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# OBSTETRICS

The Medical Epitome Series





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# The Medical Epitome Series.

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## OBSTETRICS.

A MANUAL FOR STUDENTS AND PRACTITIONERS.

BY

W. P. MANTON, M. D.,

*Adjunct-Professor of Obstetrics and Professor of Clinical Gynecology, Detroit College of Medicine; Visiting Obstetrician, Woman's Hospital and Infant's Home; Gynecologist to Harper Hospital, and to the Eastern and the Northern Michigan Asylums for the Insane; Consulting Gynecologist to St. Joseph's Retreat; Fellow of the American Gynecological Society, the British Gynecological Society, the Southern Surgical and Gynecological Society, the American Association of Obstetricians and Gynecologists, etc.*

SERIES EDITED BY

V. C. PEDERSEN, A. M., M. D.,

*Clinical Assistant in Surgery at the New York Polyclinic Medical School and Hospital; Deputy Genito-Urinary Surgeon to the Out-Patient Department of the New York Hospital; Physician-in-Charge, St. Chrysostom's Dispensary; Recently Assistant Demonstrator of Anatomy at the College of Physicians and Surgeons, Columbia University in the City of New York; Assistant Surgeon to the Out-Patient Department of the Roosevelt Hospital and to the Vanderbilt Clinic, etc.*

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## AUTHOR'S PREFACE.

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IN a work of this scope only the essentials of Obstetrics can be presented. Personal experience has been introduced only in the way of arrangement and in the discussion of the various subjects. It is hoped, however, that, brief as it is, this manual will be found of assistance to the student, and that it will prove helpful in his perusal of the larger treatises on Obstetrics.

W. P. MANTON, M. D.

DETROIT, 1903.





## EDITOR'S PREFACE.

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IN arranging for the editorship of *The Medical Epitome Series* the publishers established a few simple conditions, namely, that the Series as a whole should embrace the entire realm of medicine; that the individual volumes should authoritatively cover their respective subjects in all essentials; and that the maximum amount of information, in letter-press and engravings, should be given for a minimum price. It was the belief of publishers and editor alike that brief works of high character would render valuable service not only to students, but also to practitioners who might wish to refresh or supplement their knowledge to date.

To the authors the editor extends his heartiest thanks for their excellent work. They have fully justified his choice in inviting them to undertake a kind of literary task which is always difficult—namely, the combination of brevity, clearness, and comprehensiveness. They have equalled the conscientious efforts with which the editor has performed his duties from first to last. Co-operation of this kind ought to result in useful books, in brief manuals as contradistinguished from mere compends.

In order to render the volumes suitable for quizzing, and yet preserve the continuity of the text unbroken, the questions have been gathered at the end of each chapter. This new arrangement, it is hoped, will be convenient alike to students and practitioners.

VICTOR C. PEDERSEN.

NEW YORK, 1903.





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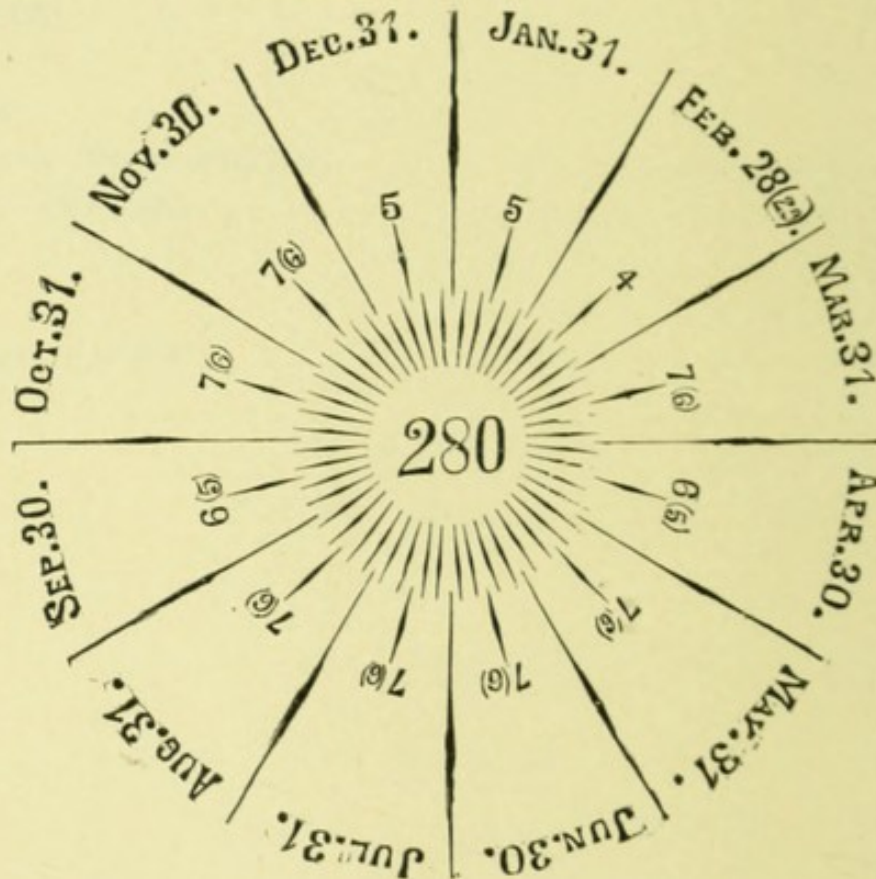
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## THE OBSTETRIC CALENDAR.

As a means of ready reference the Obstetric Calendar will be found very convenient, as accurate as any other method, and gives about the same indicated date of confinement as Naegele's rule.



**Explanation.**—(1) Ascertain the day on which the last menstruation ceased; (2) count back three *calendar* months; (3) add seven days. For example: Menstruation ceased August 1st, count back three months—*i. e.*, to May 1st—add seven days, which brings us to May 8th, the probable day of delivery. It is the same as, but easier than, counting forward nine calendar months and adding seven days. To be *quite* exact, the number of days to be added will sometimes vary, as shown in the diagram. Thus, if after counting back three months we reach March, May, June, July, August, October, or November, the number of days to be added is *seven*; if April or September, *six*; if December or January, *five*; if February, *four*. Should the pregnancy include February of a leap-year, the figures contained in brackets are to be added, except when the counting back brings us into December, January, or February.



# OBSTETRICS.

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## CHAPTER I.

### THE FEMALE ORGANS OF GENERATION, THE PELVIS, AND THE FETAL HEAD.

#### **The Female Organs of Generation.**

THESE comprise an external and an internal set. The *external organs* include the mons veneris, labia majora, labia minora or nymphæ, clitoris, vestibule, fourchette, and vaginal introitus. The *internal organs* are the hymen, vagina, uterus, Fallopian tubes, and ovaries. For the obstetrician, a knowledge of the pelvic floor is essential.

#### **The Pelvic Floor.**

The diaphragm closing the pelvic outlet is composed of skin, muscle, fascia, connective tissue, blood-vessels, and nerves, and of somewhat lozenge-shape, bounded *in front* by the symphysis and subpubic ligament; *laterally* by the rami of the pubes and ischium, the tubers ischii, and the lower borders of the great sacrosciatic ligament, and *posteriorly* by the tip of the coccyx. The junction of all these structures forms a firm, compact support to the viscera above, while their elasticity makes the passage of the child into the world possible. In the median line the pelvic floor is perforated by the rectum, vagina, and urethra. A line drawn from just in front of one ischial tuberosity to the other divides the floor into two unequal triangles—a *posterior (sacral)*, which contains the anus, and an *anterior (pubic)*, which includes the external genitals. During labor these two segments act coördinately, but in different directions, the pubic segment drawing upward and inward, while the sacral segment extends outward and backward. On removing the skin covering the pelvic floor the superficial fascia, continuous



with the general superficial fascia, is seen. Below this is the deep layer of the superficial fascia, extending from the pubic arch to behind the transversus perinei muscles, where it joins the anterior layer of the triangular ligament. The triangular ligament consists of two layers of fascia which fill in the pubic arch. Between the deep layers of the superficial fascia are three pairs of muscles—two transversus perinei, two bulbocavernosus, two ischiocavernosus. Posterior to these are the sphincter ani muscle, and, deeper down, the levator ani, the chief muscular support of the pelvic floor.

