des Femmes Grosses, Livre II., Chapter 13.

² Chapter xxiii.

assistance; for though the child has its body doubled, the thighs, being flexed upon the belly which is soft, find room by its yielding. He hastens to enjoin, notwithstanding, that as soon as it is discovered that the breech is presenting, the accoucheur must not allow it to advance or become engaged in the passage; but he must push it up, if this can be done without any violence, and passing his hand along the thighs to the legs and feet of the child, conduct them one after the other without the uterus, in a careful manner, to avoid seriously twisting or dislocating them—after which the extraction is to be finished as though the feet had come foremost.

An English writer of note, who flourished after Mauriceau, Dr. Burton, of York, the contemporary and rival of Smellie, admitted the possibility of the child being born with nates presentation, but regarding this as "very accidental," he recommends that no reliance be placed upon it, but that "as soon as the operator perceives, by the softness and fleshiness of the parts, what part presents, he must immediately thrust up against the buttocks with all his strength, but without committing violence to the child's os coccygis, or its parts of generation, which are often in this case swelled; and as he thrusts up, he must endeavor to turn the child with its belly towards the os uteri, and then search for the feet.¹

How this *thrusting up with all the operator's strength* is compatible with a due regard for the child's os coccygis or parts of generation, or, what is of vastly more consequence, the mother's parts, we are not told; but it requires no great ken to divine that such barbarous practice must be productive of the most direful consequences. Mauriceau is much more guarded in his instructions; the breech is to be pushed up, if it can be done, he says, *without any violence*; but he owns that it is sometimes so advanced in the passages, that to attempt its repulsion would endanger the life of mother and child. In such cases, he advises allowing it to progress, with such assistance as can be rendered, and even makes the following further observation, that "there is often less danger in permitting the child to advance in this posture than in hastening its extraction before the passage is sufficiently prepared and dilated; for the way not being open, and the head of the child remaining on this account longer in the passage, after the body has been with difficulty delivered, there is greater risk of suffocation, than where the parts are dilated by the breech which has come foremost."

¹ New and Complete System of Midwifery, sect. 88. 1752.

The practice, indicated by Mauriceau as *often* advisable, is that which is now justly deemed *universally* appropriate, except it be necessary to interfere on account of exhaustion, flooding, convulsions, etc. All are now agreed that in nates presentations, whether the breech or feet be foremost, the labor should be confided to nature until the hips are expelled, or the child is born as far as to the umbilicus. Concerning the further management, however, there is not the same accord. "When the umbilicus is expelled, I say, Nature! you have done your work; I must now begin mine—so I grasp the breech with a napkin, and proceed to extract carefully, but as fast as I can, working from hip to hip. As soon as the body is born, bring down the arms; pass up your finger from the shoulder to the elbow, and pressing it towards the chest, bring down the forearm, making it sweep over the face; lift up the body of the child, and extract the other arm in the same manner; the arms being brought down, pass up one or two fingers on the breast of the child, and introduce them into its mouth; press the chin down to the breast; with the other hand raise the child towards the pubes of the mother, extracting, at the same time, in the direction downwards and forwards; the delivery will thus be readily accomplished."¹

Such is the instruction of the late Dr. Gooch, delivered in his usual quaint style. He had just before directed that, when the feet are protruded, if the toes are turned towards the pubes of the mother, a napkin must be wrapped around them and as much of the child as may be, to enable the accoucheur to lay firm hold of them for the purpose of turning the toes to the nearest sacro-iliac juncture. This is done to insure the turning of the face into the hollow of the sacrum, when the head engages in the pelvis. A more recent British writer, Dr. Lee, recommends the same practice: "Except supporting the perineum," says he, "nothing is required in a great proportion of these cases, before the nates and lower extremities have been expelled, when it becomes necessary to ascertain precisely the relative position of the child to the pelvis; to rectify this if it is unfavorable, and artificially extract the superior extremities and head, to prevent the fatal compression of the umbilical cord." It is needless to multiply quotations on this point; suffice it to say, such is the general current of British prac-

¹ Practical Compendium of Midwifery, edited by George Skinner, Philadelphia 1832, p 209.

tice, since the time of Smellie. It rests, it will be perceived, upon the supposition that the natural resources are only adequate to the accomplishment, in a safe manner, of less than half of the process of childbirth when the nates present. Such a supposition is not supported by observation, which teaches indubitably that not only may the child be expelled by the unaided contractions of the uterus, but that where this takes place, the chances of its being born alive are greater, and the risk to the mother is less, than where art interposes and pragmatically turns nature out of doors. *Natural delivery, in all cases, is preferable to artificial*, but in none more than in nates presentation. Its advantages have been clearly set forth by M. Nägele, in the essay to which reference has been so frequently made. They consist, first, in the chin constantly remaining pressed on the breast during the passage of the head through the pelvis—which is greatly facilitated thereby; secondly, in the arms continuing pressed upon the breast, and being born with it; thirdly, in the soft passages being dilated so slowly, by the gradual advance of the child, as to oppose less resistance to the head as it follows; fourthly and lastly, in the contractile power of the uterus being better sustained, when the organ is emptied by its own exertions, its walls being kept in contact with the child's body. From these considerations, it is evident that the manual extraction of the child, in nates cases, is much more an artificial procedure than delivery by the forceps in vertex presentations; and the conclusion is irresistible, that before it is undertaken, we ought to be well persuaded of its necessity. Now, the ground of our interference is the safety of the child, and if it be not perilled, there is no need of our efficient and officious aid. We can, at all times, keep ourselves informed as to the state of the child, by attending to the pulsation of the cord; if this be strong and regular, it is in no danger, however long its expulsion may be delayed; if, on the contrary, this be feeble and nearly extinct, it is in imminent danger, and its release ought to be procured, with as much haste as is consistent with a proper regard for the safety of the mother.

Nor is there any necessity for grasping the child's inferior extremities or hips, when its abdomen is turned towards the anterior parts of the mother, and forcibly turning it round to give it a posterior look: such a manœuvre is not free from danger, as the head may not follow the revolution of the body, which then causes fatal torsion of the neck; nor is it at all necessary, because it generally

executes such a turn spontaneously, or, if necessary, this may be insured by the slightest imaginable assistance, simply by drawing gently on the leg or hip that is anterior, in concert with the pains.

Notwithstanding I have deprecated the rendering of aid in nates cases, merely on account of the presentation, I am thoroughly satisfied that assistance is more frequently requisite in these than in vertex cases. What we might have expected, reasoning *a priori*, experience has confirmed: the parturient powers not being so efficiently exerted, the labor is generally more protracted, in all its parts, and may be so long delayed as to require the interposition of art, upon the general principles that should govern our management of all labors. Thus, it is more frequently necessary to promote the dilatation of the os uteri, in such manner as the circumstances of the case may demand; the breech much oftener needs to be helped along, than the head; and after its extrication, the *superior* parts of the body oftener require to be assisted in their passage than do the *inferior* parts, after the head is extricated in vertex cases; and all this may be demanded, not less for the mother's than the child's safety. This accords with the experience of Madame Lachapelle, who states that to give aid, in coincidence with the natural efforts, is almost a general indication to be fulfilled in these cases. Let it be observed, too, that the aid we are contemplating must be strictly in subordination to the natural efforts; we must be content to follow, without aspiring to lead, nature.

Should it become necessary to *promote* delivery, then, nothing having occurred to justify us in *forcing* it, or making it essentially artificial, it can never be proper to bring down the feet where the breech is the presenting part; but we must limit ourselves to the use of such extractive force in aid of the pains, and always in concert with them, as can be safely employed. Two fingers, passed over the groin of the child, can make as powerful traction as is commonly necessary, and this method of assisting is preferable to the blunt hook, which is apt to inflict serious injury upon the child, and may fracture the thigh. The mechanism of labor points out the proper mode of operating with the fingers; it consists in closely following the steps of nature. If the breech has not entirely traversed the superior strait, so as to occupy the pelvic cavity completely, the fingers should act upon the groin that is anterior, or alternately upon it and that which is posterior, but chiefly upon the former, because in so doing, traction is made in the direction of the axis of the superior strait. But when the inferior strait only re-

mains to be cleared, traction must be made upon the groin that is posterior, in order that the force which is exerted may be in the direction of the axis of the inferior strait. After the hips are born, they should be embraced by the hands in such a manner that the thumbs may rest upon the lower part of the spine, and be alternately raised and depressed, as the tractive efforts are continued, which is expressed by the phrase, *working from hip to hip*. When the umbilicus is liberated, a loop of the cord must be brought down to free it from injurious extension, and, if the arms are carried up alongside the head, they must be brought down separately, commencing with that which is situated posteriorly, by passing two fingers along the humerus, as near to the elbow as possible, and depressing them over the face and breast of the child; and, finally, when the head is brought into the excavation, the right hand is to be introduced along the sacrum, and two fingers passed into the mouth to flex the head by depressing the lower jaw, while the left hand makes tractions upon the shoulders of the child. The body of the child, resting upon the right arm of the accoucheur, is to be considerably elevated towards the mother's abdomen, while the head is being extracted by the hands, placed as already indicated.

It has been already stated that it is not unfrequently necessary to assist, in the manner thus briefly described, in cases of nates presentation; and that our assistance should co-operate with the labor-pains. If we are careful to abstain from making tractions in the intervals of the pains, the delivery, though assisted, may be perfectly *natural*, that is, the arms may remain crossed on the breast, and the fundus of the uterus pursuing the child, may keep its head well flexed, so that but little force need be exerted by us; and when the child is born, the womb may be firmly contracted, and the woman in no more danger of accidents of any kind than after the most ordinary delivery. It is very different when nature is unceremoniously set aside, as recommended by Gooch and others; then the delivery is necessarily *unnatural*; tractions made in the absence of pain, draw down the body, while the arms maintain their position, and come to be placed alongside the head, or the body being twisted around to throw the face towards the sacrum, the arms are placed behind the occiput; and when the head is pulled into the pelvis, it becomes extended, and must be re-flexed before it can pass through; but, above all, there may be an increasing vacuity of the uterus, as the withdrawal of the child is going on, and the organ may be left in a flaccid condition after delivery.

But although I have condemned artificial delivery, in anticipation of danger to the child, I have admitted that it is proper when danger actually threatens it, as we are warned by the languishing state of the umbilical circulation. It must be allowed, moreover, that there is not any valid objection to hastening the exit of the head in all cases, if it be much delayed, because it is but partially contained in the uterus, and if the labor have been natural thus far, there is but small risk of any evil consequences to the mother. The extrication of the head may be greatly aided by the voluntary efforts of the patient, even more than by the uterine contractions; she should, therefore, be reminded to bear down or strain, and such an effort is often alone sufficient, if the disposition of the head is favorable to its egress. If, in spite of the united efforts of the patient and practitioner, the child be endangered by the long retention of the head, it may be succored for a considerable time, by raising its body, and passing the hand along the sacrum above the mouth, and pressing back the perineum so as to enable it to breathe. M. Gardien avers that he has often witnessed the success of this precaution, in establishing respiration and saving the child, notwithstanding such compression of the cord as would otherwise have been fatal to it.¹ Other authors, among them Dr. Meigs,² testify to the same effect; I cannot, therefore, think it judicious or proper to adopt the counsel of the last named gentleman, to send for our forceps whenever we discover that the nates are presenting, that we may be prepared to extract the head instrumentally as promptly as he recommends; for, although it may not be difficult to use the forceps in such a case, instruments ought not to be resorted to under any circumstances where the hand may supersede them, as I believe it always may, in the case under consideration, provided it be properly employed, that is, provided the entire hand, and not merely two fingers, as commonly directed, be introduced over the chin.

If the reader will turn back, and inspect Fig. 67, on page 362, it may assist him in getting a clearer idea of this important piece of manipulation. While one hand is seen to be spread over the face, to act upon its various points, the other is applied to the nucha and occiput. With the extremities of the index and medius fingers, the occiput may be pushed up, while the chin and face, on

¹ *Traité Complet d'Accouchements*, tom. ii. p. 328.

² *Philadelphia Practice of Midwifery*.

the other hand, are pulled down, for the purpose of flexing the head as much as possible. At the same time, traction is made by the hand on the face, and by the thumb and ring and little fingers, on the shoulders. It is difficult for the head to resist this combined movement, aided by strongly raising the body of the child on the forearm. Within the last twelve months, I promptly extracted the head, thus circumstanced, by this manceuvre, although it had hung in the pelvis for three or four hours, and baffled all the efforts that had been previously made to release it.

SECTION II.

. INSTRUMENTAL AID IN NATES PRESENTATION.

When the head is engaged in the pelvis, with the face towards the pubes, it must be confessed that it is much more difficult to extract it with the hands. The entire hand can hardly be introduced behind the pubes; but a finger may be inserted in the mouth, and all the fingers of the other hand may be introduced above the nucha, to push up the occiput, while the chin is drawn down. Should this manceuvre fail, we may attempt to turn the face into the hollow of the sacrum, in the manner that will be explained and illustrated in the chapter on Shoulder Presentations.

It is in such a vicious position of the head only, as I conceive, that it might be better, without wasting time in manipulations, to have recourse to the forceps, especially if the child be alive; and the mode of operating with it is well exhibited in Fig. 85.

If the child may be withdrawn with greater precipitancy than is altogether consistent with what is safest for the mother, when its life is in peril, much more may we extract it by such means as are not safest for it, when this is demanded by the condition of the mother.



Fig. 85.
Nates Presentation : face to the pubes : application of the forceps to the head.

If the labor be, therefore,

so protracted as to end in exhaustion, or if convulsions, or any other threatening accidents supervene, in nates cases, we shall be justifiable in resorting to instruments, provided manual assistance be not sufficient. For the purpose of extracting the breech, the blunt hook is commonly preferred, but I am not sure that it is safer for the child than the forceps. Against the latter, it is objected that the extremities of the blades may rest on the abdomen, and contuse its viscera. But such a consequence is not necessary or inevitable, and we know that the blunt hook has terribly contused the groin and fractured the thigh bone, according to the candid

Fig. 86.



Nates Presentation : application of the blunt hook to the groin.

admission of its advocates. The most that can be said in favor of the blunt hook is, perhaps, that it is safer for the mother; and if a practitioner is persuaded that he can use it with the least risk to her, it is his duty, when he is acting for her benefit, to prefer it.

I have no intention, however, to propose any innovation on the established practice in such cases, and certainly if the child be dead, or if the risk to the mother be imminent, the blunt hook is the proper instrument, as it can be more easily and expeditiously employed. The student will see how it operates, by inspecting the drawing, Fig. 86.

I will only further observe that, if the child be dead, as certified by the cessation of pulsation in the umbilical arteries, and much more, by the peeling of the cuticle, and the absence of all motion, we may avail ourselves of the blunt hook to bring down the arms, and to extract the head.

CHAPTER XIV.

SPECIAL TREATMENT OF THE SECOND STAGE
OF LABOR, WHERE THE FACE PRESENTS.

WHILE face presentations were regarded as essentially bad or pretornatural, they were supposed to require the effective interference of art, for the safety of both mother and child. Thus Baudelocque, who entertained such an estimate of their character, enjoins, as a general indication, the redressing of the head, by pushing up the face or pulling down the occiput, to cause the vertex to present; or, when we cannot thus happily second the efforts of nature, either because we are called too late, or there is pressing occasion to deliver immediately, the turning of the child, and bringing it by the feet, or extracting it with instruments, when it is deeply and closely engaged in the pelvis.¹ Baudelocque was, however, fully aware that the head may be spontaneously transmitted in face positions, and he describes, accurately, their mechanism; but it must be considered a striking proof of the baneful influence of prejudice, that notwithstanding this knowledge, and the further observation made by him, that the labor in these cases is sometimes finished with "astonishing facility," he continued to adhere to the general indication above enunciated. Why was M. Baudelocque astonished at the occasional facility of parturition in face presentations—but because he had prejudicated that they must be difficult?

Some animadversions upon the several items, embraced in this general indication, may assist us in settling our duty in the management of the cases under consideration.

¹ Par. 1347.

SECTION I.

MANUAL AID IN FACE PRESENTATION.

1. THE REDRESSING OF THE HEAD.

1. *The Redressing of the Head when the Face is fully presenting.*—With regard to the method of fulfilling this indication, it may be observed, that most authors, before the time of Baudelocque, directed several fingers to be applied to the chin, root of the nose, or cheeks of the child, for the purpose of simply pushing up the face, in order that the occiput may descend. But Baudelocque preferred acting upon the occiput, and bringing it to the centre of the pelvis, by curving the fingers and advancing them over the surface of this part of the head, even as far as to the nape of the neck. The lever is, also, recommended for the same purpose. Baudelocque's experience authorized him to declare, that this manœuvre may be executed without much difficulty, *when the head is still free at the entrance of the pelvis, or susceptible of being easily returned thither*; and other experience, that might be cited, corroborates his. But when these favoring conditions exist, we should not now feel at liberty to *redress* the head, as we do not believe that it is laboring under any grievous wrong. Face presentations are brought, by the unaided efforts of nature, to a satisfactory issue, so constantly, as regards the mother, and in so large a proportion of cases, as regards the child, that we should not, in anticipation of difficulty, be justifiable in causing the mother to experience the suffering and incur the risk of the operation, however slight that may be considered.

When the face has become fully engaged in the pelvis and is so closely confined there, either by its own magnitude or the strength of the tonic contraction of the uterus, that it cannot be easily pushed up above the brim of the pelvis, the redressing of the head ought, in my judgment, to be considered as out of the question. Baudelocque admits that it is always difficult, often impracticable. Why, then, attempt the operation under such circumstances, with the prospect of failure and the serious risk of injury to the mother? If the face be without the os uteri, or even if it be within it, but firmly grasped by the cervix, this *pushing up* is fraught with danger, for it may lacerate the cervix, or rend its connections with the

vagina. Yet, it is evident, the head must be lifted out of the pelvis, preparatory to its rectification, because it will be impossible to see the axis of the head in the pelvic excavation—its dimension, to say nothing of the thickness of the fingers interposed between it and the pelvis, being too great to allow such a movement. Should labor, therefore, be arrested in this stage of its progress, or any symptoms be developed, making it necessary to deliver, some other method must be had recourse to.

2. *The Redressing of the Head when the Face only partially presents.*—When the face only partially presents, it must be considered an instance of original vertex presentation, in process of conversion into complete facial presentation. If its conversion is arrested or retarded by any cause whatever, whether on account of rigidity of the neck, or inefficacious contraction of the uterus, it may prove a serious or insurmountable obstacle to delivery, for the longest diameter or the axis of the head tends to engage in the pelvis. In this case, Baudelocque advises us to sustain the forehead, with several fingers pressed against it, during every pain, in order that the natural efforts may act on the occiput and cause it to descend, cautioning us to beware of pressing on the anterior fontanel and vicinity, for fear of inflicting fatal injury on the child, by depressing the bones, which are here very thin and flexible. By this simple procedure, he represents it as an easy task to prevent the head from assuming such a vicious position as it engages in the pelvis. Should the head have taken up this vicious position, it is still by the same method, that he proceeds to redress it and restore it to its natural march; and if this alone prove ineffectual, he introduces the index and middle fingers of his other hand above the occipital protuberance, to cause it to descend, by drawing towards himself as though he were using blunt hooks.