### The Obstetric Perineum.

The skin-covered space between the posterior margin of the vulvar opening and the anterior margin of the anus is the *obstetric perineum*, marked by a median raphé.

### The Perineal Body.

This lies above the skin, is somewhat pyramidal, fills the space formed by the forward curve of the vagina and the backward curve of the anus, and is formed by the junction of the various superficial muscles, with the fibrous and elastic tissues, and measures *vertically*  $1\frac{1}{2}$  inches; *transversely*,  $1\frac{1}{2}$  inches; and *antero-posteriorly*,  $\frac{3}{4}$  of an inch. A straight line drawn from the tip of the coccyx to the subpubic ligament will just clear the apex of this part, above which the posterior wall of the vagina and the anterior wall of the rectum are in contact for about  $1\frac{1}{2}$  inches.

### The Pelvis.

The pelvis is the bony basin which is situated at the lower part of the trunk, and transmits the weight of the body to the lower extremities. As the gravity of the spine falls perpendicularly on the sacrum and is transmitted through the acetabula to the heads of the femurs, the position of the pelvis in the skeleton is oblique, and in woman the angle of inclination is  $140^{\circ}$ . The tip of the coccyx is about half an inch higher than the lower border of the pubic symphysis, while the promontory of the sacrum is about  $3\frac{1}{2}$  inches higher than the upper margin of the symphysis. The pelvis forms the most important part of the birth-canal, and is made up of four bones—the sacrum, coccyx, and two ossa innomi-



nata, which are firmly bound together by ligaments. It is divided by the iliopectineal line into two portions—an *upper* or *false* pelvis, and a *lower* or *true* pelvis. The latter only is of special interest. The upper opening of the true pelvis is somewhat cordate in form, and is called the *superior strait*, *margin*, *isthmus*, *inlet*, or *brim*. The lower opening is more oval, and is called the *inferior strait* or *outlet*. The space between the brim and the outlet is the *cavity*.

### The Planes of the Pelvis.

The pelvic canal is short and curved, and varies somewhat in shape in its different parts. In order to understand these variations more exactly, for purposes of measurement, etc., imaginary surfaces, called planes, are taken transversely through the canal at different levels. The lines of these surfaces are not parallel, but converge from behind forward, so that if they were carried out, would unite about  $1\frac{1}{2}$  inches in front of the symphysis pubis. The planes of the pelvis are not to be confused with the anterior and posterior *inclined planes* of the cavity, which are formed by the sloping walls of the ischium in front and the ischial spines behind. *Three planes are of importance—that of the brim, the cavity, and the outlet.*

**Plane of the Brim.**—From the summit of the sacral promontory, iliopectineal line, and posterior surface of the symphysis pubis,  $\frac{2}{5}$  of an inch below its upper margin. It forms an angle with the horizon of about  $50^{\circ}$  or  $60^{\circ}$ .

**Plane of the Cavity.**—From the upper end of the third sacral vertebra, centre of acetabulum, and middle of the posterior surface of the symphysis pubis.

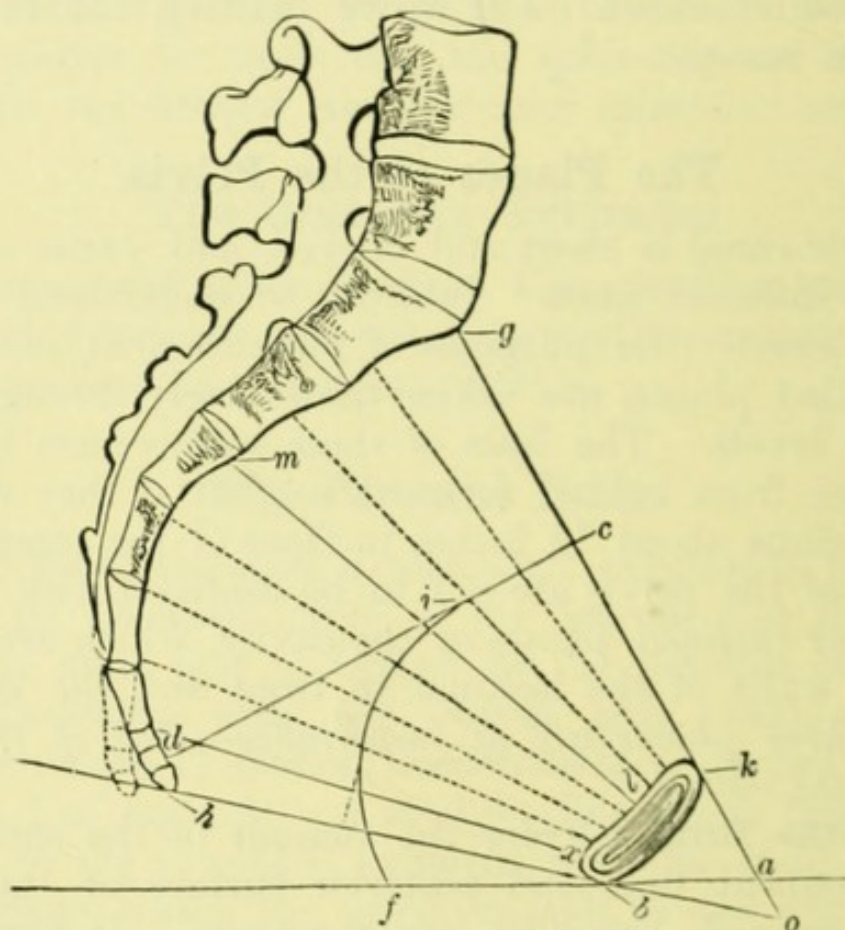
**Plane of the Outlet.**—From the end of the sacrum, ischial tuberosities, and posterior surface of the symphysis pubis just above its lower margin. A line drawn from the tip of the coccyx to the subpubic margin, representing the *anatomical* outlet, forms an angle of  $10^{\circ}$  with the horizon. On account of the yielding structures at the anatomical outlet the plane of the *obstetric* outlet is taken from the most resisting points. As the birth-canal is curved it is necessary to determine its axis in order to understand the direction in which the foetal head travels in its descent through the pelvis.



## The Axis of the Pelvis.

The axis is an imaginary line normal to the centre of each plane (Fig. 1). If the points of intersection of the axes of the various planes were joined together an irregular parabolic curve,

FIG. 1.



The planes and axes of the bony pelvis: *gmdh*, Sacrum and coccyx, and *bk*, symphysis pubis, in sagittal section; *gk*, plane of the brim; *lm*, plane of the cavity; the dotted line just above *dx*, plane of the obstetrical outlet; *bh*, plane of the anatomical outlet; *abf*, plane of the horizon; *bak*, angle between the planes of the horizon and brim, normally between  $50^{\circ}$  and  $60^{\circ}$ ; *hbf*, angle between the planes of the horizon and anatomical outlet, normally about  $10^{\circ}$ ; *bok*, angle between the planes of the brim and the anatomical outlet, normally about  $50^{\circ}$  or a little less; *cif*, axis of the bony pelvis; *cid*, axis of the inlet.

concave forward, would be formed, nearly representing the pelvic axis traversed by the child.

**"Curve of Carus."**—This arc of a circle is taken between the planes of the inlet and outlet (circumference in the middle line and centre at the symphysis pubis). The real axis of the pelvis, as pointed out, is not mathematically regular. To determine the space between the bones through which the child must pass, various *diameters* are taken of the *brim*, *cavity*, and *outlet*. Each of



these has an *anteroposterior* or *conjugate*, a *transverse*, and an *oblique* diameter.

### The Diameters of the Pelvis (Approximate).

#### Internal Adynamic Measurements.—(King.)

	<i>Antero-posterior.</i>	<i>Transverse.</i>	<i>Oblique.</i>
Brim . . . . .	4	4	4½–5 inches.
Cavity . . . . .	5	5	5 “
Outlet . . . . .	4½–5	4	4 “

These measurements are taken as follows :

**Brim.**—*Anteroposterior*, from centre of sacral promontory to posterior surface of symphysis pubis,  $\frac{2}{5}$  of an inch below its superior margin.

*Transverse*, the widest distance between the iliopectineal lines.

*Oblique* (*two, right and left*), from the right (or left) sacro-iliac joint to the opposite iliopectineal eminence. The right oblique is slightly longer than the left.

**Cavity.**—*Anteroposterior*, from upper border of third sacral vertebra to middle of symphysis pubis.

*Transverse*, from lower edge of acetabulum on one side to a corresponding point on the other.

*Oblique*, of no practical value, not being taken from fixed points.

**Outlet.**—*Anteroposterior*, from lower end of sacrum to posterior surface of symphysis pubis, just above its lower margin.

*Transverse*, from middle of inner and posterior surface of one ischial tuberosity to the other.

*Oblique*, of no practical value, not being taken from fixed points.

The above measurements are to be considered as only approximate, as hardly any two pelves have exactly the same measurements.

In the living dynamic pelvis the measurements are taken both externally and internally.

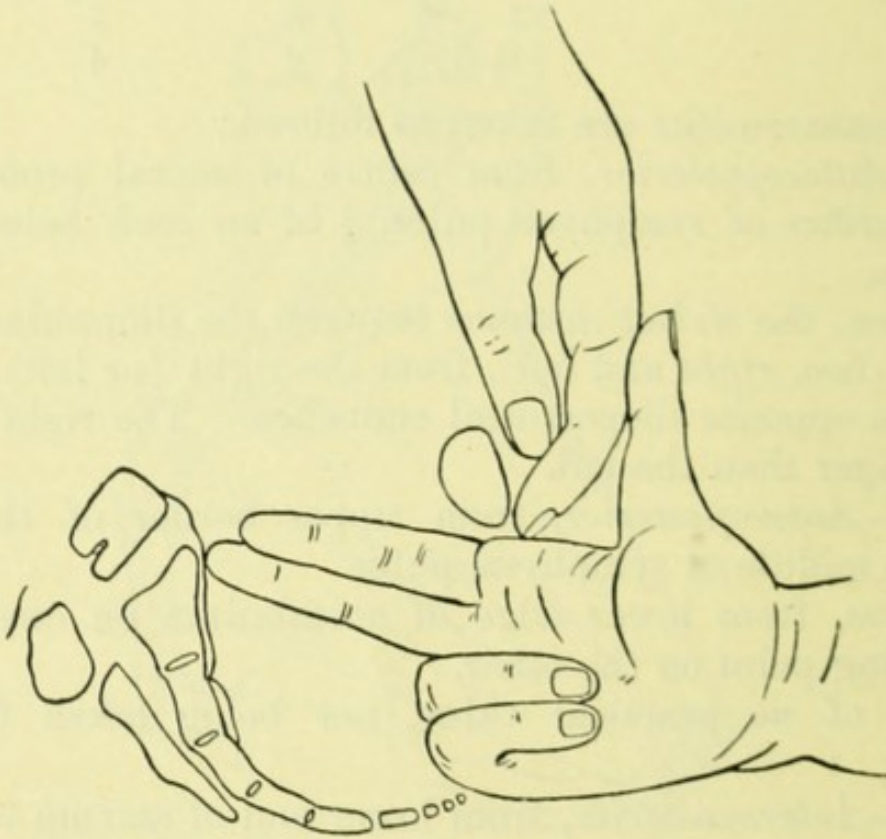
#### Internal Dynamic Measurements.

With the patient in the lithotomy position, the first and second fingers are introduced into the vagina and swept around the pelvic walls. The capacity of the pelvis may be estimated in this way.



The tip of the second finger then touches the nearest point of the sacral promontory, while the radial side of the hand is pressed against the lower border of the symphysis. A mark is then made on the hand by the finger-nail or a pencil, where it touches the pubic arch, and the fingers are withdrawn and measured. The

FIG. 2.



Measuring the diagonal conjugate (after Michaelis).

*diagonal conjugate* diameter is thus obtained. *From the measurement obtained half an inch must be deducted for the difference between the lower border of the symphysis and the point above where the true conjugate diameter falls.* In the normal pelvis it is very difficult or impossible to touch the sacral promontory in this way. Other measurements are sometimes taken by means of instruments devised for the purpose, but the conjugate is the one of most practical importance.

### External Dynamic Measurements.

In order to determine a suspected pelvic deformity, external measurements are taken. For this purpose the *pelvimeter* of



Baudelocque or one of its modifications is employed. The patient, with her clothing drawn up, is first placed on her side or stands, to determine the conjugate diameter, and rests on the back or stands for the other measurements.

**Bitrochanteric diameter**, between the great trochanters,  $12\frac{1}{4}$  inches, is of little value.

**Intercristal diameter**, the widest parts of the iliac crests,  $10\frac{1}{2}$  inches, indicates lateral capacity of false pelvis.

**Interspinous diameter**, between the anterior superior iliac spines,  $9\frac{1}{2}$  inches, substantiates the intercristal.

**External conjugate**, between the front of the symphysis pubis and the fossa below the spine of the last lumbar vertebra,  $7\frac{1}{2}$  inches,<sup>1</sup> indicates the anteroposterior capacity.

**True Conjugate**.—From this last measurement  $3\frac{1}{2}$  inches must be deducted for the soft parts and bones, to show the *true conjugate*.

**Pelvic Walls**.—The *anterior* wall (*pubic symphysis*) is  $1\frac{1}{2}$  inches; the *posterior*,  $4\frac{1}{2}$  inches; the *lateral*,  $3\frac{1}{2}$  inches deep.

*These external measurements are of very little value in determining the extent of pelvic deformity, but are useful in indicating the form of the abnormality. With considerable variation in the external measurements, the internal measurements may show a practically normal pelvis.*

### Changes in the Pelvis During Pregnancy.

The cartilages and ligaments soften and relax. As a result, toward the end of pregnancy there may be a slight movement between the ends of the pubic bones, and, possibly, as a physiologic excess of the normal, also between the ilia and sacrum.

### THE FŒTAL HEAD.

At term the head is the largest and hardest part of the foetus. It is divided into two parts—the *cranial* vault and the *cranial* base and face.

#### Cranial Vault.

This consists of seven bones—two frontal, two parietal, two temporal, and the squamous portion of the occipital. Owing to the incomplete ossification of the bones and their separation by

<sup>1</sup> These measurement values are from King.



sutures and fontanelles, the foetal head is more or less soft and plastic, and during its passage through the parturient canal is capable of *moulding*—that is, changing its shape, the edges of the bones crowding together or even overlapping. In the face and the base of the skull the bones are fixed and unyielding.

### Moulding.

This is an important element in the expulsion of the child's head through the birth-canal, since the former is thereby more perfectly adapted to the diameter of the latter, and by the elongation thus produced rotation is promoted through the increased pitch of the descending pole.

### The Sutures.

The cranial bones are separated by membranous interspaces called sutures. The most important of these are :

1. **Frontal.**—Between the root of the nose and the anterior fontanelle.
2. **Coronal.**—Between the frontal from the two parietal bones.
3. **Sagittal.**—Between the parietal bones.
4. **Lambdoidal.**—Between the parietal and occipital bones.

### The Fontanelles.

These openings are membranous spaces between two or more adjacent bones at the intersection of the sutures (see Fig. 4). Two of these are of obstetric value :

1. The **anterior fontanelle** or **bregma** (Fig. 4) is a large, diamond-shaped space about an inch in diameter at the junction of the frontal, coronal, and sagittal sutures.