Dr. Dewees treats of this case, in a very instructive manner, under the style of the "chin departing too early from the breast." He considers it as it is observed at two different periods of labor, "first, where the head has not descended entirely into the lower strait; and second, where it occupies the lower strait." In the first situation, he recommends acting upon the forehead with the fingers, after the manner of Baudelocque; but in the second, more especially if the head have escaped through the orifice of the uterus, he thinks it essential to success to employ the hand to raise the whole head, "that we may be certain of keeping the forehead sufficiently

high to permit the vertex to descend;" and then the fingers are to be applied to the forehead, as in the first situation. A case related by him shows, in a very striking light, the value of a correct knowledge of the mechanism of this case, and of sound principles in obstetric practice. I beg leave to commend the case to the reader's careful perusal, but at the same time to question the necessity or safety, in less dextrous hands at least, of the particular manipulation practised by Dr. Dewees. As to the safety, I have already expressed my aversion to raising a head escaped from the uterus; and the necessity of it, in this particular instance, is not very apparent, for the forehead can be raised or the occiput drawn towards the aperture of the pelvis, if it may not be brought any lower, and the malposition be thus rectified without preliminary elevation of the head. If the face, presenting fully, have become closely engaged in the pelvis, and it were deemed proper to redress it, it must, we have seen, be raised above its brim as a necessary preparation, because the axis of the head cannot be see-sawed in the excavation; but not so, in the partial facial presentation—because although the head engages with its axis lying across and above the pelvic entrance, the axis itself, or the longest diameter of the head, does not become actually engaged; or if it does, there is no reason why it may not retreat as well as advance.

Madame Lachapelle declares, as the result of her experience, that the forehead cannot be hindered from descending, or be restored after it has lapsed, by the mere pressure of the fingers against it—such puny opposition being altogether insufficient to resist the combined effort of the uterus and abdominal muscles. She advises us, therefore, to promote rather the descent of the face, as it is easier to reach and act upon the chin than the occiput, and in so doing, she thinks, we only promote the natural proclivity of the head.¹

This counsel deserves to be remembered, and ought to be acted upon whenever pressure against the forehead is abortive and there is difficulty in reaching the occiput; to slight it would be inconsistent with our improved knowledge, and proportionate diminished dread, of complete face presentations.

¹ *Pratique, etc., Mémoire cit.*

2. VERSION OR TURNING THE CHILD AND DELIVERY BY THE FEET.

Among the conditions requisite for the safe performance of this operation, in any case, there is one of paramount importance, viz., *the presenting part must not have passed the uterine orifice, nor come to occupy fully the pelvic excavation.* In the first instance, the cervix uteri is contracted above the part which has escaped, and in attempting to return it, there is danger of rupturing the womb; in the second, the uterus is contracted so closely about the child, if the membranes have been ruptured and the liquor amnii discharged, as is commonly the fact, that there is still danger of rupture or other serious injury, in pushing the presenting part above the brim, an indispensable preliminary to the introduction of the hand. Looking to the interests of the mother, we ought not, therefore, to resort to version at an advanced period of labor in face presentations; and we should as little think of it, at an early period, viz., as soon as the os uteri is dilated, and shortly or immediately after the rupture of the membranes, when it may be most safely performed, because, as already stated, this would be groundless anticipation of difficulty. Turning, then, can seldom, if ever, be necessary or proper in these cases, for the safety or advantage of the mother; accordingly, Madame Lachapelle, who seems to have had a *penchant* for the operation, pleads the danger to which the child is exposed, in justification of her frequent resort to it. "In my table, will be found," says she, "*forty-one* spontaneous deliveries in *seventy-two* face positions; the remainder were terminated by art; it is to be observed, though, that this great proportion of artificial deliveries was not owing to any difficulty of labor or danger of the mother, but of the child." Her rule was, to deliver when the child is brought into a suffering or critical condition, which she judged to exist by the cessation of the movements of its tongue and jaw, and the increase of congestion. The child is not, however, often in jeopardy, until the expulsion has advanced so far as to make it more or less perilous for the mother to deliver by turning; and under these circumstances, the prospect of rewarding her for the risk, by presenting her with a living child, as the fruit of the operation, is too slender to reconcile us to it. I know, indeed, that in the table referred to, Madame Lachapelle gives *seventeen* living and *three* dead children, as the result of version in twenty cases; but in

less skilful hands, and among general practitioners, the chances of success are not near so great; and it is doubtful whether one-half would be brought into the world living, or long survive the injuries received by the way. We are not told how many of the mothers lived to enjoy the triumph of obstetrical art (a capital defect in the table), but it appears to be pretty well established that more women die from parturition and its consequences, in French, than in British or American practice; and, with our views of the comparative value of the lives of mothers and unborn children, we should say, that if one of these twenty women died, in consequence of the mode of delivery, the redemption of the seventeen children, or rather, as many of them as would have been lost by other management, was too dearly purchased.

From what has just been said, it may be inferred that version is not a favorite resort with me, in face presentations, under any circumstances; and I will take the present opportunity to declare, as my own opinion, that it is seldom defensible, for any reasons whatever, where the vertex presents. In such cases, it is the most artificial of all the modes of delivery, with the single exception, perhaps, of the Cæsarean section: it subverts the purpose of nature, in the first place, by repelling the part which she so much prefers advancing, and then substitutes, to a greater or less extent, mechanical tractions for the vital agencies which she has appointed to preside over childbirth. When art has tasked her utmost ingenuity, the product is but a poor imitation of nature, in one of her most important vital functions—that which is designed for the propagation of life itself; the child may, indeed, be torn from its repository, but if the regular series of vital actions, which should have changed its habitation, be rudely interrupted, there is no estimating the pernicious consequences, immediate and remote, which may result to the mother.¹

¹ Experience continues to strengthen my aversion to turning in presentations of the cephalic extremity of the child, whether of the face or vertex. I am more and more convinced that the occasions are rare, indeed, which can justify the accoucheur in such a revolutionary interposition, as repelling the head from the pelvis, and dragging the feet down to take its place. Since the publication of the first edition of this work, a deplorable case of fatal rupture of the uterus came under my observation, produced by version practised for presentation of the face. In this instance, though the version was effected by the practitioner in attendance, before I saw the patient, yet the moribund mother could not be delivered:—the head of the child hanging in the pelvis, after the extrication of its body and limbs, nor could I extract it by art, or by force. The mother died in this predicament. I remember a parallel case, so far as the impossibility of delivering the head is concerned, which happened many years ago. A lady, the mother of a large family

SECTION II.

INSTRUMENTAL AID IN FACE PRESENTATION.

THE FORCEPS OR THE CROTCHET.

When the face has advanced so far in the pelvis, and the uterus is so closely contracted about the child, as to preclude turning, even were we disposed to resort to it, the forceps affords the proper means of delivery, if the child be alive, or the crotchet, if it be dead. It is hardly necessary to observe that the forceps is not called for, *because* it is a face presentation; though this may, for the reasons already given, more frequently require it than the vertex, but because the labor can no longer be intrusted to nature, safely for the mother and child. It is to be resorted to, therefore, upon the gene-

of children, was attended by a midwife who administered the ergot of rye, to hasten her final labor; rupture of the uterus ensued within an hour afterwards; and a physician was called, who had me sent for. On examination, it was discovered that there was a large laceration of the womb, through which the child had escaped into the cavity of the abdomen. I immediately passed my hand through the rent, got hold of the feet of the child, and brought them out of the vulva. By tractions made in the usual way, the body and arms were delivered; but, by no efforts could I, or the practitioner first summoned, succeed in delivering the head. As the mother was dying, and could live but a few moments, it was concluded to decapitate the child, rather than leave it in so unseemly a plight. What retained the head in these cases? Before answering the question, I would observe that it is generally agreed by writers that, in cases of rupture of the uterus, the child escaping into the abdominal cavity, it is proper to pursue it with the hand, and extract by the feet. But none of them, so far as I remember, seem to have experienced any difficulty in delivering the head, or if they did, it is not mentioned by them. Now, if the difficulty in question has never occurred to any other but myself, the fair inference is that the explanation of it is to be found in my awkwardness and want of skill. But as I am not willing to admit this, though not, as I hope, over-vain, I will venture to suggest that contraction of the uterus may be the cause of the detention of the head. Notwithstanding its rupture, the uterus may be excited to contraction by the introduction of the hand, and the extraction of the child. Should contraction come on immediately after its body and arms are brought back through the rent in the uterus, the aperture must, of course, be diminished, and may be so small as tightly to embrace the child's neck, and exclude the head.

To return from this digression. In the text, I have expressed my doubt whether, in general practice, one-half the children could be brought into the world alive, by the operation of version in face presentations. I am now disposed to go further, and to give it as my opinion that so few children, thus ushered into the world, long survive their birth, that recoveries may be reckoned exceptions to the rule. If, then, there be so little likelihood of saving the child, and so great risk of destroying the mother, by turning, in face labors, who will have the hardihood to undertake it? Or who can excuse himself to his own conscience, should the issue be disastrous?

ral principles that govern us in vertex cases, which it would be but reiteration to discuss here. But with regard to the manner in which the head is to be extracted, it may not be amiss to advert to a singular and gross mistake committed by Dr. Dewees. This appears to be the more necessary, because his writings are in the hands of all practitioners in this country, and are the guide of not a few.

Dr. Dewees directs, very properly, that the blades of the forceps be applied over the ears, and then erroneously observes that "they must be so applied that the concave edges must look towards the hind head, which must be brought under the arch of the pubes, and not the chin, as directed by Smellie."¹ If he had not been so careful to forbid what is right, we should have supposed that his inculcation of what is wrong was a *lapsus pennæ*, or a typographical error.

Now, in no case is the precept, to deliver in accordance with the mechanism, more obligatory on the practitioner than in face presentations. How strong the tendency of the chin towards the pubes is, we have seen, and, also, how essential its revolution thither, rather than into the hollow of the sacrum, which raises almost an insurmountable barrier to the head's expulsion, and for-

bids the hope of extracting the child alive by the forceps. Smellie understood these cases much better than Dr. Dewees. In one of his cases² where he found, when called by a midwife, the anterior fontanel at the pubes and the mouth and chin towards the sacrum, and where the womb was so strongly contracted as to defeat an effort to turn, he applied the forceps and endeavored to bring the head lower down; he then tried to turn the chin, first to one side and then to the other—which he finally succeeded in accomplishing by first raising the head in the pelvis—and eventually brought it out under the pubes, safely for the child as well as the mother. In his next case,³ he

Fig. 87.



Face Presentation: second position; application of the forceps.

¹ Midwifery, fifth edition, p. 313.

² No. IV., Collect. XXX.

³ No. V., Collect. eadem.

extracted the head with the forceps, truly, as he found it, viz., with the chin to the lower part of the sacrum, though a little to the left side; but the woman had been long in labor, the face was so low down as to protrude the external parts in form of a tumor, and she was delivered of a *dead* child. The application of the forceps in face presentation is correctly delineated in the drawing, Fig. 87, copied from Cazeaux. The face is in its second position, and the blades are placed towards the pubes and sacrum, with their concave edges directed towards the chin, which is brought forwards in the process of extraction. Should rotation have already taken place, when the forceps is to be applied, the operation is the same as in our first *situation* of the vertex.

General Conclusions.—From this discussion, it may be concluded that, in full face presentations, we are neither to redress the head, nor turn, nor use the forceps, merely because the face presents: it may, then, be inquired, is any special treatment demanded in such cases?

It has been supposed that great vigilance is necessary, on the part of the accoucheur, to prevent the chin from rotating towards the hollow of the sacrum, and to insure its turning under the pubic arch. "To give all possible aid and assistance to nature, in her attempts to turn the chin towards the front of the pelvis," is inculcated by Professor Meigs as the prime duty of the medical attendant in these cases. Again he says, "the great doctrine," in all face positions, is to bring the chin to the pubic arch: "there are," he continues, "two positions, in which the chin naturally tends to the arch, if the position be just and good; or it may tend to fall into the sacral curve, if it be not just and good."¹

Such solicitude about the destination of the chin appears to me altogether unnecessary; the pubic arch is prescribed for it by nature, and, as a rule that has very few exceptions, thither it tends and will be ultimately landed. It is fortunate for the parturient woman that there is this strong natural proclivity; for it is exceedingly doubtful whether it is at all in our power to control the movement of the chin, by any force that can be exerted by the hand, and we should be loath to use instruments for such a purpose. With due deference for the opinions of Professor Meigs, I would, therefore, say, that to have all reasonable confidence in the

¹ Philadelphia Pract. Midwifery. Chapter on Face Presentation.

ability of nature to accomplish what she proposes, is our first duty in these cases. The labor should be allowed to take its course, just as in vertex cases, unless palpable necessity of assistance should be developed during its progress, and then more efficient aid than can be given by the fingers, attempting to direct the course of the chin, will be required—the head must be extracted by the forceps.

The precaution that is to be observed in supporting the perineum, when the face is about emerging, is another item of special treatment, which Madame Lachapelle thought of sufficient importance to be attended to. "In sustaining the perineum," she remarks, "it must be remembered, that the chin is engaged in the arch, that the anterior part of the neck is pressed against the posterior face of the pubes, and that the throat rests upon the border of the arch, as its prop. We must be careful, therefore, not to push strongly upwards and forwards, whereby the danger to which the child is exposed would be greatly enhanced: the head must be simply *sustained*, and not pushed."¹ The injury which Madame Lachapelle apprehends might be inflicted on the child, is, of course, contusion of the superior part of the neck, where it is pressed against the inferior border of the pubic bones, which appears to me imaginary. The face can only be released by undergoing flexion; and of this movement, the guttural region of the neck being the pivot, considerable compression, and some contusion of it, are unavoidable. It is doubtful whether well-regulated pressure upon the perineum will materially augment the contusion; and, at all events, we should be quite unwilling to be deprived of the privilege of giving such valuable assistance, as is often in our power, by this means, as well in face as in vertex presentations. By well-regulated pressure, I mean pressure made with the hand, or both hands, according to circumstances, bearing with greatest force upon the perineum posteriorly, and directed from the os coccygis to the pubes: the object of which is to promote the particular movement which the head has to execute in escaping at the vulva (*extension* in vertex, *flexion* in face, positions). Of the efficiency of such pressure, in vertex cases, I have already expressed my strong conviction; and it may be confidently stated, that, if the assistance of art is sometimes needed in vertex presentation, it is still more likely to be needed in face cases; because, flexion, for reasons already given, is more difficult than extension.

¹ Troisième Mémoire.

CHAPTER XV.

SPECIAL TREATMENT OF THE SECOND STAGE
OF LABOR WHERE THE SHOULDER PRESENTS.

SECTION I.

MANUAL AID IN SHOULDER PRESENTATION.

THE great desideratum, in shoulder presentations, is, to restore the foetus to a situation in the cavity of the uterus, that will enable it to pass out of the pelvis, under the influence of the parturient forces, with the ordinary assistance of art. This, it is evident, will be fulfilled by pushing aside the shoulder, and bringing either the head or the nates into the pelvis, thus causing the child to turn upon its axis, and offer one of its extremities to the passage. The manual operation, by which this is effected, is denominated *turning*, or *version* of the child; and, according as the head or the nates is brought down, it is *cephalic* or *podalic* version.

VERSION.

Version, or *turning*, is ranked among the obstetric operations, and as such is treated of by most systematic writers on midwifery. It is not restricted in meaning, nor has it been in practice, to shoulder presentations, but signifies the substitution of one presentation for another deemed less favorable, and in a more limited sense, the rectification of certain malpositions. I shall employ the term in the larger sense only, and, of course, if the feet of the child be brought down to take the place of the head, in a face or vertex presentation, or the head to take the place of the feet, in a nates presentation, the manual operation of *turning* will have been performed.

The operation has not been described hitherto, in this

cause I more than doubt its eligibility, under any other circumstances than shoulder presentation, and am strongly impressed with the belief that it ought to be strictly confined to such cases. The object of it, then, would be to correct such an aberration of the axis of the child's body, as precludes delivery; not to see-saw this axis, according to our whims or crude notions, and bring one of its extremities or the other to the os uteri, as best suits our fancy, as if to run our hand up to the fundus of the uterus, and gyrate the child in its cavity, were to be reckoned among the pastimes of obstetrics. As I am, perhaps, singular in this sentiment, it is due to other authors and practitioners that I should respectfully state the grounds of my dissent from the established practice. It may serve to gain me a more patient hearing, to declare that I have not yet, in the course of a somewhat lengthened practice, met with a case of labor in which I judged it necessary or proper to resort to turning, save where the shoulder presented. Nor, in the retrospection of my conduct in this particular, have I found any cause of regret, not having lost a single patient who I had reason to think might have been saved by the operation. I shall not, I trust, give offence by the question, but I am constrained to ask those who have been much addicted to *version*, under the license granted them by the highest authorities, whether they, in a calm review of their experience, have not some reason to fear that the operation has been mischievous, in some instances—perhaps fatal in its consequences?

With this apology, I proceed to observe that all authors, without exception, recommend delivery by version for one of the alarming incidents of labor, viz., *flooding*, whilst many of the highest repute deem it equally necessary for *convulsions*, which are scarcely less alarming. I have already stated the reasons which incline me to reject this resort, in cases of labor, complicated with flooding (see the chapter on that subject), and it appears to me that the most zealous partisan cannot weigh the arguments there adduced, without conceding that, in many such cases, it is at least doubtful whether the operation did any good; nay, more, he must admit that, in some cases, the fatal issue appeared owing more to the operation, than to the accident for which it was undertaken.

In regard to parturient convulsions, the testimony against version, as a mode of delivery, is even stronger, notwithstanding its recommendation by many standard authors. "Version, or turn-

ing," says Dr. Churchill,¹ "has been often recommended, but from all the cases I have seen or collected, it would appear a most hazardous measure. Dr. Ramsbotham advises it, and yet the three cases in which he practised it, proved fatal. Five patients out of the seven are generally lost. Dr. Collins is strongly opposed to it. We may, therefore, conclude that version is not to be attempted." It may be objected that, if version is inappropriate to parturient convulsions, craniotomy must be equally so; and yet it has been recommended by myself, and practised by Dr. Collins, and many others. To this I reply that delivery can be effected in this manner with less irritation of the uterus, and consequently less likelihood of aggravating the convulsions, whilst it is being accomplished, than by the manual operation of turning, owing, as I suppose, to the fact that the os uteri is made to dilate from within instead of from without, and therefore yields more readily. I wish it to be borne in mind, moreover, that I have not advised a resort to craniotomy, in such cases, unless the necessity of delivery be very urgent—so urgent, indeed, that it is judged better to subject the patient to the risk of a temporary exacerbation of the convulsions, than to allow these to take their course. This extreme necessity cannot exist, except where the fits continue to recur with unabated violence and frequency, in despite of bleeding, purging, &c., and the labor is stationary, or making such slow progress that we cannot wait for its spontaneous termination. Under opposite conditions, I fully subscribe to the doctrine that the convulsions ought to be attended to, and the labor left to take its course.

In procidence of the umbilical cord before the head of the child, and even in cases of inertia of the uterus, retarding labor, turning has been recommended by some writers; and recently, Dr. Simpson has proposed it as an alternative for craniotomy and the long forceps, in deformity of the brim of the pelvis. In the first two conditions, the operation can hardly be said to be recognized as legitimate, whilst in the latter, even should it meet with general approval, it will seldom be found necessary. It would be out of place here to enter into a critical examination of Professor Simpson's very able and interesting paper, in which this proposal is made; but it may not be amiss to express my doubt whether it will or ought to be accepted by the profession. The object of the

¹ *Diseases of Women*, New Am. ed., p. 722.

operation is twofold; to rescue the infant from the destruction entailed by such deformities of the maternal pelvis, and, at the same time, diminish the maternal mortality incidental to child-bearing, where such inaptitude exists. As to the first, it may reasonably be questioned whether the chance of saving the child, dragged by its extremities and body through the contracted superior aperture of the pelvis, be sufficiently favorable to justify us in exposing the mother to the risk of such an operation. The only hope of getting the head through, according to Dr. Simpson's own showing, is, by tractions on the body powerful enough to flatten it in its bi-parietal diameter, to enable it to pass between the sacrum and pubes. To say nothing of the likelihood of extending the head, by such a manœuvre, and in this way adding to the difficulty of extracting it, is there not reason to fear that the *extension* of the neck and the compression of the brain may destroy the child? and is there no danger of inflicting serious injury on the mother by such tractions? The second object, viz., the diminution of maternal mortality, will be gained, as Dr. Simpson thinks, by abridging the duration of labor, because, if version be practised as a substitute for the perforator and forceps, it may be had recourse to at an earlier period. While I subscribe to the general doctrine, that morbid protraction is a pernicious element of labor, and have laid considerable stress upon it, in a previous chapter of this work, I am equally convinced that the manual operation of version, in head presentations, is a still more pernicious element, and one that is much more apt to destroy the woman it is intended to succor.