2. The **posterior fontanelle** is triangular in form, at the junction of the sagittal and lambdoidal sutures. *The anterior fontanelle is recognized by the four sutures running from its angles; the posterior fontanelle may appear to the examining finger as a slight depression, but usually only the three sutures or the ridges formed by the overlapping bones can be made out.* Very rarely small islands of bone, called *Wormian bones*, are developed in the interosseous membrane. They are said in some instances to obstruct labor by preventing the overlapping of the cranial bones.



### Protuberances.

There are five of these :

The **occipital protuberance**, an inch or more below the posterior fontanelle on the occipital bone.

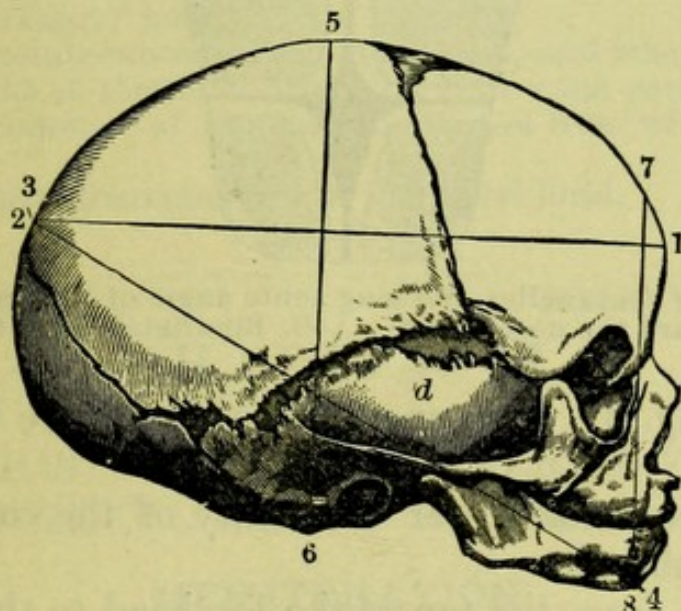
The **parietal protuberances**, one on either side the centre of the parietal bone.

The **frontal protuberance**, one on each side at the centre of the frontal bones.

### Regions of the Fœtal Head.

Three in number (Fig. 3) :

FIG. 3.



Diameters of foetal head (Playfair). 1-2. Occipitofrontal. 3-4. Occipitomentale. 5-6. Cervicobregmatic (or vertical). 7-8. Frontomentale.

The **vertex**, the cranial vault between the two fontanelles and the parietal protuberances.

The **occiput**, the part posterior to the small fontanelle.

The **sinciput**, the part anterior to the large fontanelle.

### Diameters of the Fœtal Head.

In order to understand the mechanism of labor the diameters of the foetal head with reference to their relation to the diameters of the maternal pelvis must be known. There are seven diameters of importance (see Fig. 3) :



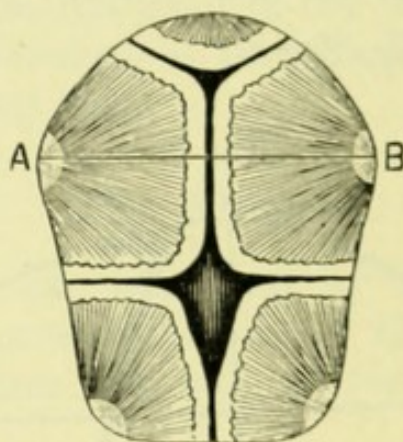
**Occipitofrontal**, from the occipital protuberance to the root of the nose,  $4\frac{1}{2}$  inches.

**Occipitomenta**, from the occipital protuberance to the middle of the chin,  $5\frac{1}{2}$  inches.

**Suboccipitobregmatic**, from the junction of the neck and occiput to the middle of the great fontanelle,  $3\frac{3}{4}$  inches.

**Suboccipitofrontal**, from the junction of the neck and occiput to the summit of the forehead,  $4\frac{3}{8}$  inches.

FIG. 4.



Showing the shape of fontanelles, the long acute angle of the anterior one pointing toward the nose (King) : A-B. Biparietal diameter.

**Biparietal** (Fig. 4), from one parietal eminence to the other,  $3\frac{3}{4}$  inches.

**Bitemporal**, from one lower extremity of the coronal suture to the other,  $3\frac{1}{8}$  inches.

**Frontomenta**, from the top of the forehead to the middle of the chin,  $3\frac{1}{2}$  inches.

### CIRCUMFERENCES OF THE FŒTAL HEAD.

**Suboccipitofrontal**,  $13\frac{3}{4}$  inches.

**Occipitofrontal**,  $13\frac{1}{2}$  inches.

### QUESTIONS.

Name the external and internal female organs of generation.

Describe the structure of the pelvic floor.

What is the obstetric perineum? How is the perineal body composed?

Describe the pelvis and name the bones of which it is made up.

What is the position of the pelvis in the skeleton?

Into how many portions is the pelvis divided? What is the dividing line?

Give the names of the three parts of the pelvic canal.



What is meant by the planes of the pelvis, and of what importance are they?

From what points are the planes taken?

What is the axis of the pelvis?

What is the "curve of Carus"?

From what points are the axes of the brim, cavity, and outlet taken?

What are the diameters of the pelvis, and from what points are they taken?

What internal measurements are made, and how is this done?

How much must be deducted from the anteroposterior diameter thus obtained to determine the true conjugate?

What external measurements of the pelvis are taken, and how?

What is the difference between the diagonal conjugate and the true conjugate?

What changes take place in the pelvic joints during pregnancy?

Into how many parts is the foetal head divided?

What is the significance of "moulding"?

Name the sutures and their position.

What are the fontanelles, and where located?

What is a "Wormian" bone?

What are the protuberances of the foetal head, and where found?

Name the regions of the foetal head, and state what parts they include.

What are the diameters of the foetal head, and from what points are they taken?

Give the principal circumferences of the foetal head.

## CHAPTER II.

### MENSTRUATION; OVULATION; FERTILIZATION AND THE DEVELOPMENT OF THE OVUM.

#### MENSTRUATION.

**MENSTRUATION** is the periodical discharge of blood from the uterus which takes place during the whole of genital life,—between puberty and the climacteric,—the period of pregnancy excepted. It occurs, on the average, once in twenty-eight days, but is subject to wide variations, and lasts from three to five days or more. The discharge consists at first of mucus, epithelia, and blood; later of nearly pure blood, and finally a decreasing amount of blood, serum, epithelia, granular débris, and some fat. At the end it is more like a leucorrhœal discharge. The reaction of the fluid is acid from the presence of phosphoric and lactic acids; it is non-coagulable from the admixture of mucus; and it has a peculiar odor from the presence of fatty acids. From four to eight ounces are lost at each period.



## OVULATION.

The periodical discharge of the fully ripened ovum from the Graafian follicle is called ovulation. Menstruation and ovulation are not necessarily coincident processes, but it is probable that the causes of the one have also an effect upon the other, and that, as a rule, the two functions occur simultaneously.

## The Graafian Follicle.

This is a small spherical vesicle situated in the ovarian stroma, the walls of which, from within outward, consist of *four* layers: a *membrana granulosa*; a *membrana propria*; a *tunica propria*; and a *tunica fibrosa*. The last two layers carry the blood-vessels. At one point in the wall—the *stigma*—there are no blood-vessels, and it is here that the follicle ruptures, and the ovum, surrounded by its *discus proligerus*, escapes. The cavity of the follicle is filled with a clear fluid—the *liquor folliculi*.

## The Ovum.

The mature human ovum is a single, more or less spherical, cell, about  $\frac{1}{125}$  of an inch in diameter, and is composed of a yolk, a nucleus or germinal vesicle, a nucleolus or germinal spot, and two enveloping membranes—the *zona pellucida* or *radiata* and the *vitelline membrane*. During the ripening process, or maturation, the nucleus travels to the animal pole of the egg and successively extrudes two spherical masses, the *polar globules*. The remnant of the nucleus then retires into the egg and becomes the *female pronucleus*. The egg is now ready for fertilization. The throwing-off of the polar globules is supposed to be effected either to make room for the male element or to prevent self-fertilization—*parthenogenesis*.

## The Corpus Luteum.

After the escape of the ovum the blood-vessels of the Graafian follicle rupture, a clot forms,—the *corpus hæmorrhagicum*,—and yellow granules of lutein appear in the external layer of the clot. The clot then contracts, becomes organized, and disappears in from eight to nine weeks, leaving a small cicatrix on the surface of the ovary, which may persist for several months. This is called the



*corpus spurium*, or false corpus luteum. When impregnation takes place, however, the corpus luteum continues to enlarge until the fourth month of pregnancy, remains stationary until the seventh month, and finally declines, until, by the eighth or ninth week after the labor, nearly all traces of it have disappeared. This is the *corpus luteum verum*, or true corpus luteum.

### FERTILIZATION.

The meeting of the male and female elements is supposed to take place, as a rule, in the outer portion of the Fallopian tube, but fertilization may take place anywhere from the Graafian follicle in the ovary to the uterine cavity. As the spermatozoa approach the ovum a slight protrusion of the protoplasm of the egg takes place, and in this the head of one spermatozoon becomes buried. The spermatozoon then loses its tail, and is known as the *male pronucleus*. The male and female pronuclei then fuse and a single nucleus is formed—the *segmentation nucleus*.

### DEVELOPMENT OF THE FERTILIZED OVUM.

#### Segmentation.

The entire ovum is then broken up into a great number of smaller cells (*blastomeres*), each of which possesses a nucleus. This process of division of the egg is called segmentation, and when it is completed the ovum is known as the *morula*, or *mulberry mass*, from its resemblance to the fruit. At about the same time a cavity—the *segmentation cavity*—makes its appearance in the interior of the mulberry mass, and this is soon filled with a clear fluid which increases rapidly in amount and distends the ovum into a vesicle—the *blastodermic vesicle* or *blastula*. As the result of the accumulation of fluid in the egg the cells for the most part are forced to one point in the blastula, where a lens-shaped mass collects, the *lenticular body*. From this subsequently three layers of cells are formed—the *ectoderm*, the *mesoderm*, and the *entoderm*. From these three layers, in the course of development, all the tissues and parts of the body are derived.

**From the ectoderm**, or outermost layer of cells—the skin and its epidermal structures; the mammary gland; the hair, nails,



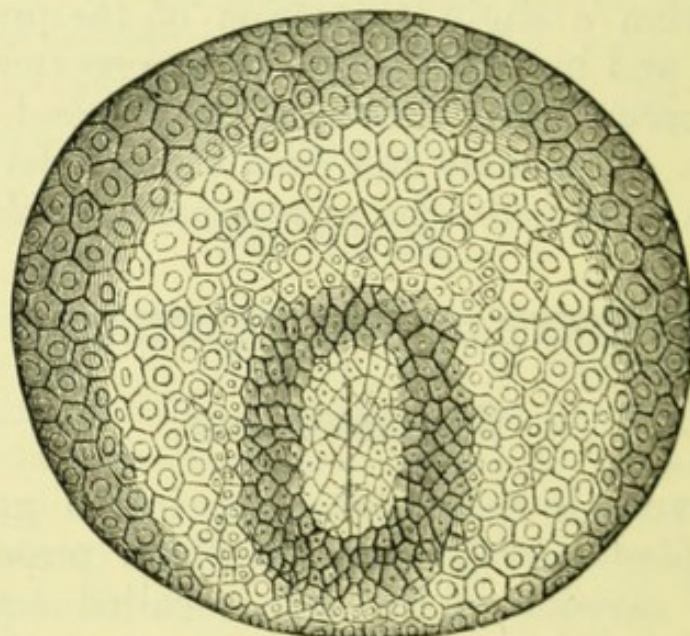
etc.; the cerebrospinal system; the cavity of the mouth; teeth; anus; chorion; amnion; placenta, etc.

**From the mesoderm**—muscles; bones; connective tissue; urogenital apparatus; internal organs of generation; blood-vessels; blood; lymphatics, etc.

**From the entoderm**—the digestive tract; lungs; liver; pancreas; bladder, etc.

On the surface of the ovum an oval, opaque area appears, the *germinal* or *embryonic* area, and in this is developed the future embryo. Just posterior to the middle of this area a linear streak appears—the *primitive streak* (Fig. 5). In front of the streak,

FIG. 5.



External surface of epiblast, showing area germinativa, area pellucida, and primitive trace.

by a thickening of the ectodermal cells, a band is formed on either side of the median axial line,—the *medullary plates*,—and by the upgrowth of the edges of these plates a groove is formed—the *medullary groove*. By further growth and the uniting of the lateral folds the groove is converted into a tube—the *medullary* or *neural tube*, the beginning of the cerebrospinal system. Immediately below the neural canal a rod of entodermal cells is formed—the *notochord*, which represents the primitive axial skeleton. A thickening of the mesoderm on either side of the neural tube gives rise to the *muscle-plates*, from which most of the voluntary muscles of the trunk and extremities are subsequently developed. External



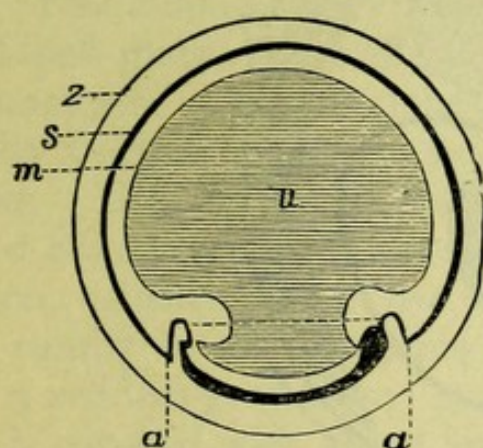
to the muscle-plates the mesoderm splits into two layers—an upper leaf which, together with the ectoderm, forms the *somatopleure* or *primitive body-wall*, and a lower leaf which, together with the entoderm, forms the *splanchnopleure* or *primitive intestinal wall*. The space between the two leaves is the *cœlom* or *body cavity* (pleuroperitoneal cavity).

### Folding-off of the Embryo.

The embryo now becomes folded off from the remainder of the blastula by the development of head, tail, and lateral folds (Fig. 6), and as these folds deepen, spaces are shut off at the anterior and posterior ends of the embryo forming the *fore-* and *hind-guts*, the beginning of the primitive alimentary canal. The middle portion of the canal is still in connection with the yolk-sac or umbilical vesicle through the cavity of the *yolk-stalk* or *vitelline duct* (Fig. 6, *u*).

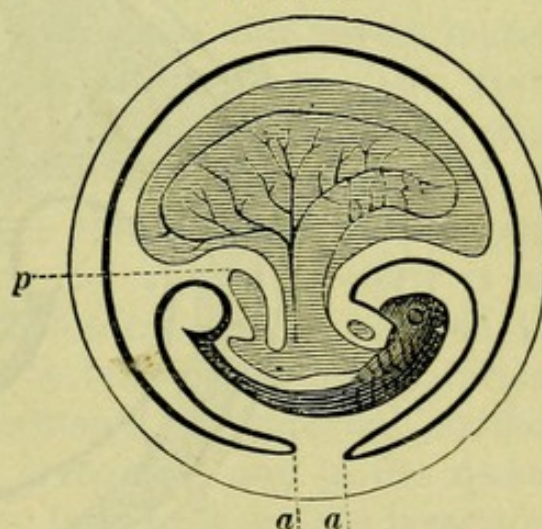
At an early period all the extra-embryonic somatopleure becomes covered with a shaggy coat of delicate villi—the *primitive*

FIG. 6.



*a, a*, Projecting folds of amnion;  
*z*, zona pellucida; *s*, epiblast;  
*m*, hypoblast; *u*, umbilical  
vesicle.

FIG. 7.



*a, a*, Folds of amnion about to join;  
*p*, commencement of allantois.