The operation of version, in the latitude that has been hitherto allowed it, is a most dangerous one for both mother and child, as is implied in the foregoing strictures upon it, and in what I have said of it, when discussing the treatment of presentations of the face. To show its average mortality, Dr. Churchill¹ has taken all the numbers that could be depended on; and in 169 cases where the result to the mother is given, 11 mothers died, or 1 in 15, whilst in 542 cases, where the result to the child is detailed, 182 children were lost, or rather less than 1 in 3. "I do not give this result," Dr. Churchill very properly observes, "as the exact mortality of the *operation*, because it is evident that the deaths in some cases may have been owing to the *cause* which demanded the ope-

¹ Theory and Practice of Midwifery, p. 292.

ration, as in placenta prævia; but as we find that even in several of these cases, the fatal termination was evidently more owing to the operation than to the hemorrhage, I am inclined to think the calculation not very far from the truth." The reader's attention is particularly asked to the concluding part of this quotation, which I have put in Italics, as it is confirmatory of the judgment I have already passed on version in hemorrhage from placenta prævia. One of the dangers of the operation to the mother, which is the most patent, is from rupture of the uterus, produced by forcing the hand into its cavity before its orifice is sufficiently dilated or in despite of the powerful resistance of contraction of its parietes, or else by unskillfulness in the act of turning itself. This source of danger is, of course, greatly enhanced by want of experience and tact in the operator, and it cannot, therefore, be expected that the general success will be anything like equal to that obtained by the *experts*, whose performances figure in Dr. Churchill's calculations. Let the general practitioner, then, ponder well before he makes up his mind to go into the operation: let him have the consolation of at least knowing that it is *indispensable*, which he can seldom if ever have, unless it be restricted to shoulder presentations.

I. PODALIC VERSION.

Having defined the applicability of version, I shall now offer some general observations, touching the *conditions* of its performance, the *preparation* of the patient, the *choice of a hand* with which to operate, and the *principles* that should govern it—premising that these general remarks have especial reference to podalic version. I shall reserve what I have to say concerning cephalic version, for the conclusion of this section.

Conditions of its Performance.—The operation ought not to be undertaken, and there is seldom, if ever, necessity of undertaking it, until the os uteri is sufficiently dilated to allow the hand to enter the cavity of the womb, without the employment of any considerable force. It is not necessary that the orifice should be so patulous as to admit the hand without the least resistance, for thus it may not be, and yet be so far dilated and dilatable withal, that the hand may enter it, without such force as would be least degree, injurious. But violence is al-

justifiable, and often destructive. If the operator has the selection of his time, the most favorable moment is, unquestionably, just when the os uteri is sufficiently dilated for his purpose, and before the membranes have ruptured, for he may then rupture them, and immediately push his hand into the uterine cavity, before the waters have escaped. He will thus have the signal advantages of ample room for the movements of his hand, free access to the feet of the child, and great facility in turning. But, unfortunately, this favorable conjuncture is not often enjoyed, at least in the practice of this country, where the physician may not be called until it is irrecoverably lost, and his services are requested only on account of the subsequent discovery that the shoulder is presenting. The operation is then to be performed, with the hindrance resulting from more or less close contraction of the uterus about the child's body, according as the liquor amnii is more or less completely discharged, and little or none will be retained, after the lapse of a few hours, for the shoulder is a worse stopper of the orifice than even the breech.

If a considerable time have elapsed since the rupture of the membranes and escape of the waters, the uterus may be so strongly contracted as to defeat any attempt to introduce the hand into its cavity, and compel us to devise some other expedient to deliver the woman. What is to be done, in this case, will be presently pointed out and explained; but let not the practitioner too hastily conclude that delivery by turning is impracticable, for I have often found that, notwithstanding I have been frustrated in a first or second trial, by persevering and varying the manœuvre somewhat, success has ultimately crowned my efforts.

Preparation of the Patient.—The patient must be placed across the bed, upon her back, and with the hips so near the side of the bed that the perineum projects a little over the mattress on which she lies. Her feet may rest on chairs, or in the laps of two assistants, who are charged with keeping her knees far enough apart to make room for the operator to stand or sit between them. A sheet or blanket, according to the season, must be thrown over her to screen the patient from exposure, which is as indelicate, as it is unnecessary; for the operation, from first to last, is to be performed under the guidance of the touch alone. The necessity of having the perineum free of the bed, arises from the course of the hand,

in its complete introduction, which is that of the axis of the superior strait; and this cannot be followed without depressing the elbow below the level of the bed. So great must this depression be, when the feet of the child lie in the anterior part of the uterine cavity, that it is sometimes less irksome to the physician to have the patient turned upon her side. It need hardly be added that the patient ought to be fully placed under the influence of an anæsthetic, as experience has proved that nothing contributes so much to facilitate the operation, and lessen its hazards. All contraction of the uterine fibres, arising from mere irritation, and irregular and spasmodic in its nature, is suspended during the anæsthetic state, and only the normal contractions remain, which are often so much enfeebled, in protracted cases, as to offer no serious barrier to the operation. It is difficult to over-estimate the value of chloroform, under such circumstances. I was requested by an eminent physician, only a few days since, to visit a patient of his, a negro woman in labor, with the shoulder presenting, and the arm down in the vagina; a foot could, also, be reached, but tractions on it availed nothing, and my friend's hand could not be introduced into the uterus, because of its energetic and nearly continual contraction. She was made to inhale chloroform until she was profoundly narcotized, and then I found no difficulty in passing my hand into the fundus of the uterus, and turning the child by bringing down the other foot.

Choice of a Hand.—Not a little discrepancy will be found among practical writers, in the directions they give as to the hand that should be employed, in the different shoulder positions. Without discussing the merits of their conflicting advice, I shall be content to state my own rule, which is, that the right hand must be used for the right shoulder, and the left hand for the left shoulder. Where there is obscurity or uncertainty as to the presentation, the right should be preferred, because it is that which most persons are accustomed to employ, and can, therefore, use with the greatest facility. The choice of a hand for the operation implies a perfect knowledge of the presentation, which ought, in fact, always to be attained, whenever it is practicable, before commencing the operation. This is the more necessary where the uterus is in a contracted state, as, by guiding the hand in the right direction, namely towards the feet, we shall be saved a deal of toil, and the pain, which must result from passing the hand in a wrong

tion, and then having to withdraw it in order to get into the proper track.

The *principles* that should govern the operation of version can be best expounded by describing it in a general manner, *i. e.*, without reference to either shoulder or its particular position. When we shall have made ourselves familiar with the principles, we may proceed to study the practice in special cases. For the purpose of describing it more methodically, I shall divide the operation into three parts, *viz.*, 1st. The introduction of the hand into the uterus. 2d. Seizing and bringing down the feet. 3d. The extraction of the child.

First. *Introduction of the Hand.*—The hand selected for the operation, and likewise the forearm, must be well lubricated with lard or oil, with the exception of the palm, which ought not to be greased, that it may take a firmer hold of the legs. The operator is, of course, to divest himself of his coat, and roll up the shirt sleeve of the arm which is to be used. Some practitioners are fastidious on this point, fearing that such preparation will give them too much of a butcher-like aspect; but this is certainly neater and less frightful than to have the shirt sleeve dangling about the arm, soaked with blood and other fluids, as I have sometimes seen it in the lying-in chamber. The hand, thus prepared, is to be formed into a cone, by pressing the fingers together and flexing the thumb on the palm, and must be presented to the external organ, with its breadth corresponding to the genital fissure. By pressing on the perineum, the external orifice can be gradually dilated, so as to receive the entire hand, which is now lodged in the vagina. In effecting this part of its intromission, the hand must move in the direction of the axis of the vagina, that is, upwards and backwards; and it will be best to act only *during the pains*, as the severer suffering of the throes of labor will render the patient unconscious of the pain inflicted by the hand. The uterine cavity is now to be entered, and to accomplish this, the hand must preserve its conical form, and the resistance of the os uteri, if any exist, must be overcome by gradual dilatation. These dilating efforts must be made only *in the intervals of the pains*; and when the hand is fairly introduced, it must grasp the presenting shoulder in such manner as to get a good hold of it—the thumb in the axilla and the fingers upon its top, for instance—and push it upwardly and at the same time towards the side of the uterus where the head

of the child lies, in order to carry it as far away as possible from the os uteri. Such a movement not only makes room for the passage of the hand towards the feet, but also rotates the body of the child in the uterine cavity, and brings the feet nearer the os uteri, so that they can be more easily reached. In other words, version is actually commenced, before the introduction of the hand is completed. It was remarked, I think, by the celebrated Dr. Hamilton, of Edinburgh, that, in cases where the version of the child is favored by the presence of a good portion of the liquor amnii, he had been enabled, by repelling the shoulder from the superior strait, to hook down the feet with his fingers or perhaps a single finger, without so much as passing his hand into the uterus. The ascension of the head and shoulders may be greatly promoted by properly directed pressure upon the abdomen of the mother with the other hand, which had been hitherto used to steady the uterus. Should it be necessary, however, to pass the hand deeply into the uterus, as it may be where the organ is closely contracted, it must not be pushed forwards *during the pains*, but lie flat upon the surface of the child's body, ready to resume its march the instant the pains cease, that the most may be made of every interval of the muscular contractions.

Second. Seizing and bringing down the Feet.—The hand having arrived at the feet, takes a secure hold of them, by inserting the index finger between the internal malleoli, while the thumb is applied to the outer part of the ankle of one leg and the other fingers to the outer part of the other ankle. Embracing the opportunity offered by an interval of the pains, the operator is to bring the feet down over the child's abdomen, as much as possible in the direction of the natural flexure of the body; and this evolution may be assisted by the hand that is applied externally, which must push the head upwards towards the fundus of the uterus. When the womb is strongly contracted, it is not always easy to seize both feet; the practitioner ought then to be satisfied with one, and proceed to make the evolution by drawing it down. I have several times adopted this course, and considered myself fortunate in getting hold of one foot. Again: it may happen, under the same circumstances, that the feet cannot be reached at all; in that case, the turning may be effected by acting upon the knees, or upon one knee, by means of two fingers applied to the ham, and then one or both legs can be extended and brought out of the vulva.

Third. *Extraction of the Child.*—When the child's feet are brought through the vulva, it would, undoubtedly, be proper to confide the completion of labor to nature, if sufficient power be retained by the uterus, and be so vigorously exerted as to give promise of a satisfactory issue. But this rarely, if ever, happens, in the cases we are considering; for the labor has generally been tedious, and the uterine force, more or less, completely expended, before we are called on to deliver, and it is then our indispensable duty to extract the child. This part of the operation must, however, be executed, in as close conformity as possible to the natural procedure. If there be pains, no matter how feeble, our extractive force should act only in concert with them; and, if there be no pains, we should extract, not continuously, but with intervals of rest, in imitation of nature. Each application of artificial force ought, moreover, to be made with gradually augmenting strength, and be as gradually relaxed, for this, too, is nature's method. As to the movements that the body of the foetus is to be caused to execute, they are precisely such as belong to the mechanism of labor, in nates presentations; and the manner of proceeding, in order to secure these, having been already explained in the chapter on that subject, we need not repeat what is there said.

In the extraction of the child, after turning, there is, however, one thing to be attended to, which hardly merits attention in the management of nates presentations, because the vigilance of nature exonerates us from solicitude concerning it—I mean the care which the operator is to take to turn the anterior parts of its body towards the loins of the mother, while he is engaged in extracting it. The sufficiency of nature, in original nates cases, arises from the uterus possessing and exerting its forces, in a good degree, needing only, at most, the assistance of the accoucheur; and the tendency of these forces being to cause so desirable a revolution of the child's body, even where its abdomen is toward the pubes, primitively. But in shoulder presentations, the delivery is more artificial; and should the toes point forwards when the feet are brought out, the head may come into the pelvic excavation, with the face towards the pubes, and its extrication be thus rendered much more difficult. To prevent, if possible, such a catastrophe, the operator ought to make traction upon the leg that is towards the pubes, which tends, in the gentlest and most gradual way, to turn the anterior parts of the child's body posteriorly; so that when the head is brought into

the pelvis, the face may be in the hollow of the sacrum. To effect so desirable an object, most writers direct more vigorous exertions, even the grasping of the child's body, and forcibly turning it round; but such a manoeuvre is not free from serious objections, in all cases where the uterus is firmly contracted. In the first place, the head may not follow the rotation of the body, being hindered by the firm embrace of the fundus of the uterus; and thus the neck may experience a fatal twist, for its articulation with the head will not permit rotation equal to half a circle. In the second place, supposing the *head* to obey the impulse communicated to the body, the *arms* may not; and one of them may be made to decussate the back of the neck, when the head gets into the pelvis, and offer a serious barrier to its egress. Two kinds of *decussation* are distinguished by M. Dugès, according as the accident occurs at a more or less advanced stage of the extraction. If, when the body is turned round, the arm is pendent by the side, it first crosses the back, and then moves upwardly as the body is extracted, until, finally, it is lodged upon the back of the neck. If, on the contrary, the arm be raised alongside the head, when the body is made to revolve, the arms and the head only remaining in the uterus, the arm is depressed and sinks beneath the occiput. The first kind of decussation is, according to Dugès, recognized by the inferior angle of the scapula being made to approach very near the spine, and the forearm is sometimes found hanging down the opposite side; in the second kind, the inferior angle of the scapula is removed to a greater distance from the spine, and the forearm is never pendent, but raised along the opposite side of the head.

To discriminate between the two kinds of decussation is material in practice, because their treatment is very different—the first or *ascending* decussation, as it may be called, requiring the arm to be brought down over the back, and the second or *descending*, requiring the arm to be pushed up over the head, and brought down over the breast—but to avoid the manoeuvre, likely to produce such an embarrassing accident, is still more important. If, therefore, the uterus be strongly contracted, and simple traction upon the member that is forward should not cause the child's anterior parts to turn towards the mother's back, it will be better to allow the head to come into the pelvis, with the face towards the pubes, and trust to our ability to rotate the face into the hollow of the sacrum,

should it prove impossible to extract it, in its untoward position. Such is the practice recommended by Madame Lachapelle, and Dugès avers that it is not difficult to turn the face into the hollow of the sacrum, by the manipulation of that distinguished midwife—which will be presently explained and illustrated.

These general observations being premised, we are prepared to consider the operation of turning in the several positions of shoulder presentation, commencing with the second position of both shoulders, because in these the operation—though it may not be more easily executed—is more regular, that is, more in conformity with our general rules, than it may be practicable to make it in the first position.

1. *Turning in the Second or Scapulo-sacral Position of the Right Shoulder.*—Let the student recall to mind the relations of the child's body, in this position; its back is towards the loins of the mother, its head is in the right iliac fossa, and its lower extremities, folded upon its abdomen, are contained in the left anterior part of the womb. The operator introduces his right hand in the state of supination, seizes and pushes the right shoulder upwards and towards the right iliac fossa of the mother, and then glides the hand over the posterior parts of the child's body, until it reaches the breech. The drawing, Fig. 88, represents the right shoulder in this, its

Fig. 88.



Right Shoulder: second position; introduction of the hand preparatory to turning.

Fig. 89.



Right Shoulder: second position; version commenced.

second position, and the transit of the right hand of the operator towards the feet of the child. The hand is then brought forwards,

becoming prone, as it rounds the breech, to get hold of the feet, which are drawn towards the child's abdomen, in bringing them down into the vagina, and thus this position of the shoulder is converted into first position of the nates. In the drawing, Fig. 89, the situation of the child relatively to the uterus is seen; its feet and, of course, its legs have been drawn over its abdomen, towards the os uteri. Version is commenced, and will be completed by bringing the feet without the vulva. The extraction is then to be made in compliance with the rules already laid down; and no difficulty can be experienced in gradually rotating the anterior parts of the child backwardly, so as to bring the occiput behind the pubes.

2. *Turning in the Second or Scapulo-sacral Position of the Left Shoulder.*—In this position, the back of the foetus is directed posteriorly, its head is in the left iliac fossa, and its legs are in the right anterior part of the uterus. The left hand is introduced supine, pushes the shoulder upwards and towards the left iliac fossa, traverses the back of the child, becoming prone, as it passes over the breech, grasps the feet, and brings them down into the vagina, converting the case into a second nates position. Extraction is as favorable as in the corresponding position of the other shoulder.

The drawing, Fig. 90, illustrates the manner of assisting the extrication of the arms, should they be detained after the extraction of the trunk. The procedure is essentially the same, whether it be a case of left or right shoulder, or indeed, whether it be first or second position of either shoulder. It consists in passing two fingers along the humerus of the arm that is towards the sacrum of the mother, endeavoring to reach its cubital extremity, and pressing it downwards and towards the breast of the child. When it is delivered, the arm that is towards the pubes is to be brought out in like manner, making room for the fingers behind the pubes, by pushing the shoulders into the hollow of the sacrum, where there is the more space, since the other arm has been delivered.

Fig. 90.



Shoulder Presentation: extrication of the arms after delivery.

Third. *Extraction of the Child.*—When the child's feet are brought through the vulva, it would, undoubtedly, be proper to confide the completion of labor to nature, if sufficient power be retained by the uterus, and be so vigorously exerted as to give promise of a satisfactory issue. But this rarely, if ever, happens, in the cases we are considering; for the labor has generally been tedious, and the uterine force, more or less, completely expended, before we are called on to deliver, and it is then our indispensable duty to extract the child. This part of the operation must, however, be executed, in as close conformity as possible to the natural procedure. If there be pains, no matter how feeble, our extractive force should act only in concert with them; and, if there be no pains, we should extract, not continuously, but with intervals of rest, in imitation of nature. Each application of artificial force ought, moreover, to be made with gradually augmenting strength, and be as gradually relaxed, for this, too, is nature's method. As to the movements that the body of the fœtus is to be caused to execute, they are precisely such as belong to the mechanism of labor, in nates presentations; and the manner of proceeding, in order to secure these, having been already explained in the chapter on that subject, we need not repeat what is there said.

In the extraction of the child, after turning, there is, however, one thing to be attended to, which hardly merits attention in the management of nates presentations, because the vigilance of nature exonerates us from solicitude concerning it—I mean the care which the operator is to take to turn the anterior parts of its body towards the loins of the mother, while he is engaged in extracting it. The sufficiency of nature, in original nates cases, arises from the uterus possessing and exerting its forces, in a good degree, needing only, at most, the assistance of the accoucheur; and the tendency of these forces being to cause so desirable a revolution of the child's body, even where its abdomen is toward the pubes, primitively. But in shoulder presentations, the delivery is more artificial; and should the toes point forwards when the feet are brought out, the head may come into the pelvic excavation, with the face towards the pubes, and its extrication be thus rendered much more difficult. To prevent, if possible, such a catastrophe, the operator ought to make traction upon the leg that is towards the pubes, which tends, in the gentlest and most gradual way, to turn the anterior parts of the child's body posteriorly; so that when the head is brought into

being seized, are to be brought directly down into the excavation. The drawing, Fig. 91, illustrates this mode of turning, in which it will be seen that there is a slight deviation from the rule that requires the child's inferior extremities to be turned towards its abdomen;—they make, in fact, a lateral version, *i. e.*, the feet are drawn towards its left hip, instead of towards its abdomen.