*chorion*. The ovum is now called the *chorionic vesicle*. Coincident with the folding-off of the embryo the external walls of the folds grow upward, arch over the embryonic back, and, uniting, form the *amnion*, by which the embryo is inclosed (Fig. 7). A fluid—the *liquor amnii*—is later secreted within the sac



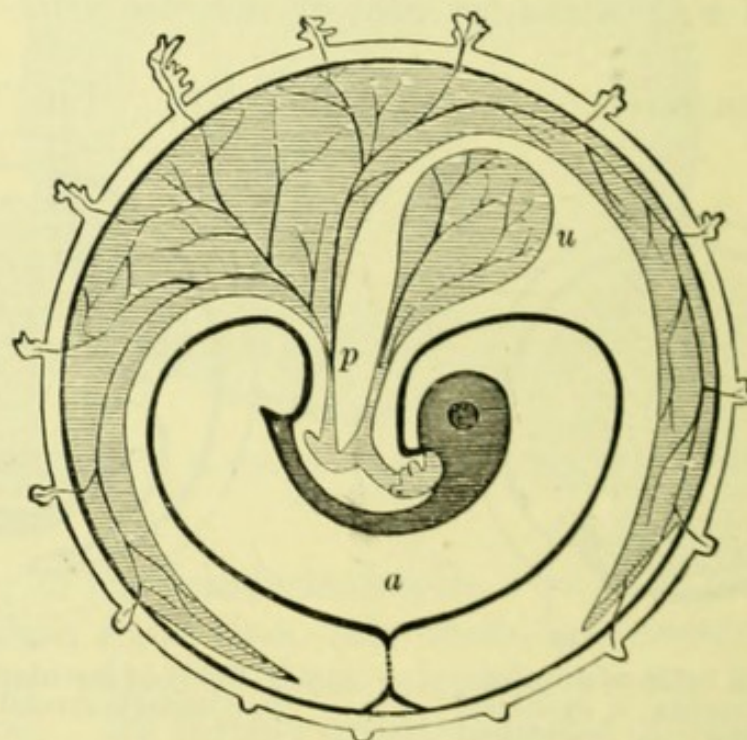
of the true amnion, and this, increasing in amount, brings the amnion into contact with the chorion some time during the third month of development.

The **liquor amnii** is a clear fluid, alkaline in reaction, and with a specific gravity of 1007 to 1028; it amounts to one or two pints at term, and is derived largely by transudation from the maternal structures. It serves to maintain an equable distention of the uterus, prevents the child from violence and pressure, and permits of its free movements *in utero*, and during labor it serves to soften and lubricate the parts.

### Abdominal Stalk, Allantois, Placenta, and Cord.

The embryo is now entirely separated from the chorion except at its caudal end, which remains fixed as the *abdominal stalk* (Fig. 8). At an early period a bud-like diverticulum—the *al-*

FIG. 8.



Further development: *a*, Junction of amniotic folds; *p*, pedicle of allantois; *u*, umbilical vesicle.

*lantois*—develops from the posterior end of the hind-gut, and grows outward to the chorion, with which it unites, and assists in the formation of the *placenta*. The allantois carries with it from embryo to placenta two arteries and two veins. The allantois,



together with the abdominal stalk, enters into the formation of the *umbilical cord*.

### Changes in the Uterine Mucosa.

As the result of fecundation of the ovum the uterus enlarges, becomes more vascular, and its mucosa hypertrophies and is more or less thrown into folds. The entire thickened lining is designated as the *decidua vera*. When the ovum enters the uterus it is usually arrested in one of the folds nearest the tube-opening, and at once attaches itself to the uterine wall. The folds by which it is surrounded then grow forward and their edges unite over the ovum, forming a sac—the *decidua reflexa*. The part of the uterine mucosa to which the chorionic vesicle first becomes attached is the *decidua serotina*.

### The Placenta.

The embryo is at first nourished by osmosis through the tips of the chorionic villi which penetrate the uterine mucosa. The villi of the serotinal region enlarge, branch, and enter into the formation of the *placenta*, which is partly embryonal and partly maternal. The remaining villi atrophy and disappear. The fully developed placenta, or after-birth, is a roundish, spongy mass with a diameter of about 8 inches, and weighs about a pound. It is usually thickest at its centre, the edges thinning out to the membranes. The inner, or foetal, surface, to which the cord is attached eccentrically, is smooth and glistening, and is covered by amnion, beneath which two umbilical arteries and one umbilical vein ramify in all directions. The external or maternal surface is of a reddish-gray color, rough and irregular, and in the recent state is covered with blood and clots. It is broken into irregular patches or squares—the *cotyledons*—between which the decidua serotina dips down, forming partitions or septa. The placenta is formed during the third month of pregnancy. Its function is nutritive, respiratory, and excretory.

### The Cord.

This extends from the placenta to the child, is of a glistening, grayish-white color, of varying thickness, and is about 22 inches



long, but may be longer or shorter. It contains two arteries and a vein which run a somewhat spiral course. The centre of the cord is filled with a jelly-like matrix called *Wharton's jelly*.

### **Uteroplacental Circulation.**

The decidua gives rise to numerous processes, between which the chorionic villi penetrate. The arteries of the processes run in an irregular manner, with many spiral turns, and, as they approach the surface of the process, become tuft-like, lose their coats, and open freely into the intervillous spaces. The veins open at the bases of the processes and along the decidual margins of the intervillous spaces. The chorionic villi, therefore, hang more or less freely in a blood-filled sinus. Each decidual process, or cotyledon, has its individual circulatory region, the blood pouring out from the sides of the processes and reëntering the maternal circuit through the veins at its bottom (Bumm).

### **Embryonic Circulation.<sup>1</sup>**

The blood is collected from the vascular area in the mesoderm of the embryonic area by the vitelline veins, which empty into the sinus venosus, a large trunk which enters the posterior end of the heart. This also receives the systemic veins. From the ventricle the blood passes through the truncus arteriosus, and the aortic arches to the primitive aortæ, whence it is returned through the vitelline arteries to the vascular area, and, to a limited extent, to the body of the embryo.

### **The Fœtal Circulation.**

After the development of the placenta the circulation becomes more complex. The blood is carried from the placenta by the umbilical vein to the under surface of the liver, where it divides into two streams, one proceeding through the ductus venosus to the inferior vena cava and thence to the right auricle of the heart; the other, being joined by blood from the portal vein, passes through the capillaries of the liver to the hepatic vein and

<sup>1</sup> For a description of the vessels considered in the primitive and later circulation the student is referred to the author's *Syllabus of Embryology* or other work on the subject.



the inferior vena cava to the right cardiac auricle. From the right auricle the blood flows through the foramen ovale to the left auricle. Here it meets with the current from the pulmonary veins, is passed to the left ventricle, and thence to the aorta and the systemic vessels. From the head and upper extremities the blood is collected by the superior vena cava, passes through the right auricle to the right ventricle, and is forced into the pulmonary artery. Outside the lungs the stream divides, a small portion going to these organs, the greater part turning off through the ductus arteriosus to the aorta. From the aorta most of the blood returns through the hypogastric arteries to the placenta, a small part going to the lower portion of the embryonic body and extremities.

### The Changes in the Circulation at Birth.

By the third or fourth day after birth the hypogastric arteries dwindle and become obliterated, and at the end of the first week the umbilical vein and the ductus venosus are closed. By the end of the third week the ductus arteriosus is impervious. The foramen ovale usually closes soon after birth; should it remain open, an admixture of venous and arterial blood takes place and gives rise to the condition known as *cyanosis neonatorum*, or "*blue baby*."

As a result of these changes the blood from the superior and inferior cavæ passes from the right auricle to the right ventricle, by the pulmonary artery to the lungs, is returned by the pulmonary veins to the left auricle, thence to the left ventricle, and so on to the dorsal aorta, by which it is distributed to the trunk, head, and extremities.