This method is much easier of execution than any other; and no objection lies against it except that the child's anterior parts may be directed towards the front of the pelvis. But this may be corrected, if not by turning the body round, by rotating the head when it comes into the pelvis, in the manner advised by Madame Lachapelle, which will be illustrated, so soon as we have studied version in the first position of the other shoulder.

4. *Turning in the First or Scapulo-pubic Position of the Right Shoulder.*—The back of the child is towards the pubes, its head is over the left iliac fossa, its feet are contained in the right posterior part of the womb. Let the student draw a mental picture of the relations of the fœtus to the mother, before he proceeds with the operation of turning, and he will then be prepared to understand that the right hand must be introduced supine, to raise and push the shoulder upwards, and towards the left iliac fossa, and then passed up over the right sacro-iliac symphysis, where it finds the feet, which are straightway brought into the vagina by a lateral version, *i. e.*, they are drawn towards the right hip of the child, and not directly towards its abdomen.

This manoeuvre is liable to the same objection that attaches to it in the first position of the left shoulder, *i. e.*, the anterior plane of the child's body may be turned towards the pubes of the mother. Should the head come into the pelvis, with the face forwards, either in a right or left shoulder presentation, it may be delivered in the manner depicted in Fig. 92, first recommended, I believe, by Madame Lachapelle. Here the object is to turn the face of the child backwards into the hollow of the sacrum, to facilitate the disen-

Fig. 91.



Left Shoulder: first position; turning commenced.

gagement of the head, which, it is obvious, cannot be done by twisting the body, for the head might not, nay, certainly would not, obey the movements of the body, and the child's neck would consequently be dislocated. The manipulation consists in passing the hand into the pelvis obliquely behind the occiput, until it reaches the cheek, and even the nose and mouth, on the opposite side of the pelvis. To get a firmer hold of the face, a finger may be insinuated into the mouth, and then by properly directed traction, the face is to be drawn into the concavity of the sacrum, and, at the same time, towards the inferior outlet of the pelvis. Should this manœuvre fail, the forceps may be applied, as directed and figured in the chapter on the treatment of nates presentation.

Fig. 92.



Rectification of the head after turning.

Several modifications of podalic version have been proposed, some of which it will be proper to notice, more especially as we are occasionally obliged to adopt them in difficult cases of shoulder presentation.

First. It has been recommended by Dr. Radford, of Manchester, England, *never to bring down more than one foot in the manual operation of turning a child.*¹ The reason assigned for this precept is, that it enables us to bring down a part, approximating in its measurements to those of the breech presentation, which, as is very well known, is more favorable to the child than presentation of the feet, because being more bulky, it better prepares the passage to admit the quick transit of the head, upon which the safety of the infant depends. Dr. Huston informs us, in a note, that he has not, for the last twenty years, attempted to bring down both feet, unless he had strong reasons for believing the child to be dead, or from the existence of some circumstance requiring rapid delivery, as convulsions, hemorrhage, or laceration of the maternal organs. He regards it as certainly safer for the child and less difficult for the operator; the reasons for this innovation appear very cogent, but I will not

¹ Churchill's Midwifery, in Huston's edition.

undertake to pass a definitive judgment upon its merits, in default of statistical data to justify it.

Whether we are prepared, however, to accept this modification of version or not, there are cases of shoulder presentation, in which the uterus is so strongly contracted around the foetus as to render it very difficult to find and grasp both feet, or, more correctly speaking, both ankles, and we are obliged to be content with one. In such cases, it is certainly *safer for the mother*, which ought to be the paramount consideration, to turn by one foot rather than force the hand further, in quest of its fellow, at the risk of rupturing the uterus; and such has always been the practice I have myself pursued, whilst I frankly own that I have hitherto made it a rule to bring down both feet, in all cases where they were easily accessible.

Secondly. It has been recommended that *one of the knees* should be grasped instead of the feet, in all cases of turning, and the principal reason assigned by Dr. Breen,¹ who first proposed this modification, is, *the greater facility of the operation*—because a purchase is obtained nearer to the breech, and the child is made to revolve on the lesser axis of the trunk. This method of operating is ably advocated by Dr. Simpson,² who believes it to be preferable in most, if not in all cases, but especially in cases of shoulder presentation, in which the liquor amnii has been for some time evacuated and there is firm tonic contraction of the uterus; it being then an important object not to be obliged to introduce the hand further into the uterus than is absolutely necessary, and to turn by a part which produces as little change as possible in the form of the infant. These objects are fulfilled by the seizure of the knee instead of the foot, because the knees lie nearer the os uteri than the feet, by the whole length of the legs, or about three inches, and the leg which is seized is allowed to remain in apposition with the thigh, instead of being drawn away from it, making an angular projection, which must endanger laceration of the uterus. This latter point is

Fig. 93.



Danger of lacerating the uterus by the abduction of the foot from the thigh.

¹ Edinburgh Med. and Surg. Journal, vol. xiv. p. 29.

² Works, First Series, p. 557.

illustrated by the wood-cut, Fig. 93, copied from Dr. Simpson, representing *one* stage of the operation of turning by the foot, in which the leg is seen to be bent to a right angle with the thigh, and the foot of the infant, as Dr. Simpson says, "projected and crushed against the interior of the uterus."

The secret of turning with facility and safety, in difficult cases, consists, as Dr. Simpson thinks, in knowing which knee should be seized, and this secret he takes the credit of first divulging: "If we turn with one of the extremities—and whether the foot or the knee—it should be the foot or knee of the limb on the *opposite side of the body* to that which is presenting." The observance of this rule effectually secures, according to him, the rotation of the child upon the longitudinal axis of the trunk, or in other words, its version, instead of the flexion of its body forwards upon its transverse axis, bringing an extremity into the pelvis without displacing the shoulder. This mere flexion instead of version is produced, in many instances, Dr. Simpson alleges, by pulling down *both knees* or *both feet*, or *the foot or knee* which was nearest to us. I have, on several occasions, had this difficulty to contend with in

Fig. 94.



Turning by the knee or foot most remote from the os uteri.

turning for shoulder presentation; but how it was produced and whether from one hold upon the child more than from another, I am not able to state. It may be that attention to Dr. Simpson's precept might have prevented it, and, therefore, to make it as plain as possible, I will borrow another of his woodcuts, Fig. 94, in which it is seen that if, in passing our hand into the uterus, we insinuate it along the anterior surface of the thorax and abdomen of the child, we come in contact with both knees at the same

time. And now, instead of hooking our finger or fingers into the flexure of the nearer or lower knee (*a*), we must hook them into the upper, more distant, or opposite one (*b*), and then by carrying this knee diagonally across the abdomen of the child to the os uteri, "we both *flex* and *rotate* at the same time the trunk of the infant," to use his own language, "and in doing so, the semi-rotation of the trunk

inevitably carries up the presenting arm, in proportion as the knee which is laid hold of is pulled down." Should it be proved by future and more extended experience, that this method completely insures the success of the operation (and nothing less is asserted in the extract I have made from Dr. Simpson), we shall be freed from some of the most perplexing difficulties that have hitherto severely tasked alike our patience and our skill.

My own experience in turning by the knee is next to nothing, but it forcibly strikes me that it must be greatly preferable to a toilsome and hazardous search after the feet, when we are straitened by rigid contraction of the uterus, and it certainly appears reasonable that the evolution of the child will be best promoted by the seizure of the more distant knee. Still, I should prefer the common operation, such as I have described, *whenever it is safely and easily practicable*, because we are less liable, as I should think, to be led into the commission of mistakes by it—mistaking an elbow for a knee, for example—whilst we acquire more complete control over the labor and can extract the child, at will, without resorting to instruments, the possible necessity of which is conceded, when only one leg is brought down—Dr. Huston, for instance, declaring, in the note to which I have referred, that "if any more force be necessary to bring the hips of the child through the soft parts, than can be prudently exerted on one limb of the child, a finger, or the blunt hook, applied upon the opposite groin, will supply the requisite aid."

II. CEPHALIC VERSION.

In the first edition of this work, but little was said of this operation. It was, in fact, summarily dismissed in the following sentence: "Cephalic version has but few advocates at the present day, and is confessedly applicable to such a limited number of cases, that it is scarcely worthy of our formal consideration."

Nor has this manœuvre met with any more favor from other American authors of treatises on midwifery. Dr. Dewees, for instance, observes: "The circumstances which would render the restoration of the head to the axis of the pelvis practicable (if it be practicable), will also give facility to bringing down the feet; namely, a sufficient relaxation of the uterus and the absence of pain."¹

¹ System of Midwifery, par. 1404.

Dr. Meigs only says of it: "It has been proposed to restore the head to the brim of the pelvis, in cases in which it has deviated, so as to allow another part of the foetus to present itself there. I have on different occasions attempted to succeed in this version by the head, but have always signally failed, with the exception of a case which I have already related in a former page of this work. In that instance I succeeded by means of pressure made upon the external surface of the abdomen. The attempts might always be made with propriety in those cases in which the contractions of the womb have not as yet driven the presenting parts firmly into the opening. With a loose and flaccid uterus, the student might have the good fortune, after lifting the shoulder out of the way, to lodge the head fairly in his palm, and pushing the fundus uteri in an opposite direction so as to raise the breech of the child, draw the head to the abdominal strait and let it engage therein. I think no very violent efforts should be made to effect this kind of version."¹

It would be easy to show that the operation is not held in any higher esteem among British writers on midwifery generally, but it is not necessary to swell my pages with quotations. On the continent, it has met with more favor, and in fact there never has been a time, since its rejection and the substitution of podalic version by the great old surgeon-accoucheur, Ambrose Paré,² that it had not there some advocates.

¹ *Obstetrics, &c.*, 1849, p. 451.

² It may prove interesting to the reader to have a description of podalic version by its inventor, which I extract from an old English translation of the works of Ambrose Paré, by Thomas Johnson. It is found in lib. 24, and chap. xxvi., which treats "*of the chirurgical extractions of the childe from the womb either dead or alive,*" and is as follows: "Then must the ohirurgian, having his nails closely pared and his rings (if hee wear anie) drawn off his fingers, and his arms naked, bare, and well anointed with oil, gently draw the flaps of the neck of the womb asunder, and then let him gently put his hand into the mouth of the womb, haveing first made it gentle and slipperie with much oil; and when his hand is in, let him finde out the form and situation of the childe, whether it bee one or two, or whether it bee a mole or not. And when hee findeth that hee cometh naturally, with his head towards the mouth or orifice of the womb, hee must lift him up gently, and *so turs him that his feet may com forwards*, and when hee hath brought his feet forwards, hee must draw one of them gently out at the neck of the womb, and then hee must binde it with som broad and soft or silken band a little above the heel with an indifferent stick knot, and when hee hath so bound it, hee must put it up again into the womb, then hee must put his hand in again, and finde out the other foot, and draw it also out of the womb, and when it is out of the womb, let him draw out the other again whereunto hee had before tied the one end of the band, and when hee hath them both out, let him join them both close together, and so by

Inculcated by the Father of Medicine, cephalic version continued to be practised, or at least attempted, in all cases where the vertex did not present, down to the time of Paré, and has never been unanimously relinquished.

Amongst those who have made the most vigorous efforts to restore it to its ancient rights, M. Flamant, professor at Strasburg, towards the close of the last century, stands the most conspicuous, and since he wrote in its defence, several writers have published cases, going to show the practicability of the manœuvre and its preferableness to turning by the feet, at least so far as the safety of the child is concerned. Out of fifteen cases that came under his care in 1826, M. Busch, for example, as we learn from Velpeau, had fourteen living children, and several other practitioners have met with nearly equal success.

Since the appearance of the first edition of this work, Prof. M. B. Wright, of Cincinnati, has published a reclamation of cephalic version, entitled "Difficult Labors and their Treatment," for which a gold medal was awarded by the Ohio State Medical Society. The high reputation of the author, both as a practitioner and a teacher, together with the indorsement of the State Medical Society to which he belongs, entitles his essay to a candid and respectful consideration.

M. Velpeau, who plainly manifests a *penchant* towards cephalic version, restricts it, in shoulder presentations, to cases where—1. The arm is not prolapsed and the uterus is not too much contracted. 2. Whenever the feet are further removed from the strait than the head is, and where it is probable that the labor would

little and little let him draw all the whole bodie from the womb. * * * * *
 But if the infant lieth as if hee would com with his hands forwards, or if his hands bee forth alreadie, so that it may seem hee may bee drawn forth easily that way, yet it must not bee so don; for so his head would double backwards over his shoulders, to the great danger of his mother. Once I was called unto the birth of an infant, whom the midwives had assaied to draw out by the arm, so that the arm had been so long forth that it was gangrenate, whereby the childe died; I told them presently that his arm must bee put in again and hee must bee turned otherwise. But when it could not bee put back by reason of the great swelling thereof, and also of the mother's genitals, I determined to cut it off with an incision knife, cutting the muscles as near as I could to the shoulder, yet drawing the flesh upwards, that when I had taken off the bone with a pair of cutting pincers, it might com down again to cover the shivered end of the bone, lest otherwise when it were thrust in again into the womb, it might hurt the mother. Which beeing don, I turned him with his feet forwards, and drew him out as is before said."

terminate spontaneously if the head were at the strait.¹ But Dr. Wright's preference of it extends much further, and he considers it to be not only *applicable* when the uterus is strongly contracted round the child and the cord prolapsed, but the more imperatively *necessary*, because then delivery may be accomplished by it when it cannot be by podalic version.

It is, therefore, preferred by him in all cases of shoulder presentation, except where there is inefficiency or exhaustion of the powers of the uterus, so that it may be feared that the head, though restored to the pelvis, may not be expelled.² Another reason assigned by him for preferring it to podalic version is, its greater safeness for both mother and child.

To substantiate the pre-eminent claims which he thus sets up for cephalic version, he not only enters into an argument, but adduces several cases in which it was successfully performed by him. Two of these cases occurred in his own practice, and being detected at an early period of the labor, were easily rectified: the details of only one of them are given. Three other cases, occurring in the practice of Drs. Richardson, Terry and Walker, to which he was called in consultation, are recited at greater length. In two of these, ineffectual, though apparently well-directed, efforts had been made to turn by the feet; in one, the patient was in the first stage of labor, and turning had not been attempted, when Dr. Wright was called. In all of them, delivery was accomplished by cephalic version, as testified by the gentlemen who had them under their charge, and who reported them in the *Western Lancet*, from which they have been extracted by Dr. Wright.

My space will not allow me to quote these cases in detail, and I shall, therefore, make such extracts as may serve to establish the main point, which Dr. Wright is desirous of proving, namely, that cephalic version was practised where podalic version had been fruitlessly tried.

¹ Complete Treatise on Midwifery, Phila., 1852, p. 473.

² I have stated Dr. Wright's views in my own language, as there is some ambiguity in his own statement of them. I give them in his own words in this note, and the reader can judge whether I have rightly construed them.

"Turning by the feet is to be preferred in cases of inefficient uterine action or in exhaustion from long continuance of labor; in hemorrhage, convulsions, or in any case in which there may be a demand for speedy delivery.

"Turning by the head should be selected in all cases where difficulty arises from malposition merely; or in convulsions, hemorrhage, or prolapsus of the funis, if the uterus should be engaged in vigorous expulsive efforts."—*Essay*, p. 22.

In Dr. Richardson's case, it is remarked: "I directed my hand in search of the feet, passing it up with the palm applied to the right side of the child, until it reached the ilium: beyond this point my hand would not pass, with the degree of force employed, which was sufficiently great to be compatible with safety and advantage. The uterus had firmly and persistently contracted around the pelvis and over the crest of the ilium. I retained my hand for some time in its position, hoping to be able to insinuate my fingers beyond this point of constriction and gain the feet, but was compelled to desist and withdraw my hand, and give over the attempt." It was a case of right shoulder presentation, the arm and several coils of the funis prolapsed, the membranes ruptured seven hours before the doctor was called, and the pains strong and frequent. It was agreed that Dr. Wright should be sent for, who visited the patient in company with the partner of Dr. Richardson, he having left the patient for a short time to fulfil other engagements. On his return, he was informed that Dr. Wright had been there, and had rectified the mal-presentation, and upon examination he found "*the arm returned and the vertex presenting.*"

The second case is thus described by Dr. Terry, who was in attendance: "I gradually and easily passed my right hand into the uterus, and with little difficulty found the right foot, and brought it down so that the toes were near the vulva. At this point I found a resistance to any further progress in that way. I then made search for the other foot, but did not find it. During this effort, the right hand of the foetus came down, and on withdrawing my hand, the funis prolapsed. I now attached a strong fillet to the ankle, after which I passed my left hand into the uterus. I attempted to raise the child up from its present position, but failed, the head lying in the right iliac fossa. At this time the pains had ceased, except when roused by external force. The patient, myself, and attendants were much exhausted, from the severe labor and time devoted to effect delivery." After an interval of a few hours, Dr. Terry obtained the assistance of Professor Wright, and it was found, on their arrival, that the pains had returned, but they were not severe. Finding the foetus presenting, as already described, Prof. Wright attempted to turn by elevating the shoulder and making traction upon the leg, which was down. "Failing in this, he endeavored to introduce his hand into the uterus, with a view to obtain control of both feet, but the uterus had contracted so thoroughly upon the child as to render it impracticable." It was

now determined to deliver by cephalic version, and Professor Wright's manœuvre is thus described: "*The leg, arm, and funis were successively returned into the cavity of the uterus, and the vertex was brought into the superior strait, with the posterior fontanel behind the left acetabulum.*"

In the third case, the membranes had been ruptured nearly thirty-six hours before Dr. Walker was called, who found the patient with severe pain, but could not reach the os uteri. Eight hours subsequently he detected a shoulder presentation and had Dr. Wright sent for at once, who, finding the elbow down in the vagina, extended the forearm and brought the hand out at the vulva, with a view to a more satisfactory diagnosis, and then put it back again to explore for the head. *Cephalic version* was performed, which brought about a *face* presentation instead of a vertex. It could readily be changed for the vertex by the pressure of the finger against the occiput, but relapsed so soon as the finger was removed. Expulsive contractions had not commenced, when the version was made, nor was the os tinæ more than two-thirds dilated. The second stage of labor came on eight hours subsequently, and it was found, on examination, that the face persisted in presenting, and had partially engaged in the superior strait. No further attempts to change the presentation were made, and the labor was terminated in two hours and a half, by the natural efforts.

As Dr. Wright attributes the extraordinary success of cephalic version, in his hands, to his method of operating, which he claims to be original, it is highly necessary that the reader should be made acquainted with it. It consists in first returning the arm of the child, should it be prolapsed, and placing it as nearly as possible in its original position across the breast, when the operator is to apply his fingers to the top of the shoulder, with the thumb in the axilla or on such part as will give him command of the chest and enable him to apply a degree of *lateral force*. Whilst the left hand is applied to the abdomen of the mother over the breech of the fœtus, with the right, "*lateral pressure is to be made upon the shoulders in such a way as to give to the body of the fœtus a curvilinear movement. At the same time the left hand, applied as above, makes pressure so as to dislodge the breech, as it were, and move it towards the centre of the uterine cavity. The body is thus made to assume its original bent position, the points of contact with the uterus are loosened, and perhaps diminished, and the force of adhesion is in a good degree overcome. Without any direct action*

upon the head it gradually approaches the superior strait, falls into the opening, and will, in all probability, adjust itself as a favorable vertex presentation. If not, the head may be acted upon as in deviated positions of the vertex, or it may be grasped, brought into the strait, and placed in correspondence with one of the oblique diameters."

I have quoted Dr. Wright's description of the operative manoeuvre in cephalic version, because it is the best and most precise one which I have anywhere seen. On comparing it with the loose directions of M. Cazeaux, it will appear to the greater advantage, and justify, I think, the claim of Dr. Wright, if not to originality, at least to the credit of having more clearly apprehended the object to be attained, and of more perspicuously pointing to the proper method of attaining it.

The directions of M. Cazeaux, quoted by Dr. Wright, are as follows: "Grasp the presenting part, push it above the strait, and then carry it as far as possible towards the side opposite to where the head is found; and afterwards get hold of the latter and bring it down, if the efforts made by the other hand through the abdominal walls have not proved sufficient to make it descend into the excavation."

Now, whilst it may be true that M. Cazeaux or any other accoucheur well versed in such manoeuvres would, in point of fact, operate as Dr. Wright does, it is very apparent that such vague and general directions are ill calculated to initiate the beginner into these high mysteries. Instead of directing, in general terms, to *push up* the shoulder and *push it aside*, Dr. Wright very properly directs that the pressure upon the shoulder, from the commencement to the end, shall be methodically applied, with reference to the production of movement of the foetal body in accordance with the concave surface of the uterine cavity, over which it is made to glide. There can, I think, be no doubt that more can be effected by such scientifically directed force than by random efforts or force applied without any well defined intention.

Having now given a fair *résumé* of the testimony in favor of cephalic version, brought forward by Dr. Wright and described his *modus operandi*, I shall next inquire whether he has made good his position, which may be thus stated: *Cephalic version may be performed in any case of shoulder presentation that admits of turning by the feet, or even where this latter mode of turning is wholly imprac-*

licable, and it ought, with the exception before specified, to be preferred on account of its greater safeness for both mother and child.

It must be admitted, on the threshold of our inquiry, that in two of Dr. Wright's cases, recorded in his Essay, both of the complications were present, which, in the opinion of M. Velpeau, should countermand turning by the head, viz., the arm was prolapsed and the uterus was contracted, and that he is, therefore, justly entitled to the credit of performing an operation forbidden by the great French surgeon-accoucheur. Nor have I any hesitation in declaring that I would hardly have supposed it possible to deliver by cephalic version in these cases. It is proved, therefore, so far as two¹ cases go, that the operation was accomplished under conditions of labor, to which it is not generally believed to be appropriate, and where turning by the feet is usually deemed the only proper resort. But we are bound, by a fair consideration of these cases, to bring in a verdict of *not proven* on the count that cephalic version did what podalic could not. It is only proved that Dr. Wright succeeded with his favorite manoeuvre after the gentlemen in attendance had failed to turn by the feet—nothing more nor nothing less. Had Dr. Wright, in good earnest and with a resolute purpose, undertaken to deliver by podalic version, he would, in all probability, have succeeded. It has happened to me, again and again, to be called to bad cases of shoulder presentation, in which I have succeeded in turning and delivering by the feet, notwithstanding that persevering attempts had been previously made without effect. It is no disparagement to the physicians in attendance to suppose that Dr. Wright may possess more skill than themselves, in a line of practice to which he has devoted himself with assiduity and success for many years. They themselves must have believed so, else they would not have summoned him to their assistance.

Be this as it may, however, it is more important for us to inquire whether these two cases can be considered as fair samples of the fruits that may be reasonably expected of cephalic version, under similar circumstances. In this branch of our inquiry, we must be guided by the experience of others as well as of Dr. Wright, nor ought we altogether to discard our reason.

With a view to promote this inquiry, I will divide shoulder presentations into *two classes*, in reference to the facility or difficulty

¹ I say *two*, because in Dr. Walker's case, the patient was in the *first* stage of labor, at the time of the operation.

of correcting the vicious position of the infant by either mode of turning. In the first class, which may be designated "simple," *the labor is in its first stage—the os uteri being barely dilated, the membranes whole or recently ruptured, the uterine contractions not very powerful or decidedly expulsive, and the shoulder has not become impacted in the pelvis.* In the second class, which we will call "complex," *the second stage of labor has set in or has long been established, the liquor amnii is evacuated, there are bearing-down pains, the uterus is strongly contracted around the child, and the shoulder has definitively taken up its position in the pelvis.* The arm may, also, have protruded, and likewise a portion of the umbilical cord, in which event the case is complicated as well as complex.

It cannot be doubted that in shoulder presentations of the first class, cephalic version may sometimes be brought about with great facility. It is only necessary to resist the intrusion of the shoulder into the pelvis and push it aside, in order that the head of the child may drop down and take its rightful place. Dr. Wright alludes to two such cases, which happened under his observation when he was a young practitioner, and many others might be adduced were it necessary. I myself met with a case of *spontaneous cephalic version* (to which, as it appears to me, his two cases approximate), many years ago, which took place while I was preparing to turn. Here, everything is in favor of the success of the operation: there is abundant room in the uterus, and the movement of the foetus within its cavity is not impeded by strong contractions, whilst the natural tendency of the head towards the os uteri seconds the design of the operator. The operation consists, in fact, in nothing more than *the repulsion of the shoulder*, which scarcely requires the introduction of the hand into the uterus.

But in shoulder presentations of the second class, the foetus is very differently situated and the operation of cephalic version is by no means so easy, for supposing that its body can be moved at all, even by the most scientific direction of the force that is applied to the shoulder, it is obvious that when the head is drawn by the movement over the os uteri, the chances are much against its engaging and properly adapting itself to the superior aperture of the pelvis. It must be seized by the hand of the operator and suitably adjusted, before its expulsion can be trusted to the natural powers. How difficult it is to lay such hold upon the slippery, convex surface of the head as will enable us to turn it about and

place it according to our wishes, none can know who have not tried the experiment. It is understood of course that, in this manipulation, the hand is operating in the uterine cavity, notwithstanding the assertion of Dr. Wright, made, as I suppose, without due deliberation, that "the hand does not enter the cavity of the uterus and consequently, neither its walls nor any portion of them are forcibly pushed out."

It is not possible for the hand of the operator to seize the head of the child, without penetrating first into the cavity of the uterus. Turning by the head would, therefore, appear to be fully as difficult an operation as turning by the feet, in cases of what I have called complex shoulder presentation, and from the reason of the thing as well as the experience of others, I am persuaded that it is so, notwithstanding Dr. Wright's success in accomplishing it in two such cases. If there be procidence of the arm, in addition to the contracted state of the uterus, the difficulty of cephalic version is greatly enhanced, and I must think that, in by far the largest number of cases, an insuperable barrier is raised against its performance. True, such a complication does not appear to have proved an obstacle in the way of Dr. Wright, for in Dr. Richardson's case, the right arm of the fœtus was in the vagina, accompanied by several convolutions of the umbilical cord; and in Dr. Terry's case, a hand and a foot and the cord to boot were down in the vagina. Nothing, I confess, in the recital of these cases, surprises me so much as the nonchalance with which the putting up of these lapsed parts and appurtenances of the fœtus is spoken of: the uterus too strongly contracted to admit podalic version, and yet "the leg, arm, and funis were successively returned into the cavity of the uterus, and the vertex was brought into the superior strait"—all right, be it observed—"with the posterior fontanel behind the left acetabulum." And again, in Dr. Walker's case, the arm was brought down by Dr. Wright, with a view to a more satisfactory diagnosis, which being obtained, the arm was put back again snugly in its place!

The expression of my surprise must not, however, be construed to imply a doubt whether these things were done, for I as much believe it as though I had been an eye witness. But I warn the most skilful accoucheur that he shall seldom succeed in doing likewise.

Procidence of the arm was long believed to be a most untoward accident, inasmuch as it was supposed to impede the introduction of the hand for the purpose of turning by the feet, and to be in the

way of the passage of the inferior extremities of the child after it should be turned. How to get rid of the lapsed member was, therefore, a problem that sorely puzzled accoucheurs, who entertained this belief. Its reduction was advised by some writers, who differed among themselves as to the proper means of procuring it, certain of them advising that the child should be made to retract it, by cold applications or pinching; others counselled that it should be pushed directly upwards to raise the shoulder and make room for the hand of the accoucheur, whilst others again thought it better to bend the arm at the elbow and endeavor to deposit it in the uterus. Of all these proposals, the latter is doubtless the safest and most rational, but even it is not free from serious objection, both because it is difficult of execution, not to say impossible in many cases, and exposes the patient to the risk of laceration of the vagina and neck of the womb.

This danger is alluded to by many authors, but by none, so far as I remember, in such emphatic terms as by the celebrated M. Levret: "When we are called to a woman in labor," says he, "and find an arm of the child in the vagina, we ought carefully to examine whether those who had assisted her before us, may not have lacerated the vagina at its insertion into the *os tincae*, by the efforts they may have made to reduce the arm, according to the unwise advice of Mauriceau. The laceration will always be found, under such circumstances, in the lateral parts of the vagina, and never anteriorly or posteriorly, the reason of which is obvious. Should we find laceration, the fact ought always to be communicated to the friends of the patient, in order that we may not be held responsible for its probable fatal consequences."¹

It was the great difficulty experienced in reducing the procident arm, as well as the danger attendant upon the efforts necessary to accomplish it, that led Ambrose Paré, and many others after him, to advise its amputation near the shoulder; nor are there wanting cases, in which the offending member has been rudely twisted and torn away.

Now, if it were so easy and harmless a matter to reposit the arm in the uterine cavity, as it appears to be from the perusal of Dr. Wright's cases, what are we to think of these devices to get quit of it, but most of all, of its amputation and forcible, not to say cruel avulsion, which have been resorted to by the great men, whose

¹ L'Art des Accouchements, par. 761, 762, 763.

light still shines along the path they trod? But besides this accumulated testimony of experience, the simplest deduction from the physiology of parturition ought to satisfy us that the restitution of the escaped arm to the cavity of the uterus, after the lapse of a longer or shorter time, must become physically impossible. If there has been no tampering with the case, the arm does not prolapse until the uterus has become so much contracted as no longer to afford it room: then it is, indeed, expelled by uterine contraction, and its escape may be reckoned as so much of labor actually performed, according to the best ability of nature. Whether, however, the arm be expelled or extracted, the uterus closes in upon the rest of the child, more or less promptly, and accommodates itself to its diminished contents. How rash the attempt, then, to force in the protruded member! What wonder that it should often have resulted in the fatal lacerations, which Levret must have frequently met with, unless he was egregiously deceived.

It is fortunate for the patient as well as for the accoucheur that it is now well ascertained that the procidence of an arm is not to be deprecated, because it offers no obstruction to turning by the feet—nay, in the opinion of some, it is a positive advantage. Of the truth of this I have myself long been thoroughly convinced; so much so, indeed, that I have often brought the arm down to determine more precisely the position of the fetus in utero, when some obscurity has rested upon it; but I have never found it in my way, and have not, therefore, tried to replace it. With prolapsed cords I have more experience of this kind: I have put up many a one, but they have invariably come down again. Indeed, procidence of the arm, so far from hindering podalic version, rather facilitates it, as Madam Lachapelle contends,¹ because by putting a fillet upon the wrist, as recommended by Baudelocque, *we may prevent the arm from entering the womb*, in the process of turning, where it might take a wrong direction, extended as it is, and if it obeyed not the rotation that turns the sternum posteriorly, it might mount up the back of the child and become crossed upon its neck—thus causing a peculiar difficulty described in a previous part of this chapter. If the arm is kept down by the fillet, it may serve, also, to direct the rotation of the trunk, whilst it furnishes another purchase which may be useful in the extraction of the child; to which it may be added that being

¹ *Pratique des Accouchements, cinquième mémoire.*

already disengaged, it frees us from the delay that is sometimes attendant on the extrication of the shoulders, in the operation of turning.

Having spoken of the comparative *facility* of the two modes of turning, in simple and complex cases of shoulder presentation, their comparative *advantages* and *disadvantages* will next claim our attention. On this highly interesting subject there is, it must be confessed, a great paucity of reliable data to guide our judgment to a correct decision. As for the results to the *mother* of turning by the *feet*, a considerable body of statistics has been collected, which may enable us to approximate the truth. Thus, on consulting the "Tabular View of Seventy-one Cases of Shoulder and Arm Presentations," given by Dr. Lee,¹ and referred to by Dr. Wright, we find that *seven* women died from *rupture* of the uterus and *three* from inflammation of that organ. *Four* of these cases of rupture occurred in the practice of other accoucheurs and *three* in patients under Dr. Lee's own charge, "where," as he observes, "no great difficulty was experienced, or force employed in turning." To these may be added *forty* cases of shoulder or arm presentations, in the Dublin Lying-in Hospital during the mastership of Dr. Collins. In *thirty-three* of these, delivery was effected by podalic version; in *six*, by breaking down the thorax; in *one* the arm descended with the breech, the birth being premature and the child putrid. In *three* of the forty cases the uterus ruptured, *one* having been brought to the Hospital in this state; in *one* the pelvis measured but 2½ inches from pubes to sacrum, and in the *third*, the injury occurred in the turning. *Four* of the forty women died—*one* of inflammation of the brain, *one* of puerperal fever, and *two* of ruptured uterus, the child having been turned in one of these and its thorax perforated in the other.²

It thus appears that the *gross* mortality to the *mother* in Dr. Lee's cases was 1 in 7; in Dr. Collins', 1 in 10; while the mortality from the accident which is specially liable to occur in such cases, viz., rupture of the uterus, was 1 in 10 in Dr. Lee's cases, and 1 in 20 in Dr. Collins'.

It deserves to be particularly remarked, however (a circumstance which has escaped the notice of Dr. Wright), that this great mater-

¹ Theory and Practice of Midwifery, Phila. 1844, p. 335.

² Practical Treatise on Midwifery, Am. ed., p. 49.

nal mortality in Dr. Lee's cases happened almost entirely among those in which delivery was too long delayed. Dr. Lee's language is: "In a great proportion of these the operation of turning was undertaken in the most unfavorable circumstances, both for the mothers and their children, after the liquor amnii had entirely escaped, and the uterus had not only been contracting for many hours around the child, but repeated unsuccessful efforts had been made to deliver." We have no statistics specially of simple cases or of cases where the operation is undertaken at the proper time and by competent performers. Had we such, it cannot be doubted that it would be shown that *nearly uniform success* has crowned the operation. I cannot recollect a single instance of fatal termination out of quite a considerable number of shoulder presentations, delivered by podalic version, which have come under my own observation.

Of the results of *cephalic version*, on the other hand, so far as the mother is concerned, we are profoundly ignorant, for the silence of death itself reigns in the meagre records to which alone I have had access. No allusion whatever is made by the continental advocates of the operation to the fate of the mother: it is only the *children* they hold up in their arms and beckon us to join them in their shouts of exultation over their rescue. "Busch gave an account in 1826 of fifteen cases," says Dr. Churchill, "in which fourteen *infants* were born living. In 1827 Ritgen collected forty-five successful cases. Riecke has had sixteen cases." But what were the circumstances of the labor and what became of the *mothers* we are not informed.

It must be admitted that the statistics of shoulder presentation treated by podalic version, do not exhibit near so favorable returns, as far as the child is concerned. But then it is equally due to candor to state that, considering the bad character of most of the cases embodied in its tables, its relative success is truly surprising. Thus, whilst the general infantile mortality attendant upon turning, in all manner of cases, is, according to Dr. Churchill's collection, rather *less than 1 in 3*, it is, according to Dr. Collins, but *little more than 1 in 3* in shoulder presentations—33 of the children were turned, of which 20 were born alive.

But in trying to determine the important question that now engages us, we must consult our reason as well as statistics, which, as I have shown, are too meagre and indefinite to afford us much aid. What is the response of this oracle, if we inquire into the

comparative success of podalic and cephalic version? Plainly, it must be that, so far as the *mother* is concerned, it matters but little whether delivery be effected by the one mode or the other, *provided the most favorable opportunity be seized for the operation.* This position is so fortified by all experience as to be unimpregnable, for it is conceded on all hands, that under such a condition, there is little or no danger to the mother in delivering by the feet. Here, therefore, neither operation is particularly to be preferred, and the accoucheur is at liberty to select between them. Under the same favorable conditions, cephalic version, supposing it to be equally practicable, is preferable to podalic, in reference to the *child*, just so far, and no further, as *vertex* presentation is more favorable than *nates*; for when a shoulder presentation is reduced to either a *vertex* or *nates*, the expulsion of the child may be equally confided to nature, and the result must rigorously be the same as though it were originally presentation of the *vertex* or *nates*. This position, also, will not be contested.

Our oracle still further respondeth that it is a very delicate question, to determine which mode of turning ought to be preferred, supposing them to be equally practicable, *when the uterus is constricted and hugs the infant tightly in its embrace, and everything is adverse to either operation.* Still, she doth not refuse to entertain the question, and we will listen reverently to her ratiocinations.

To prove the greater safety of cephalic version, for the *mother*, Dr. Wright draws a parallel between it and podalic version, in these words: "In *cephalic version* the hand does not enter the cavity of the uterus, and consequently neither its walls, nor any portion of them are forcibly pushed out. The fœtus is moved comparatively little within the uterus, the head being already near the superior strait; while in *podalic version*, the part to be first delivered, is most remote from the canal through which it must pass. In the former, the injury (rupture) cannot result without great awkwardness on the part of the obstetrician, while in the other we have reason to feel surprised at the escape of injury. In turning by the feet the hand must necessarily be moved considerably within the uterus, and often while it is contracting violently. In turning by the head there is but little, if any, direct contact of the hand within the uterus. In the one case, contusion of the uterus by the hand is to be expected—in the other case there is no injury, because there is no contact. Turning by the feet may occasion a severe nervous shock. Not so in changing the shoulder for the

head." It will be readily perceived that, in this comparison, most of the advantages ascribed to cephalic version are derived from an erroneous assumption, namely, that the hand of the operator does not enter the uterine cavity, which has been already exposed, and the untenableness of which, I doubt not, Dr. Wright will himself admit, when his attention is drawn to it. That the hand need not be passed so deeply into the cavity is true, but that it can *handle* the head *ab externo* will scarcely be credited, unless it can be shown that it can act where it is not. There may not be as much likelihood of its doing mischief, when its manipulations are confined to the region of the *os*, as when it is passed into the *fundus uteri*: but it cannot be pretended that there is no danger of its lacerating the cervix and increasing the gravity of the lacerations, which, as we have seen, Levret charges on the simple replacement of the prolapsed arm—which is the initial step of turning by the head whenever that complication exists.

Turning by the head, then, is not exempt from the danger of lacerating the uterus, on the score of its being performed by the hand operating from without, nor can it be made satisfactorily apparent that it exposes to less risk of this kind, because of the little movement of the foetus, necessary to bring the head to the superior aperture of the pelvis. There is, as has elsewhere been observed, considerable diversity in shoulder presentations: the top of the shoulder, including a portion of the neck, may present, or the upper extremity of the *os humeri* or the elbow, nor is this latter variety uncommon. Now, whilst it may be granted that, in the first of these varieties, the head is nearer to the superior strait than the breech is, yet in the latter, there is manifestly no difference, and the foetus must be made to gyrate as much to bring the head as the breech into the excavation. Now, when we put all these things together, viz., the forcible *putting in* of the arm, if it be prolapsed, the seizure of the head of the foetus in utero, by *the hand of the operator*, which cannot be dispensed with in difficult cases, and the *movement of the foetal body* over the internal plane of the uterus, making a circuit that may be equal to that of podalic version, how is it possible that there is no risk of contusion and laceration of the uterus?