### Embryo and Fœtus at Different Months of Development.

**First Month.**—Chorionic villi are present over the entire ovum. Indications of eyes, mouth, anus. Rudimentary extremities appear. Heart  $\frac{4}{10}$  of an inch long.

**Second Month.**—About one inch long. Eyes, nose, ears, distinguishable. Suggestions of hands and feet. External genitals.

**Third Month.**—Ovum size of a goose-egg. Fingers and toes separate. Nails as fine membranes. Neck separates head from



body. Sex distinguishable. Length, 5 inches. Weight, 460 grains.

**Fourth Month.**—Six inches long; weight, 850 grains. Short hairs—lanugo—present. Head equal to about one-fourth of entire body. Quickening occasionally perceptible.

**Fifth Month.**—Ten inches long; weight 8 ounces. Vernix caseosa forming. Eyelids begin to separate. Heart-sounds perceptible. Quickening takes place.

**Sixth Month.**—Twelve inches long; weighs  $23\frac{1}{2}$  ounces. Hair on head. Eyebrows and eyelashes. Testicles are near rings.

**Seventh Month.**—Fifteen inches long; weighs  $41\frac{1}{2}$  ounces. Pupillary membrane disappears.

**Eighth Month.**—Sixteen inches long; weighs  $3\frac{1}{2}$  pounds. Left testicle descended. Nails do not protrude beyond finger-tips. Lanugo disappearing.

**Ninth Month.**—Eighteen inches long; weighs  $4\frac{1}{2}$  to 7 pounds. All anatomical features complete.

#### QUESTIONS.

Define menstruation, and describe the function.

What is ovulation?

Describe the Graafian follicle.

Describe the human ovum.

What are the polar globules, and why are they formed?

What is the female pronucleus?

Describe the formation of the corpus luteum.

How does the corpus luteum of menstruation differ from that of pregnancy?

Describe fertilization.

What is the male pronucleus?

Describe segmentation.

What are the segmentation cells called?

What is the morula?

What is the blastodermic vesicle?

What is the lenticular body?

Name the three primary cell-layers.

What parts of the body are formed from the ectoderm?

What parts of the body are formed from the mesoderm?

What parts of the body are formed from the entoderm?

What is the embryonic area?

What is the primitive streak, and where does it appear?

What are the medullary plates, and how are they formed?

Describe the formation of the medullary groove.

How is the neural tube formed, and what future structures does it represent?

What is the notochord, and how is it formed?

Where do the muscle-plates appear, and what are subsequently developed from them?

What is the somatopleure?



- What is the splanchnopleure?  
What is the cœlom?  
Describe the folding-off of the embryo.  
What is the umbilical vesicle, and by what is it connected with the embryo?  
What is the primitive chorion?  
What is the chorionic vesicle?  
What is the amnion and how is it formed?  
Describe the liquor amnii, and state its source.  
Describe the development of the allantois and mention its function.  
Describe the changes which take place in the uterus as the result of pregnancy.  
Name the deciduæ and define them.  
Describe the placenta and its formation.  
Describe the uteroplacental circulation.  
Describe the embryonic circulation.  
Describe the fœtal circulation.  
What changes take place in the circulation at birth?  
Describe the appearance of the embryo and fœtus at the different months of pregnancy.
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### CHAPTER III.

#### CHANGES IN THE MATERNAL ORGANISM INCIDENT TO PREGNANCY.

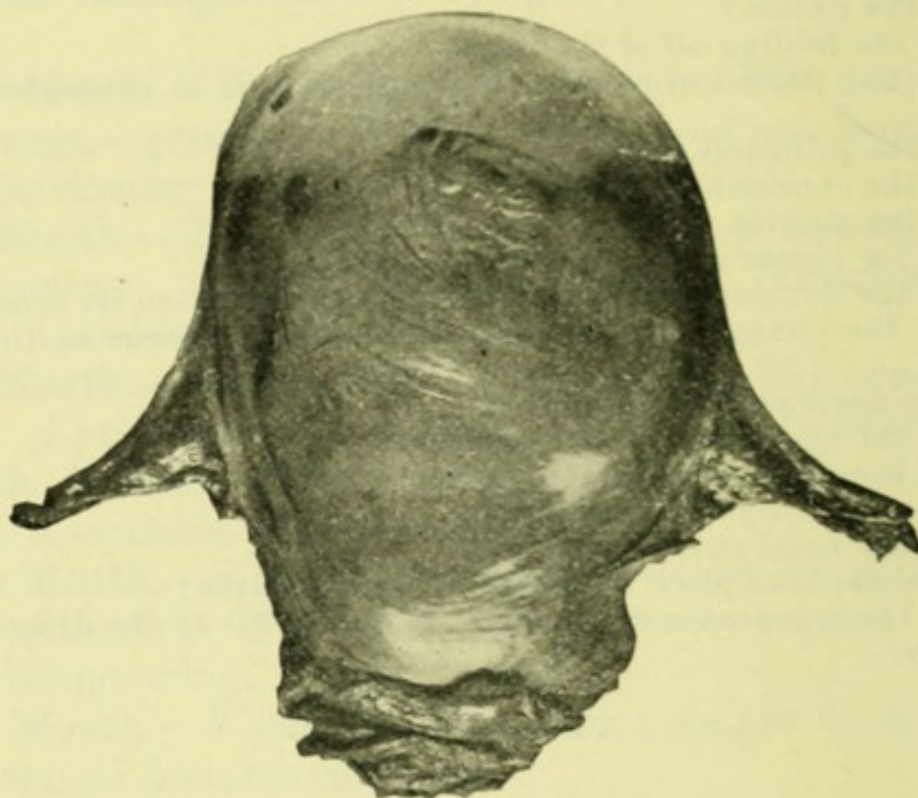
##### THE UTERUS AND THE ADNEXA.

THE uterus itself manifests the first effects. The virgin womb has a capacity of about 1 cubic inch, is  $2\frac{3}{4}$  inches long,  $1\frac{3}{4}$  inches wide, 1 inch thick, and weighs about 12 drachms. At term the uterus has a capacity of about 400 cubic inches, is 14 inches long, 10 inches wide,  $9\frac{1}{2}$  inches thick, and weighs from 2 to  $2\frac{1}{2}$  pounds (Fig. 9). This increase in size is due to both hyperplasia and hypertrophy of the tissues of the organ. Besides the increase of the elements, the muscular fibres are elongated to about 11 inches, and they are five times thicker than in the nulliparous uterus. The cervix participates but little in these changes, remaining practically the same until a few weeks before delivery. It becomes softened as the result of hyperæmia, and the glands are more active, secreting a thick, glairy mucus. The cervical canal is also more or less dilated.

The **adnexa** participate in the general increased nutritive activity.