It only remains that we should inquire, by the light of reason, into the benefits conferred on the *children*, which, as we have seen, have been taken under the special protection of cephalic version. When we consider the extraordinary success that has been claimed

for this mode of delivery (14 living children in 15 deliveries, according to Busch)—success almost equal to that of perfectly natural labor—we cannot hesitate to conclude that the operation was, in by far the greatest number of cases, if not in all, undertaken at the most propitious time. If it be said that there is no evidence of this, it may be answered, neither is there any evidence to the contrary; and in the only cases of cephalic version, with the details of which I am acquainted, the result to the children was not so encouraging. I allude to the cases adduced by Dr. Wright, in *all* of which the children were lost: in Dr. Richardson's case, the child was expelled, *lifeless*, by the natural pains; in Dr. Terry's case, the *head was perforated* after an unsuccessful effort to extract it with the forceps; in Dr. Walker's case, the *child was dead and putrid*. Thus must it ever be in cases of shoulder presentation, which have been long protracted, no matter what mode of delivery is resorted to. It is not physically or physiologically possible that the fœtus can long endure the baneful circumstances by which it is surrounded; if promptly, gently, and skilfully extracted, it may live; but its hold on life is greatly enfeebled, and no care nor skill shall always save it. Its death, in all such cases, is not so much the result of the *mode* as of the *antecedents* of delivery; but I verily believe, and the statistics of Drs. Wright and Collins bear me out in the belief, that a well-conducted delivery by the feet offers a better chance of saving the child than cephalic version. Nor are there any sufficient grounds for the belief that podalic version is less preferable for the mother; for whilst it is possible that cephalic version, if easily practicable, may not be attended with so much risk of *immediate* injury to the mother, there can be no reasonable doubt that it is much more liable to be followed by pernicious consequences, exposing the woman, as it necessarily does, to the *prospective* danger of protracted labor, which it has no power to terminate.

From the foregoing remarks it may be concluded—

1. That in simple cases of shoulder presentation, either cephalic or podalic version may be practised, the former being preferable (provided it can be accomplished) on account of the greater probability of saving the child.
2. That, whilst cephalic version is not absolutely impracticable, in complex and even in complicated cases of shoulder presentation, it is more difficult of performance and fully as dangerous, both to the mother and child, as podalic version, in one or another of its forms.

But granting, now, for the argument's sake, that cephalic version is, in its ultimate results, as eligible as podalic version, still I should contend that in complex, much more in complicated cases, it ought never to be had recourse to, because the sufferings of the patient are uselessly protracted by it. Even if there be not exhaustion of the uterus, it is impossible to know beforehand, in any such case, whether the child will be expelled by the natural powers or require to be delivered by instruments, thus subjecting the patient to the combined hazard of manual and instrumental delivery. That this is not a groundless apprehension, one of Dr. Wright's cases, already alluded to, may testify, in which, after the head was restored to the pelvis, the forceps and perforator were both called in requisition to extract it.

To me it seems that cephalic version, under the circumstances we are now considering, is an *unfinished* operation. The patient is made to endure all the pain and incur all the risk of manual delivery, for the sake of having the head of the child placed where it may be expelled by a second course of labor as severe and perhaps as prolonged as the first might have been, had the head originally presented instead of the shoulder. Suppose, in performing the operation of lithotomy, a surgeon should make his incision into the bladder, seize the stone with his forceps and place it upon the cystic aperture, to be expelled by the contractions of that viscus: all would pronounce such an operation to be not only an unfinished one, but very strange and unaccountable. Not less strange and unaccountable does cephalic version appear to me. When a woman has been long in labor, the uterus striving in vain to expel the child under a shoulder presentation, the necessities of her condition will not admit of any temporizing expedients or half-way measures; she needs to be delivered, and turning by the feet alone can give us dominion over the labor, which is salutary alike for the mother and the child.

SECTION II.

INSTRUMENTAL AID IN SHOULDER PRESENTATION.

It has been already declared that cases will now and then be met with in practice, in which, on account of the excessively contracted condition of the uterus, it will be found wholly impossible to deliver by turning. I have had three or four cases of this kind, and what

is to be done for the relief of the woman, under such circumstances, will now claim our attention—I say for the relief of the *woman*, because the *child*, being dead, as it always is, when the mother is brought into such fearful peril, has no claim to our regard; and even though it were alive, the paramount claims of the mother forbid the doing anything which might increase the hazard of her life. It is manifest that all attempts to *forcibly* pass the hand between a powerfully contracted uterus and the foetus must be extremely painful, and may cause fatal rupture of the organ; no such attempts can, therefore, ever be justifiable. The only resort is mutilation of the child, either by *eviscerating* its trunk, to enable the operator to extract it doubled upon itself, in imitation of the natural process of duplication, or by *decapitating* it, in order that the body and head may be separately extracted. The former operation, being the only one of which I have any experience, I will briefly describe, referring the reader to other treatises, particularly to the elder Ramsbotham's "Practical Observations" for an account of the latter.

When this operation has become necessary, the shoulder is forced low in the pelvis, and the arm is usually protruded. A large incision is to be made in the most dependent part of the thorax, between two of the ribs, by means of Smellie's scissors, conducted to the part by two fingers of the left hand. This incision is to be crossed by another, which divides one or both ribs, so as to make a large perforation, through which the hand may be introduced, to remove the contents of the chest. The diaphragm is next to be perforated, and the abdominal viscera removed. The evisceration being completed, a crotchet is to be passed through the opening made in the chest, to get hold of the inferior part of the child's spine, or, better still, the interior of its pelvis; and with this instrument, traction is made to bring the nates into the excavation, and eventually through the vulva; the remainder of the delivery is to be conducted as in cases of ordinary turning.

The inexperienced practitioner should bear in mind that this operation may be sooner described than performed; for his encouragement, he may, however, be assured that it can be safely done by patience and perseverance, aided by a correct knowledge of the process adopted by nature, in those rare instances in which her unaided efforts are successful. In no cases is it more necessary to imitate nature than in these; for I have distinctly observed in practice that the child is always *extracted*, as it is sometimes *expelled*, doubled.

CHAPTER XVI.

THE TREATMENT OF THE THIRD STAGE OF
LABOR.

THE treatment of the third stage of labor is not unfrequently considered as subordinate to that of the previous stages, especially of the second. We are tempted to make this disparaging estimate by the greater dignity as well as bulk of the child in comparison with its appurtenances, which we somewhat opprobriously call the *after-birth*. There could be no more gross or fatal mistake. Great and important changes are rapidly taking place in the condition of the parturient woman, during this stage, and it behooves the accoucheur to be upon the alert, lest he be taken by surprise, and to be always prompt to render whatever assistance may be required by any sudden emergency that may arise. Then, again, he should consider that nature has thrown upon his hands another patient, whose utter helplessness appeals to his sympathies, and whose life is, in a manner, committed to his keeping. In a word, I should say that he, who cannot quit himself well of all the duties, both great and small, that pertain to this concluding act of parturition, is unfit to practise midwifery.

In the third stage of labor, the attention of the accoucheur is necessarily divided between the mother and new-born child, and in considering his duties, I shall speak, *first*, of the ordinary management which is required, when nothing occurs to interrupt the usual course of events, either as to the mother or child, and, *secondly*, of the treatment of the most common deviations from such a course.

SECTION I.

THE ORDINARY MANAGEMENT OF THE THIRD STAGE OF LABOR.

In considering the *ordinary management* of the third stage, it will be well for the student to accustom himself to what might be called the natural order in which his care should be bestowed respectively on the mother and her child. Pursuing such an order, I proceed to remark :—

1. That immediately after the child is born, it is to be taken hold of by the practitioner, and removed as far from the genitals of the mother as the length of the cord will allow. This removal should be slowly and deliberately accomplished, that the cord be not jerked or put on the stretch, and the child must be brought from under the cover and placed on its back or side, that air may have free access to it, when, if not before, it begins to breathe and cry.

2. Having provided for the child, the accoucheur should next spread both his hands over the hypogastrium of the mother, either in contact with its integuments or with very thin covering intervening, to ascertain whether the uterus be properly contracted or not. If it be contracted, he will be able easily to feel its hard globe, which he may search for in vain, if it be in a state of relaxation. In the first case, its contraction should be increased, or at least maintained, by pretty firm pressure with the hands; in the second, its contraction should be excited by friction over the whole abdomen, with both hands, alternated with strong pressure. Abdominal friction and pressure will, according to my experience, seldom, if ever, fail to arouse the uterus from its lethargy; and the success of these valuable expedients will be announced by the gradual gathering of the expanded organ into a ball under the hands, which is wound tighter and tighter, as the tonic contraction increases in power.

3. The accoucheur then turns to the child again, to inquire whether it can be safely severed from the mother, by cutting the cord, which had hitherto connected it with her. To decide this question, he must examine the state of the circulation in the umbilical vessels, which is done by taking the cord between his thumb and

finger, and noting the degree of pulsation that exists in its arteries. If the pulsation be strong, *throughout the whole length of the cord*, or as far towards its placental end as it can be examined, he may conclude that the new mode of life, which is now just beginning, is not perfectly established; for when the lungs are fully inflated, and the new channels of circulation are freely opened, the blood forsakes its foetal routes, and the umbilical pulsation becomes feeble or extinct, or if it can be felt near the child's abdomen, it ceases at no great distance from it. *The cord must not be divided until the new or extra-uterine life is satisfactorily established.* It is not, however, necessary to defer this operation until there is a total cessation of the umbilical pulse, under the puerile apprehension that the child may be feeble and sickly all its life, in consequence of the loss merely of the little blood that may be faintly circulating in the umbilical vessels, when the section of the cord is made.

The division of the cord is a very simple affair; it is done with a pair of scissors (which should be sharp), after having tied a ligature very tightly around it, at the distance of about two fingers' breadth from the umbilicus. The cord should be cut half an inch beyond the ligature, or far enough to prevent the ligature slipping off, after the section is made. It was formerly the practice to apply two ligatures, and divide the cord between them, for what reason, I am unable to conjecture, unless to guard against hemorrhage from the placental end of the cord, which might have been dreaded when this branch of the foetal circulation was imperfectly understood. It is now well known that whatever bleeding of this kind may occur, proceeds from the foetal vessels in the placenta, and cannot, of course, affect the mother, while, by depleting the placenta, it only makes its expulsion easier. The child being severed from the mother, is delivered to the nurse or female friend, who receives it in a warm blanket.

4. The accoucheur next makes an examination, to learn whether the placenta be detached or not; which is done by taking hold of the cord with the left hand, and pulling it cautiously until it is straightened (not stretched), and the index finger of the right hand is then slid along the cord, as a conductor into the patulous genitals of the patient. If the placenta be detached, it is lying loose about the external orifice of the uterus, or partly in the upper portion of the widely dilated vagina, and the finger is readily conducted to its smooth surface, where, also, the root of the cord is felt, if the pla-

centa have been separated in the most usual way. If it have been rolled into a cylinder in separating, the finger may not reach the root of the cord, and will not feel the smooth, but the lobulated, surface of the placenta; still it may identify it as the placenta. If the placenta cannot be reached in such an examination, it may be inferred that it is still attached to the uterus.

The conduct of the practitioner must be determined by the result of this exploration. If the placenta is *not* detached, the abdominal frictions and pressure should be renewed and diligently kept up, repeating the vaginal examination, from time to time, to ascertain whether or not the placenta can be reached by the finger. Should these efforts to bring the placenta within reach, by exciting uterine contractions, be unsuccessful, there will be ground to conclude that some unusual obstacle exists, requiring for its removal more than the ordinary treatment, with which only we are at present concerned.

If, on the other hand, the placenta is detached, are we to wait for its natural expulsion? or, if we are not to commit the case unreservedly to the resources of nature, how long shall we wait before we proceed to extract the placenta? Different rules of practice have been inculcated by eminent teachers, in relation to this part of the duties of the accoucheur; without discussing their merits, I shall simply state my own views and the practice which I have ever pursued.

It has always appeared to me that when the placenta is detached and lying loose in the genital organs, there is no necessity of waiting for its expulsion by the contractions of the uterus. Writers, who attach importance to the recurrence of the uterine contractions for this purpose, do not discriminate, as they ought, between the tonic and muscular contractions of the parturient organ, and assign to each its appropriate office. Their anxiety for the return of pains evidently proceeds from the supposition that the patient is in an insecure and perilous state without them; for their absence, it is imagined, is indicative of a relaxed condition of the womb, which might, at any moment, give rise to hemorrhage. With such views, it is no wonder that the artificial removal of the secundines, in the absence of uterine contraction, is condemned by them as rash and hazardous. But it has been shown that muscular contraction of the uterus has nothing to do, either with the separation of the placenta or the prevention of hemorrhage; these are the work of the tonic contraction, and the muscular is alone concerned with the

work of expulsion. The tonic contraction may exist in a high degree, as we can easily satisfy ourselves by the tests that have been explained, and yet, in this third stage of labor, the uterus may be disposed to rest from its more active expulsive efforts, and tolerate, for a long time, the presence of the secundines in its cavity. It is wearied by the exertions it made, in the previous stages of labor, and withal it possesses less muscular force, as we have seen in a former chapter.

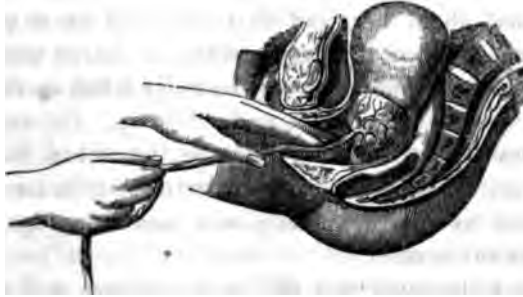
In this jaded and crippled condition of the uterus, if the placenta be allowed to remain in its cavity, there may be no return of expulsive efforts for hours or days; and meanwhile the secundines begin to decompose and emit an offensive odor; the genital surfaces become sore and heated, and the uterine orifice is contracted; so that when driven at last to extract the placenta, the practitioner encounters no little difficulty, and the patient suffers greatly on account of the procrastination.

If, then, the only good that can result from the return of labor-pains is the expulsion of the placenta, lying loose and waiting to be expelled, and nothing but evil is to be expected should it be retained long, I cannot but regard it as culpable timidity or negligence in the practitioner, to call upon Hercules when he might help himself; for it is within his power easily and safely to extract the placenta, whether there be pains or not. For my own part, I am ready to avow that I seldom wait for pains, or inquire of the patient whether she feels them or not—my only solicitude being to have the womb well contracted, and the placenta naturally separated. These conditions existing, I proceed, without delay, to extract the placenta, like a good *miller* (pardon the pun), when its turn to be served comes, that is, after the matters, already specified as entitled to precedence, have been dispatched.

The extraction of the placenta and membranes is, usually, a simple affair, and may be illustrated by the annexed drawing, Fig. 95. In its performance it is, however, proper to observe certain precautions which I proceed to suggest. The extraction is effected by tractions upon the cord, made by taking hold of it, near its cut extremity, with one hand, entwining it about the fingers to make the hold more secure, and seizing it between the thumb and fingers of the other hand, except the index, near the vulva—the index being at liberty that it may be introduced into the vagina, to note the progress of extraction. Traction is to be made, in the first

place, downwards and backwards, until the placenta is drawn into the vagina, and this direction may be given to the force by the

Fig. 95.



Extraction of the Placenta and Membranes.

hand next the vulva. Should there be any difficulty in causing the placenta to move in that direction, it may be overcome by pressing upon it near the root of the cord, with the points of two fingers, or by introducing two fingers deeply into the vagina, to press the cord towards the hollow of the sacrum, as far as possible, and holding them there as a pulley to give the desired direction to the force exerted by the other hand. When the placenta is brought fully into the vagina, traction is to be made upwards and forwards, in the direction of the axis of the vulva, when the placenta is readily brought through the external organ, at which time some pain is commonly complained of, and the diaphragm and abdominal muscles are excited to expulsive efforts.

When the placenta is extracted in this manner, it is doubled upon itself, and the membranes are inverted and turned over towards its uterine surface, as in cases of natural expulsion. The membranes are, however, liable to be broken off, and one or more fragments of them may be left in the uterus. No serious consequences need be apprehended from this accident; but the retained membranes may become the nucleus, around which blood coagulates, to form a mass of considerable size and firmness; and this being expelled, in the course of a few days, may be mistaken for a part of the placenta, and reflect discredit upon the practitioner. Or, this coagulum of blood may be supposed to be the uterus itself, prolapsed or inverted, or a polypus or other tumor, and give rise to great and unnecessary alarm. Instances of these mistakes and

groundless alarms, have fallen under my observation. I remember one case, in which the medical gentleman who had delivered the patient, came for me in person, to go with him to her house, two days afterwards; telling me that the patient had discovered something unusual about her, and that he found on examination, a tumor of some kind, in the vagina, which he feared was the womb, displaced. Before coming for me, he had pushed up the supposed tumor, and inserted a tampon to hold it up. On removing the tampon, it was soon discovered that the tumor had no connection whatever with the parts; and upon extracting it, its true nature was disclosed by pulling it to pieces, and bringing to light its membranous substratum.

To prevent the laceration of the membranes, and the leaving any portion of them behind, it is a good rule of practice to draw the placenta very slowly through the vulva; as it comes forth, take hold of it with the hand and twirl it several times, in order that the membranes, by being twisted together, may be made stronger and less liable to break. The placenta ought, moreover, to be slowly withdrawn from the vulva after it is disengaged, and the finger of the other hand should be passed into the vagina, to help along the tail of membranes, and to remove any fragments that might otherwise remain. He only can, to use a popular and expressive word, be said to have *cleared* his patient, who is careful to attend to all of these minutiae, which may appear finical to some.

5. The patient having been cleared, the next duty of the accoucheur is, to apply the binder for the purpose of giving support to the relaxed muscles and integuments of the abdomen, and, by its pressure upon the uterus, keeping up a due degree of tonic contraction, on which her safety so materially depends. A towel, long enough to go around the hips and wide enough to cover the abdomen, from the pubes to the cartilages of the ribs, or a piece of cloth of equal dimensions, makes a good binder, which has the advantage of being always at hand. It should be applied next the skin, which can be done under the bedclothes, by pushing one end of it, rolled like a bandage, under the back and hips, and unrolling it as it is brought forwards over the abdomen, to be pinned opposite the side. It should be drawn quite tight over the hypogastrium, and slacker over the upper region of the abdomen; and if it be desirable to make greater pressure upon the hypogastrium,

another towel folded can be placed under it as a compress. The only objection to this extemporaneous bandage is, its liability to slip above the hips, which may be obviated by a strip of cloth passing between the thighs, and pinned to it before and behind, in the manner of the T bandage.

The proper application of the binder I consider a point of sufficient importance to demand my personal attention, in every case. I always apply it myself, unless the patient have a nurse, in whose intelligence and carefulness I have confidence. To justify this solicitude concerning a matter regarded as trivial by some, it may not be amiss to mention another accident, quite as alarming though not so dangerous as uterine hemorrhage, which the binder is calculated to prevent. I allude to faintness accompanied by sinking, bordering on collapse, which occasionally supervenes, shortly after parturition. There may be other causes for this state, but I am persuaded that in many instances, it is owing to the sudden removal of the stimulus of distension, by the emptying of the gravid uterus, which acts in the same manner as drawing off the fluid of ascites, but more deleteriously, on account of the shock inflicted upon the nervous system, by the sufferings and efforts inseparable from childbirth. This persuasion rests upon observation in the lying-in chamber; for I have seen patients, prostrate and unable to speak above a whisper, with feeble, faltering pulse, cold extremities, and other marks of great depression, speedily aroused to greater animation by the careful application of a tight abdominal bandage, aided by a hypogastric compress.

6. Inasmuch as nothing is so essential to a woman, recently delivered, as rest and freedom from annoyance of every kind, at least until her exhausted powers are recruited, it is a good general rule to direct an anodyne, before leaving her. The anodyne must necessarily be one of the preparations of opium; two teaspoonfuls of paregoric, thirty or forty drops of laudanum, or half a grain of sulphate of morphia, may be given, according to circumstances. I am aware that this practice has been condemned, on account of the supposed danger of its interfering with the proper contraction of the uterus; but this objection is, I apprehend, altogether theoretical, for I have never seen anything to countenance it.

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SECTION II.

THE ACCIDENTS OF THE THIRD STAGE OF LABOR AND THEIR TREATMENT.

Having now explained the ordinary management of the third stage of labor, comprising a certain routine of duties, of greater or less importance, I shall next endeavor to direct the treatment that may be required, either by the child or mother, on account of the morbid states or accidents which may supervene. I speak now, of course, only of what may occur *during this stage of labor*, and not of the diseases to which a woman is liable during the puerperal state, or an infant within the month usually allotted to confinement. Confining myself within these limits, I would direct attention to:—

1. THE ASPHYXIA OF NEW-BORN INFANTS.

The condition of an infant born asphyxiated, is analogous to that of adults after strangulation, or the respiration of gases unfriendly to life. It is, in fact, brought into this condition by the operation of the various causes that may arrest its umbilical circulation, or hinder the oxygenation of its blood, in the placenta. The circulation of the foetal blood through the umbilical vessels is liable to be arrested whenever the cord is subjected to pressure between the head of the child and the pelvis of the mother, as it is liable to be in procidence of the cord in vertex presentations, and also during the passage of the head and thorax of the child in nates presentations. Though there be no compression of the cord, interrupting the circulation of the blood in its vessels, it is evident that unless the maternal blood flows freely through the cells of the placenta, the foetal blood will not be oxygenated. In either case, *intra-uterine asphyxia* is the consequence, which may not be discovered until the child is ushered into the world.

Whether the foetal or maternal blood be prevented from circulating through the placenta, the effects upon the child are the same; its blood not being vitalized in the placenta, soon ceases to flow in that direction, and is sent, in unusual quantity, to its internal

organs, particularly to the brain; because such large currents as had been hitherto sent to the placenta, being suddenly stopped, the descending aorta cannot receive and distribute as much blood as before, and consequently more blood is thrown into the carotid and subclavian arteries. While this derangement of the balance of the foetal circulation is going on, the action of the heart grows feebler, for the want of duly oxygenated blood, until it altogether ceases—never to be aroused again, unless the child be born in time to be resuscitated.

It is not difficult to recognize the existence of asphyxia in the new-born child. Its insensibility, immobility, absence of respiration, and of any effort to establish it, together with the cessation, usually, of pulsation in the cord, and the heart having ceased to beat—in short, all the tokens of apparent death—too plainly indicate it to allow mistake. To the signs just enumerated, should be added, lividity and tumefaction of the surface of the body, especially of the face.

Asphyxia, produced by the causes that have been mentioned, and accompanied by the signs that have been described, may be called *simple*, to distinguish it from another form of the malady, not unfrequently met with in practice, which may be termed *apoplectic* asphyxia, in which there is a deeper congestion of the brain, or, it may be, a still more serious lesion of this organ. This is treated of, by most writers, as apoplexy of new-born children; but as it is generally associated with asphyxia, and differs from it only in degree, there is no necessity of separating them. Apoplectic asphyxia, although it may result from the same causes as the simple, is, I apprehend, most usually induced by severe and long-continued compression of the head, from difficult and instrumental deliveries—whereby the blood is forced from the surface of the head to the brain, by pressure on the jugular veins, in face presentations, or by compression of the inferior parts of the body, in nates presentations, particularly where the feet are foremost, in consequence of which the blood is determined to the brain, because it is excluded from the lower parts.

Apoplectic asphyxia is accompanied with the same insensibility, immobility, and absence of respiration that attend simple asphyxia; but the heart may continue to beat, and the umbilical arteries to pulsate, and there are greater lividity and swelling of the face, the eyes being prominent and injected with blood, and the pupils

dilated. In both forms of the disease, when the means of resuscitation have been ineffectually applied, the heart and large vessels will be found gorged with black blood, and cerebral congestion will be discovered: but in the apoplectic variety, there may be effusion of reddish serum upon the surface and within the ventricles of the brain, or extravasation of blood, coagulating into a layer, of considerable thickness, upon the surface of the cerebral hemispheres.

The *treatment* of the asphyxia of new-born children may be divided into—1. That which is proper in the simple variety of the malady; and 2. That which is requisite in the apoplectic form.

Simple asphyxia is to be remedied by the employment of all the means calculated to put the respiratory apparatus in motion. Among these, one of the most powerful is, *sprinkling the surface, particularly the face and chest, with cold water*. For this purpose, the fingers should be repeatedly dipped in cold water, and shower the fluid, with considerable force, upon the parts indicated. The practitioner ought to be careful not to have the fingers too wet, lest the child be drenched and chilled, and after each aspersion, or, at all events, now and then, the surface should be wiped dry and well rubbed. The skin is thus rendered more sensitive, and the probability is greater that the respiratory nerves will be excited through its medium. MM. Desormeaux and Dubois recommend, as an excitant of respiration, which has more frequently succeeded in their hands than all others, a sort of douche upon the parietes of the thorax, made by filling the mouth with *eau-de-vie* (brandy), and spirting it forcibly upon the breast. It is, they say, rarely necessary to repeat this many times: it soon causes a convulsive contraction of the inspiratory muscles, blood and air penetrate the lungs, respiration is established, in an irregular manner at first, being feeble and convulsive, but it speedily becomes stronger and more regular.¹ I have no experience of this, but it evidently acts on the same principle, and its effects are the same as sprinkling with cold water.

With the same view, frictions should be made on various parts of the body—upon the extremities, accompanied by smart slapping of the palms of the hands and soles of the feet—along the spine, upon the temples, etc. Smellie seems to have had great faith in flagellation, as a means of resuscitating still-born children. In his

¹ Dictionnaire de Médecine, article Nouveau-né.

Treatise on the Theory and Practice of Midwifery he observes: "Whatever augments the circulating force, promotes respiration; and as this increases, the circulation grows stronger, so that they mutually assist each other. In order to promote the one and the other, the child is kept warm, moved, shaken, *whipped*; the head, temples, and breast rubbed with spirits; garlic, onion, or mustard applied to the mouth and nose," etc. Speaking, in his "*Collection of Cases*," of the different means had recourse to, to resuscitate a still-born child, after delivery by turning, in a difficult case of shoulder presentation, he says: "That which had the greatest effect, was whipping his little breech, from time to time, for which I ask pardon of my old friend and preceptor, *Dr. Nicholls*." The mucous membranes may also be irritated, as, for example, by holding camphorated spirits, hartshorn, etc., to the nose, and a little camphorated or simple spirits may be put in the mouth. Of blowing the fumes of burnt paper into the anus, recommended by Baudelocque and others, I have no experience.

The warm bath is advised by almost all writers, but I have seldom used it; and the little I have seen of it has not impressed me very favorably. Should the means already recommended fail to arouse the child, the next recourse is, artificial inflation of the lungs; and if this does not succeed, nothing more can be done. To inflate the lungs, I have been in the habit of applying my mouth to the child's, after having made a deep inspiration, and expiring the air, pretty forcibly, taking the precaution to close its nostrils with the fingers of one hand, while those of the other press moderately upon the trachea, to close the cesophagus, to insure its passage into the lungs. Successful inflation is indicated by the rising of its chest, when the blowing is to be intermitted and the air forced out, by pressure with the hand upon the chest and abdomen; the blowing is then to be repeated, alternated with pressure, until respiration is established, or we are convinced of the hopelessness of our efforts. These efforts must not, however, be relinquished until they have been fully and fairly tried—for I have known them succeed after the lapse of half an hour of disappointment.

In the apoplectic form of asphyxia, the great remedy is *blood-letting*, which must be promptly practised by cutting the umbilical cord, when, if its circulation be active, blood immediately spouts from its arteries. We have been directed to receive the blood in a vessel or upon a diaper, that we may estimate the quantity sub-

traced. But I take no such precautions; and instead of looking nervously at the blood, look at the child's countenance, watching the chasing away of its purple hue by the rosy tints of health; and when its complexion is good, I arrest the bleeding. While the blood is flowing, the child usually begins to breathe, at first with a sort of convulsive struggle, but presently it breathes deeply, and announces, by its cries, that it has escaped the danger that menaced it in the portal of life. If the umbilical pulsation be faint or extinct, blood cannot be procured so freely from the cord; when the bleeding should be promoted by stroking it and immersing the child to its navel, in warm water, made more stimulating by the addition of salt or mustard. If blood cannot be obtained in this way, a leech should be applied behind one or both ears. If blood-letting fail to resuscitate, the other means, already recommended in simple asphyxia, should be tried.

I have said nothing of bloodletting in the treatment of simple asphyxia; cases of this kind do, nevertheless, occur, in which it is not only proper but highly beneficial. Whenever the child is decidedly plethoric and congested, although the congestion may not reach the height of apoplexy, it is useful and salutary to detract blood from the cord. Nay, ample experience justifies me in saying that, when even simple asphyxia does not exist, if the child be plethoric and discolored, showing that it has suffered from the manner in which it has been ushered into the world, it will be benefited by losing a little blood, and secured, as I have reason to believe, from the convulsive affections, inflammations, and hemorrhages to which it would be otherwise obnoxious.

After the new-born child is recovered from the immediate effects of asphyxia, it will be proper to purge it freely to relieve the congestion of its internal organs, especially of the brain: and for this purpose we cannot do better than to give it a grain of calomel, followed with a small teaspoonful of castor oil in five or six hours.

2. MORBID RETENTION OF THE PLACENTA.

The most efficient means of promoting uterine contraction, specially with a view of insuring the detachment of the placenta, have already been pointed out and their great importance has been insisted on. These means are so efficacious, and, indeed, the tendency of unaided uterine action to detach the placenta is so strong,

that where it is not speedily detached, there is reason to fear the existence of some unusual obstacle. The practitioner ought, nevertheless, to persevere in the assiduous use of his abdominal frictions and pressure, for at least an hour, before he despairs of their success. If, at the expiration of this time, he is still unable to feel the placenta or any part of it, in an ordinary vaginal examination, he may conclude that *morbid retention* exists, and proceed to inquire into its nature. In such cases, it will be found that the placenta is retained by one or the other of the following causes, viz., *atony of the uterus, irregular contraction of the uterus, or morbid adhesion of the placenta*, which, as they require a difference of treatment, must be separately considered.

I. RETENTION OF THE PLACENTA FROM ATONY OF THE UTERUS.

Atony of the uterus may be ascertained to exist by the large size, and flabby, amorphous feel of the uterus, examined through the parietes of the abdomen. There is, likewise, an entire absence of pains, and the placenta cannot be reached by the finger, passed along the cord made moderately tense. If the placenta be partially detached, there is necessarily, or at least commonly, uterine hemorrhage; but if it retains its connection with the uterus, no blood is effused, and the woman is in no immediate danger.

Undue protraction of the previous stages of labor is, according to my observation, the most common cause of uterine atony in the third stage, the parturient power being so exhausted as to be inadequate to further vigorous exertion. But it may happen that too prompt expulsion of the child will leave the uterus in this atonic condition, because the organ is then, as Baudelocque expresses it,¹ taken by surprise, and is so stupefied as to have its contractile faculties suspended. On the same principle, the extraction of the child by manual or instrumental force, in the absence of pains, may be followed by atony of the uterus.

When uterine hemorrhage attends retention, from this cause, all are agreed as to the imperative necessity of extracting the placenta, with suitable precautions to insure a due degree of tonic contraction of the uterus. But if there be no hemorrhage, there is not the same accord, but discord rather, among writers and practitioners as

¹ Par. 232.

to the proper course of procedure. Some maintain that after a limited and specific time, the accoucheur ought to interpose and terminate the suspense of the patient, while others deprecate interference merely on account of the lapse of any time. To the latter class belonged our celebrated countryman, Dr. Dewees, who, for so long a period, ruled our obstetrical realm with an absolute sway. "I have always objected to making 'time' the criterion for action in midwifery," says Dr. Dewees, in discussing the subject now under consideration; and on the next page he declares, "When this state of things presents itself" (viz., retention from want of tonic power), "all attempts to deliver the placenta must be forborne, until we have, by properly instituted frictions over the region of the uterus, obliged it to contract and harden itself under the hand."¹ But what if the uterus wont be "obliged" to harden, and obstinately remains flaccid? We have been rubbing it for an hour, according to our directions, and still it is as incoherent as dough; how much longer shall we rub? There is a more direct and powerful means of exciting the uterus to contraction; why not resort to it now, without relying any longer upon that which has baffled us for the space of an hour?

The more powerful uterine excitant, to which reference is made in the preceding paragraph, is, the introduction of the hand into the flaccid cavity, to arouse its torpid parietes to action, and to withdraw the placenta. My own "fixed" rule of practice, in this case as well as in retention from the other causes mentioned, is, to have recourse to this manipulation, in an hour or so after the birth of the child, it being understood, of course, that all other means have been diligently but vainly tried in the interim. The passage of the hand, well lubricated with oil or lard, along a track so recently traversed by the child and yet patulous, from atony, is neither a painful nor a difficult operation. In performing it, the patient must be placed on her side, or, if she lie on her back (which I commonly prefer), her pelvis must be near the edge of the bed, with the perineum slightly projecting, her feet being supported on chairs, or the laps of assistants, because the hand having to follow the axis of the excavation, the arm must necessarily be greatly depressed. The practitioner should pull off his coat and roll up the shirt-sleeve of the arm, usually the right one, which is to be

¹ Midwifery, Chapter 32, of the Assisted Delivery of the Placenta.

used in operating: the latter part of the preparation ought not to be made in view of the patient, or, indeed, of the bystanders. It can be done, as well, under the covering which protects the patient against unnecessary exposure and him from prying observation.

The preliminaries being settled, the accoucheur takes the cord in his left hand, twisting it about the fingers to get a secure hold of it, and draws upon it until it is straightened or rendered a little tense. The cord is to be thus held, as a guide to conduct to the placenta the other hand, which, formed into a cone, by pressing the fingers closely together and flexing the thumb upon the palm, is now introduced in the direction of the axis of the inferior strait, viz., upwards and *backwards*, until it is fairly lodged in the vagina. It next enters the uterus; and, in this part of its introduction, it moves upwards and *forwards*, in the direction of the axis of the superior strait, while an assistant presses on the abdomen to steady the uterus. Conducted by the cord, the hand arrives at the placenta, upon which pressure is to be made with the knuckles, while counter pressure is kept up by the other hand (now no longer needed to hold the cord), through the walls of the abdomen. The hand is, also, moved about in the uterine cavity, and brought in contact with other points of its parietes, to stimulate them to contraction. It happens sometimes that when contractions cannot be provoked by these assaults of the hand, they are evoked by feigning a retreat in partially withdrawing the hand. Cases occasionally occur, in which neither of these manoeuvres is successful, and then I have not scrupled to make a cautious separation of the placenta, by a finger insinuated between it and the uterus, which will hardly fail to excite contraction. When contraction takes place, it may separate the placenta, or complete the separation the practitioner had commenced, and the hand may now be withdrawn, bringing the placenta along with it. If the placenta be separated, partially or wholly, the hand must never be withdrawn until the uterus is felt to be in a state of vigorous contraction, for the patient would be exposed to the risk of hemorrhage from the exposed orifices of the utero-placental vessels.

I know that the manual extraction of the placenta, under the circumstances described, in an hour after the termination of the second stage, has the appearance of a cruel operation, uncalled for by the actual condition of the patient. She is suffering no pain, is in no immediate danger, and if let alone, *might* do well, uterine con-

traction, after the lapse of a longer time, coming on and finishing its work, with less pain than is inflicted by artificial delivery. The arguments for delay are specious, and apt to captivate the timid or too sensitive practitioner. The reasons which justify the more decisive course I have recommended ought, therefore, to be set forth so strongly, if possible, as to induce its general adoption. Let it be remembered, then, that the placenta cannot be allowed to remain in the uterus, without the imminent risk of alarming hemorrhage, which may occur at any moment, and destroy the patient before the practitioner can come to her rescue. Her condition is, therefore, in this respect, so perilous, that the medical attendant would hardly be excusable in leaving the house, unless, indeed, his residence be very near, and even then he may be out of the way when an urgent message is sent to recall him. The practitioner is consequently fettered, and the patient is anxious about her situation. Supposing that she escapes hemorrhage, she is liable to offensive discharges from the genitals, produced by putrefaction of the placenta—discharges so offensive as to infect the chamber, though spacious, with their odor, and taint even the adjoining apartments—and then constitutional symptoms, of the most alarming kind, may supervene: “purgings, vomitings, sweatings, a pulse of one hundred and forty, a cheek of typhoid tint, and a brown tongue.”

The latter part of this sketch is taken from an author, partly in his own words, who is by no means as decided in his determination to remove the placenta as some others; and who speaks of leaving this mass in the uterus with more complacency than is, I think, allowable, because he had “*noted more than one case, in which the placenta had remained a long time in the uterus, without a single conspicuous symptom of irritation becoming manifest.*” Dr. Blundell, the author referred to,¹ seems to have experimented a good deal in this way, and that apparently from the strong repugnance he manifests, everywhere and in every variety of expression, in his lectures, against the introduction of the hand into the uterus, which he never recommends, but in connection with the risk incurred by it, when there is any difficulty in the operation, of *bruising*, and *tearing* the parts, and the consolatory prospect of *inflammation*, *slough-*

¹ Lectures on the Principles and Practice of Midwifery, edited by Charles Severns, M. D., Lecture XXX.

ing, and *death*, as its result. To this sketch of the consequences, likely to arise from leaving the placenta in the uterus, already sufficiently gloomy, I will only add that, should it become necessary to remove the placenta, at a period somewhat remote from the birth of the child, the difficulty of the operation is greatly enhanced, and there may then be real danger, while the patient must necessarily suffer great pain, on account of the soreness and swelling of the parts.

These considerations gave fixity to the rule which I early adopted for the government of my own practice, in these cases, namely, the rule to deliver the placenta manually at the expiration of an hour from the close of the second stage. I have had no reason to repent my adherence to the rule; no uterus has been torn or bruised, or destroyed by inflammation and sloughing, and never having, in a single instance, allowed the placenta to abide in the uterus, I have never in my own cases, snuffed the intolerable stench of its putrescence. Is it necessary to fortify myself with authority? Hear what Burns says: "We ought never to leave the bedroom, until the placenta be expelled; if it be not excluded in an hour after delivery, we ought to extract it."¹

I have said nothing concerning *ergot*, which is recommended by some, or the various other *deobstruents*, as they are called by Dr. Blundell, who discourses at some length in their favor as remedies for retained placenta. Among these are, injections of senna and salts into the rectum, coughing, sneezing, blowing on the back of the hand (why deviate from a more ancient direction, to blow into a bottle?), but above all, *retchings*, provoked by tickling the throat with a feather. I have no experience with any of these things, because I regard them as trifling and uncertain, and know that my hand will not forget her cunning. I beg that the reader will not infer, from my commendation of the hand, that its introduction into the uterus is an every-day feat with me. Far from it. According to my experience, there will seldom be occasion for it, on account of atony, if the previous parts of labor have been properly managed.

¹ Principles of Midwifery, Philadelphia edition, 1823, vol. i. p. 375.

II. RETENTION OF THE PLACENTA FROM IRREGULAR CONTRACTION OF THE UTERUS.

Irregular contraction of the womb is most apt to ensue after unusual prolongation of the previous stages of labor, more especially where the membranes are ruptured prematurely, and the liquor amnii flows away entirely, before the child engages in the os uteri. The tendency to unequal and irregular contraction, under such circumstances, has been noticed in the former part of this treatise, and the chosen seat of it has, also, been pointed out. That seat, it will be remembered, is the upper part of the neck, the cervico-uterine orifice. Whether contraction exists, at this part, prior to the expulsion of the child, hindering its escape, or takes place immediately after its birth, the uterus, it is evident, will be divided into two cavities—a superior cavity, that of the body, and an inferior cavity, that of the neck. The student might, perhaps, conceive

Fig. 96.



Hour-glass contraction of the womb.

what is the shape of the uterus, seized with such an irregular contraction: but to help him to acquire a correct impression of it, I annex a drawing, Fig. 96, from which it will be perceived that the organ is made to assume the shape of an hour-glass, from which, indeed, it takes its name of the *hour-glass* contraction of the womb. The placenta is imprisoned, encysted, as it were, in the upper compartment, which, being contracted, is but little, if any, larger than the lower, and the cord is seen projecting through the stricture of the uterus, and traversing the empty cervical compartment on its way outwards.

Other abnormal states of the uterus, existing in conjunction with retention of the placenta, may doubtless be mistaken for hour-glass contraction, particularly closure of the *os uteri*, shutting up the placenta in the general cavity of the womb; which I understand to be what Dr. Ramsbotham denominates "*globular contraction*," and which, as I suppose, takes place simply from the placenta's being allowed to remain in the uterus, when it might have been abstracted. Still, I cannot agree with that admirable practical

writer in the opinion that hour-glass contraction is exceedingly rare, and that globular contraction is very often mistaken for it. I have myself met with a considerable number of cases of hour-glass contraction, of a well marked character, and Dr. Burns testifies to its commonness. The theory of Dr. Ramsbotham, by which he attempts to account for this opinion of the Scottish professor, is certainly ingenious, but appears to me to be in the highest degree improbable. He supposes that Dr. Burns habitually mistook contraction of the *os uteri* for hour-glass contraction! which involves, of course, the further error of mistaking the vagina for the inferior portion of the uterus! The truth is, I strongly suspect, that Dr. Ramsbotham's "globular contraction" is itself very rare, and certainly it will not be met with, very soon after the expulsion of the child; whereas hour-glass contraction always takes place immediately afterwards, for it is found so soon as a deep exploration is made to discover the cause of the retention of the placenta.

The *treatment* of hour-glass contraction, which is the only irregular contraction that can operate as an impediment to the delivery of the placenta, is simple, though it may be difficult and painful in the execution. It consists in the introduction of the hand, and the insinuation of the fingers, one after another, within the strictured portion of the uterus, for the purpose of dilating it, and gaining access to the upper chamber, where the placenta is incarcerated. This stricture is usually so great as to leave an aperture no larger than the cord, around which it is formed, and so firm that very persevering efforts are required to overcome it. To be safe or successful, our efforts must not be violent but steady, and we must be content to gain our end by slow degrees. It may take an hour or more to overcome the resistance of the constriction, and get the hand fully in the upper chamber, when the placenta is to be grasped, after separating it, if it be found adherent, and slowly withdrawn; observing whether the fundus contracts after the hand, and if it do not, pressing against it, making, at the same time, counter pressure externally with the other hand, until it is excited to contraction.

The manual removal of the placenta, in cases of hour-glass contraction, is, as already intimated, a painful operation—few operations are, indeed, more painful—it will, therefore, be proper to do all we can to diminish the sufferings of the patient. Fortunately

we now have it in our power to annul the cruel suffering which has hitherto attended the operation, by placing the patient completely under the influence of chloroform, by which the stricture is at the same time relaxed, and the operation promoted. If

Fig. 97.



Removal of the Placenta, in hour-glass contraction.

chloroform cannot be had, or if the practitioner does not see fit to use it, a large dose of opium—a hundred drops of laudanum, or one grain of sulphate of morphia—may be exhibited an hour before the operation is commenced. In the drawing, Fig. 97, the hand is seen in the act of dilating the strictured portion of the uterus, to which it is to be conducted by the cord, made slightly tense by traction with the left hand. When the stricture is reached, the left hand is to be applied upon the abdomen to steady

the uterus, and co-operate, as before said, with the hand in the womb.

III. RETENTION OF THE PLACENTA FROM MORBID ADHESION.

This obstacle to the natural exclusion of the placenta, is occasionally met with in practice, and is more alarming than simple atony, because, according to my observation, it is more apt to be accompanied by hemorrhage, owing, as we may suppose, to all parts of the mass not being equally firmly adherent, and the separation of the less adherent portion, exposing the mouths of bleeding vessels. The existence of morbid adhesion of the placenta may be *suspected* when the uterus feels firmly contracted, and the placenta is, notwithstanding, so high as to be beyond the reach of the finger: but it can only be certainly detected by the hand, carried into the cavity of the womb.

When morbid adhesion of the placenta is suspected, the means already directed to excite the uterus to more powerful contraction, should be diligently employed for an hour (unless hemorrhage appear, and then no delay is proper); and if these do not answer, we

must proceed to its manual extraction. Baudelocque,¹ and after him, our celebrated countryman, Dr. Dewees,² inculcated the practice of applying force to the placenta, by means of the cord, for the purpose of disrooting its attachments and bringing it away. In order to the success of this method, they tell us that the force must be directed in such a manner as to act perpendicularly to the surface of the placenta; in order to which, again, it must be ascertained to what part of the uterus the placenta is adherent, and then, by arranging a couple of fingers in the vagina, as a pulley for the cord to be drawn over, the required direction can be given to the force. I have no experience of this manœuvre, having always regarded tractions upon the cord, in cases of retained placenta, no matter from what causes, as unsafe, on account of the danger of inverting the uterus. It was not, therefore, without surprise, that I discovered, that a late and generally judicious writer, Dr. Robert Lee,³ recommends these tractions, as a part of the ordinary management of the placenta. Discoursing of the treatment of natural labor, he says: "When a pain is felt, slight traction, in the direction of the axis of the brim of the pelvis downwards and backwards, should be made upon the cord," and with what object? why, "to promote the separation of the placenta from the uterus." "By compressing and squeezing the fundus uteri," he continues, "and gently pulling from time to time, on the cord, the placenta usually descends, and passes through the os uteri into the vagina, in the course of a quarter of an hour, or twenty minutes, or half an hour after the birth of the child." "More anxiety," he adds, "is often felt by us during this period, than during the whole of the previous stages of the labor, and not without good reason." Not without good reason, I would say, certainly; for, were I to imitate Dr. Lee's practice, in this particular, I should, undoubtedly, feel anxious, instead of being composed, as I usually am, by the confident expectation that the uterus can be excited to detach the placenta, and bring it within easy reach. Even in view of the

¹ L'Art des Accouchements, chapter 5, section 5. Des obstacles qui proviennent des adherences contre nature du placenta, et de ce qu'il convient de faire en pareil cas.

² Midwifery, chapter 32.

³ Lectures on the Theory and Practice of Midwifery, Philadelphia edition, 1844, page 222.

possibility of being disappointed in this expectation, I am not dismayed, for I remember my *hand*.

To return from this digression. The safest and most reliable treatment of morbid adhesion of the placenta, consists in introducing the hand, in the manner and with the precautions already described; and when it reaches the placenta, endeavoring to excite the uterus to throw it off, by pressing on its surface, or, as Burns directs, by gently rubbing, or, as it were, pinching it up between the fingers and thumb. Should these efforts fail, and this has happened in my hands, we may be under the necessity, contrary to the prohibition of this high authority, of breaking up the adhesion with the finger, insinuated between the placenta and uterus. The operation is to be executed as rapidly as is consistent with its proper performance, for, as the placenta is being detached, the mouths of the uterine vessels, running to it, are unstopped, and blood is felt trickling, or, it may be, streaming down the arm. When the placenta is separated, it is to be abstracted with the co-operation of uterine contraction.

Fig. 98.



Removal of adherent Placenta.

The student will gain a better idea of the manual operation for the removal of adherent placenta by inspecting Fig. 98, in which it is very well portrayed. I may add that, when the placenta is partially detached, whether by the fingers of the accoucheur or by uterine contraction, he may seize hold of the detached portion and pull it in order to separate the remainder, instead of dissecting with the finger.

Should it be found difficult to break up the attachments of the entire placenta, on account of the very intimate adhesion of a part of it, we must rest satisfied with bringing away so much of it as can be separated without too great or too persevering effort, as the uterus might be perforated by such strenuous exertion, an instance of which was witnessed by M. Cazeaux, in the practice of an "imprudent surgeon." We are informed, by the same author, that Leroux, of Dijon, tore off a considerable portion of the internal muscular coat of the uterus by pulling too violently on the detached portion of the placenta. In the few cases that have occurred in my own practice, in which I could not sepa-

rate the whole of the placenta by moderate force, I judged it the least of two evils to leave a part of it to be gradually cast off, by spontaneous loosening and disintegration. The patient then ought to be carefully watched, as she is liable to hemorrhage and irritative fever; and abundant vaginal injections of milk and water, or, if the uterine discharges are offensive, of solution of chlorinated soda, properly diluted, ought to be used two or three times a day.

3. POST-PARTUM FLOODING.

The last topic which will engage our attention is *uterine hemorrhage*, occurring in the third stage, either before or after the removal of the placenta. Uterine hemorrhage, during any of the stages of labor, or the latter months of pregnancy, before labor comes on, is not, as we have seen, like the hemorrhages to which other organs are obnoxious, from morbid states, but resembles, rather, hemorrhage from injuries, which come within the province of the surgeon. It is, in fact, essentially of the same nature. Wounded arteries and veins bleed, because they are cut—the effusion of blood being purely *passive*, in the sense, at least, that preternatural momentum of the circulation has nothing to do with causing it. As long as the circulation goes on, no matter at how feeble a rate, blood will continue to flow from the divided vessels, until they are secured by ligature, or stopped by coagula. Just so with regard to uterine hemorrhage, towards the close of pregnancy or at the time of parturition. Blood flows from the denuded orifices of the utero-placental arteries and veins, whenever the placenta is separated, and will continue to flow until it is arrested by coagula, or nature's ligatures. These ligatures consist in the muscular fibres of the uterus, that encircle the blood-vessels, and they are *tied* by the tonic contraction of the uterus. If the uterus be well contracted, the ligatures are tightly drawn; if it be relaxed, they are loose about the vessels: hence the satisfaction of the intelligent obstetrician if he finds the uterus firmly contracted after the expulsion of the child, and his anxiety (which he must, however, keep to himself), if he finds it flabby, or fails to find it at all.

Of flooding, occurring in the latter months of pregnancy and terminating in the induction of labor, I have treated at considerable length in the early part of this volume; but the student ought to be apprised that it is of much more frequent occurrence during or immediately subsequent to the third stage of labor. Indeed, our

utmost vigilance is often needed to avert *post-partum* flooding, and it may suddenly supervene when we are least expecting it. Nor do we perform our duty unless we remember that it is a covert, as well as an open enemy of parturient females, and may intrench itself in the womb, after having barricaded the external orifice with coagula. In this concealed situation, it may sap the foundations of life, and the practitioner not be aware of danger until he sees the edifice tottering to its fall. Dr. Gooch very properly remarks, that the constitution suffers from this *internal hemorrhage* as if an equal quantity of blood were discharged externally—the blood in either case being out of the circulation—and consequently the danger is equally great. “I have,” says he, “seen many cases of internal hemorrhage. Not long since I was requested to attend at the examination of the body of a female who had died soon after delivery; the labor appeared to have terminated favorably, and the accoucheur had left her: soon afterwards she became pale and fainted: he was immediately sent for; but just as he arrived she expired. There was no external discharge of blood; he knew not to what so fatal a change could be imputed. As soon as we entered the bedroom to examine the body, we perceived that the abdomen was much above the level of the body, and appeared as prominent as that of a woman seven months gone with child. The uterus, on its exposure, was seen to be enormously distended; and although there was no external evidence of hemorrhage, on cutting into it we found a mass (amounting to a gallon) of coagulated blood.”¹ We now and then hear of sudden deaths among parturient females, in all parts of the country, astounding the friends on account of their unexpectedness, nothing having occurred in the previous stages of the labor to prepare them for such a catastrophe. In many of these melancholy cases, concealed uterine hemorrhage was the fatal foe—so much the more fatal because unsuspected. It should, therefore, be engraven on the memory of every practitioner of midwifery, in capital letters, that **UTERINE HEMORRHAGE IN THE THIRD STAGE OF LABOR IS THE GREAT DESTROYER OF PARTURIENT WOMEN.**

These observations upon the nature and tendency of uterine hemorrhage, in this stage of labor, being premised, we may proceed to consider the most effectual weapons with which we can arm ourselves when called to combat it.

¹ Practical Compendium of Midwifery.

First: Hemorrhage before the Extraction of the Placenta. The treatment in this condition ought to be modified by the previous circumstances of the case. If a discharge of blood should take place immediately after the birth of the child, we may try *frictions* and *pressure* over the uterus, with the hope of exciting sufficient contraction to arrest it. These means not proving efficacious as promptly as we desire, we may resort to *cold*, either by repeatedly wetting our hands in cold water, while pressure and frictions are making with them on the naked abdomen, or by applying cloths from which cold water or a mixture of vinegar and water is wrung out. But if the discharge appear later, notwithstanding frictions and pressure had been used as preventives, or in the event of the failure of these means quickly to control it, where it commences immediately after the birth of the child, it must be met by the introduction of the hand into the cavity of the womb, for the double purpose of compelling it to contract, and of removing the placenta. In cases of internal hemorrhage, no time should be lost in trying the milder remedies, because by the time it is discovered, by the pallor of the patient's countenance, the feebleness of the pulse, faintness, sickness at the stomach, large size of the abdomen, etc., she has already lost so much blood, and the uterus is so little disposed to contract, that we must use the club of Hercules to kill the lion of Nemæa, or it will kill our patients—and this club is neither more nor less than the **HAND**, carried into the uterus to press upon its internal surface, aided by counter pressure from without, and to withdraw the placenta, as soon as it is perceived that the uterus is contracting.

I have said that one of the objects of the hand's intromission is to excite uterine contraction, and I have been careful to give precedence to this indication, because it is paramount. What would it avail to evacuate the uterus, by bringing away the placenta, and leave its walls as relaxed as an empty sack? And yet this is the practice inculcated by M. Velpeau, which can hardly be contemplated without a shudder; and it is surprising that neither his American translator nor the editor of the third edition of his midwifery, published in this country, protested against it. Speaking of hemorrhage before the delivery of the placenta, M. Velpeau says: "Whether it depends upon inertia, spasm, plethora, or irritation of the womb, it is always a dangerous phenomenon, which we ought to make haste to combat; if the presence of the placenta is not the only cause, it at least serves to keep it up and aggravate it; we

should, therefore, be diligent in extracting it, even although there should be inertia"¹! M. Velpeau professes to be in doubt as to the cause of the hemorrhage, but he does not hesitate to say that it is "improperly attributed to the non-contraction of the womb, in consequence of which the blood must flow in torrents from *supposed* orifices that remain gaping upon the internal surface of the organ," and then straightway he envelops himself and his reader in a fog of puerile conjectures. Now, if there be any one principle in practical obstetrics firmly established, it is precisely this: that a relaxed uterus may bleed profusely, soon after the birth of the child, if the placenta be detached, while a contracted uterus cannot bleed; and to call in question the existence of large vascular orifices, especially venous, where the placenta had been attached, is preposterous, because any one may see them, and thrust the end of his little finger into some of them. It is fortunate for M. Velpeau that the uterus is prone to contract, on the introduction of the hand, and particularly when it is being withdrawn, else it cannot be doubted that his practice, in these cases, would prove disastrous in the extreme. This contraction may, however, fail to take place, if no precautions be adopted to insure it; it cannot, therefore, be believed, by any one holding correct doctrine on this vital and deeply interesting subject, that the practice of M. Velpeau is as successful as that which sound principles prescribe.

In the treatment of hemorrhage, while the placenta is retained, I have said nothing of injecting the umbilical vein with cold vinegar and water, or brandy and water, of administering styptics, or even ergot, because none of these things can be relied on: the HAND, the HAND is the main chance.

Secondly: Hemorrhage after the Extraction of the Placenta.—The same indication is presented here as in the first case, namely, to excite uterine contraction; but it may be fulfilled by other means, though the hand is to be held as *une chose de réserve*, in the event of their failure. These means are: 1. Firm pressure upon the naked abdomen, by both hands, with a movement of the fingers, as if we aimed to grasp the uterus, and amass its flabby, floating parietes. When this manipulation is commenced, the uterus is nowhere to be felt; but, if it be successful, we presently feel it

¹ An Elementary Treatise on Midwifery; or Principles of Tokology and Embryology, translated from the French, by Charles D. Meigs, M. D., with notes and additions by William Harris, M. D., Philadelphia, 1845, p. 544.

gathering itself up, and becoming hard to the touch. In proportion as the uterine globe is formed, from the preëxisting chaos, the hemorrhage subsides, and when it feels uniformly hard, we know that our patient is placed on *terra firma*.

2. The application of cold, in the manner already directed, viz., by cloths wrung out of cold water, or by cold water poured in a small stream from a pitcher or teapot on the abdomen. Cold cloths may likewise be applied to the vulva, and ice may be deposited in the vagina; or ice-water may be injected into the bowels, a quart at once, which is a favorite remedy of my highly esteemed and judicious colleague, Prof. B. R. Palmer, who informs me that it has never failed, in his hands, to excite uterine contraction and arrest the bleeding. When we consider the contiguity of the intestine to the uterus, it appears to be reasonable to suppose that cold applied in this manner must operate more powerfully than through the parietes of the abdomen; and this consideration ought to incline us to give the greater heed to the experience of Dr. Palmer. I may add that the injection of half a pint of cold water into the rectum, night and morning, is highly extolled by Dr. Gooch as a remedy for obstinate menorrhagia. Cold, freely and boldly used, is a powerful agent; and I have met with very few cases of hemorrhage, of this kind, that did not yield to it, in conjunction with grasping pressure. When such cases do occur, we must, as already intimated, introduce the hand into the uterus to arouse it from its stupor. It seems to have been a favorite practice of Dr. Gooch, to press with the hand in the uterus upon the bleeding surface of the organ, whilst counter pressure is made with the other hand on the outside of the abdomen, and in this way, he says, he has known the most profuse hemorrhage suppressed.¹ My own experience does not enable me to decide on the merits of this particular manual operation, because, as already stated, I have seldom had occasion to insert my hand, in these cases; it may, however, be doubted whether any special efficacy can be claimed for it, unless, indeed, pressure be made strong enough to contuse and stanch the bleeding vessels, independently of uterine contraction—a procedure not required by the nature of the case—to say nothing of the risk of dangerous consequences. Contraction is emphatically the one thing needful.

¹ Op. cit., p. 154.

Some practitioners are in the habit of administering ergot, in the hemorrhage under consideration. There is no harm in giving the article, provided we put no trust in it. I mean to say that ergot might possibly do good; but that its operation is too precarious to justify any one in relying on it, to the neglect of the more certain resources which have been pointed out. There is another expedient, adopted by some, and sanctioned by high authorities, which is not so harmless—I allude to the *tampon*. To attempt to control hemorrhage from an empty and flaccid uterus, by plugging the vagina, is highly hazardous. We may, it is true, prevent the issue of blood by this expedient, but we can have no assurance that it will not continue to pour from the vessels and collect in the uterine cavity, until life is exhausted. It is better to contend with an open than a lurking enemy; for though we are fully able to cope with him, we might be circumvented by his wiles. Let the blood, then, have an unobstructed channel; we can, the more clearly, discern our patient's danger—which it is folly to hide from our eyes—and shall be incited to more earnest efforts to save her from impending death.

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