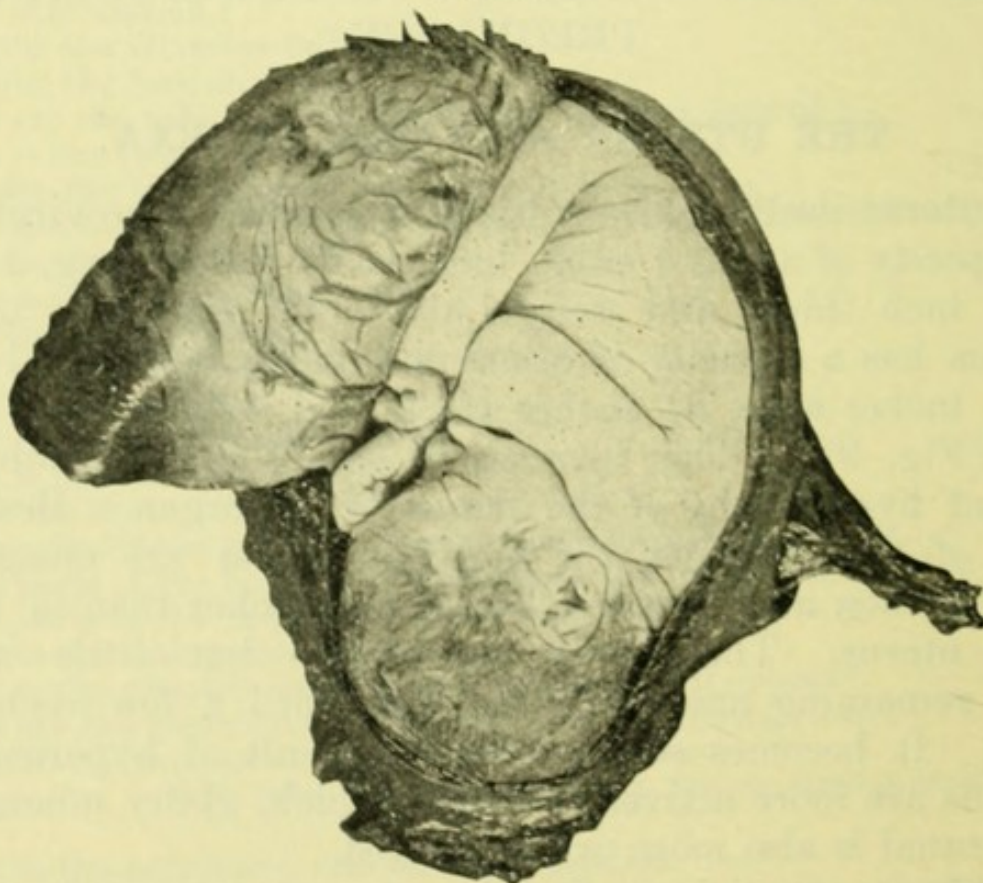


FIG. 9.



Pregnant uterus, ninth month (anterior surface).

FIG. 10.



Posture of the fœtus in the uterus, L. O. A. (photograph of uterus and child from a patient dying suddenly two weeks before term).



### THE BLOOD.

The blood is increased in quantity, and slightly altered in its composition. The water, fibrin, and white corpuscles are increased; the red cells are at first relatively diminished, but later return to the normal. The hæmoglobin is decreased, and the alkalinity of the blood increased.<sup>1</sup>

### THE BREASTS.

These swell and increase in size as the result of augmented circulatory activity and a multiplication of the acini, and an increase of the cellular elements takes place. The nipples enlarge, lengthen, and are erectile, and a secretion from the gland, called *colostrum*, may be pressed out in drops or even a thin stream.

### GENERAL BODILY PHYSIOLOGY.

The **excretions** are increased; the kidneys and skin-glands become more active. **Pigmentation** spots develop on the skin of the face, abdomen, and breasts. **Albuminuria** is said to be present in from 5 to 10 per cent. of pregnant women, especially during the later months of pregnancy and in parturition, and lactose is sometimes found in the urine—in less than 1 per cent. The **liver** and **spleen** are enlarged as the result of a physiological fatty degeneration. **Respiration**, especially in late pregnancy from pressure of the enlarging uterus on the diaphragm, is embarrassed. The **transverse** diameter of the chest is diminished, and the **antero-posterior** is increased. The **nervous system** is generally affected to a greater or less extent, and the mental characteristics are often changed. Reflex phenomena are usually present. After the first few months the centre of gravity, when the woman is in the erect position, is shifted by the forward growth of the uterus, and squaring of the shoulders and backward inclination of the trunk become necessary to maintain equilibrium.

The **general nutrition** is augmented, and a filling-in and rounding-out of the body from fat-accumulations occurs. As the result of nutritive changes the osseous system is deprived to a greater or less extent of its constructive elements, and fractures of the bones

<sup>1</sup> According to the latest observations of Bidoni and Gardini (*Arch. ital. de Biol.*, xxxii., p. 36), the number of corpuscles is diminished.



of pregnant women are slow in healing on this account. Thin, bone-like masses, called osteophytes, are often deposited between the dura mater and the skull.

#### QUESTIONS.

- What are the measurements and capacity of the virgin uterus?
- What changes does pregnancy effect in the uterus?
- To what extent does the cervix participate in these changes?
- How is the blood affected by pregnancy?
- How are the secretions affected?
- Is albumin or sugar found in the urine of pregnant women?
- What changes take place in the liver and spleen?
- Are the nervous system and mind affected?
- Why is the gait of pregnant women changed by pregnancy?
- How are the bones affected?
- What are osteophytes and their significance?

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## CHAPTER IV.

### THE SYMPTOMS, SIGNS, DIAGNOSIS, AND DIFFERENTIAL DIAGNOSIS OF PREGNANCY.—MULTIPLE PREGNANCY.

FOLLOWING impregnation certain symptoms and signs appear, upon the careful study of which the physician must base his diagnosis, and differentiate pregnancy from other conditions with which it may be confused. The symptoms and signs may be divided into *subjective*, those of which the woman herself is cognizant, and *objective*, those which appear to examining eye, ear, and touch.

#### SUBJECTIVE SYMPTOMS.

##### Suppression of Menstruation.

Pregnancy causes a cessation of the regular monthly flow, which remains absent during the entire period of uterogestation, and usually for several months afterward. There are many conditions, however, which may give rise to the same symptom, while, on the other hand, it is quite possible for an *apparent* menstruation to continue for a time in the pregnant state or as long as the decidua reflexa remains unattached to the vera—that is, prior to the fifth month. Usually a bloody discharge during the early months of pregnancy is due to some pathological condition of the



cervix. Suppressed menstruation—*amenorrhœa*—may also appear during anæmia, chlorosis, diseases of the kidneys and lungs, and in insanity, while temporary absence or irregularity may result from exposure to cold, mental impressions, change of climate, and other causes. Again, impregnation may take place before the establishment of the menstrual flow and in women who have not resumed the function following a preceding gestation. It must also be borne in mind that *irregular menstruation* is frequently a symptom of *ectopic* pregnancy. The fear of impregnation in unmarried women after illicit intercourse will occasionally suspend menstruation for one or two months.

### Nausea and Vomiting.

Nausea, accompanied or not by emesis, usually begins about the fourth or fifth week of pregnancy, and continues until the sixteenth week or longer, but it may come on at once, anticipating the amenorrhœa. It is generally manifested upon first arising in the morning, and subsides within a short time, but it may occur at any period of the day and continue during the entire waking hours. It may be absent, and in rare instances, through some unexplained sympathetic relationship, manifest itself in the husband alone. Nausea may be excited only by various odors or sights, or be caused by constipation. On the other hand, a morning sickness may develop in derangements of the stomach and liver, in neurotic sterile women desirous of children, and in other conditions. An increased secretion from the salivary glands usually accompanies the gastric disturbance, and in some instances may amount to salivation. Morbid longings are often developed, and an irresistible desire for certain articles of food or drink, generally those of a sour or acid nature. Indigestion, intestinal flatulency, and eructations of gas are frequently present. The appetite is often capricious or may be entirely lost (anorexia).

### Quickening.

The impact of the enlarging uterus, through foetal movements, against the abdominal wall about the sixteenth week of pregnancy gives rise to a sensation described as a "fluttering." This is known as quickening. It is claimed by some women to be experienced at an earlier date, and by others it is not felt at all. It



may be confounded with gas in the intestines, contraction of the abdominal muscles, and other sensations.

### Other Subjective Symptoms.

The **breasts** swell, tingle, and give rise to a feeling of weight, and the nipples become erectile and sensitive to pressure from the clothing. The **nervous system** is hyperæsthetic, and the disposition of the woman may undergo marked changes. Mental exaltation and depression are often exhibited. **Irritability of the bladder** is a frequent and often annoying symptom. **Constipation** is the rule. **Neuralgias** in different parts of the body, especially of the fifth nerve, are of common occurrence. **Cardiac palpitation, syncope, and difficulty in breathing** may be experienced. A **leucorrhœal discharge** is almost always present, due to increased circulation in cervix and vagina. *Taken singly, the above symptoms are of no positive diagnostic value; collectively, they are of importance as furnishing presumptive evidence of pregnancy.*

## OBJECTIVE SIGNS.

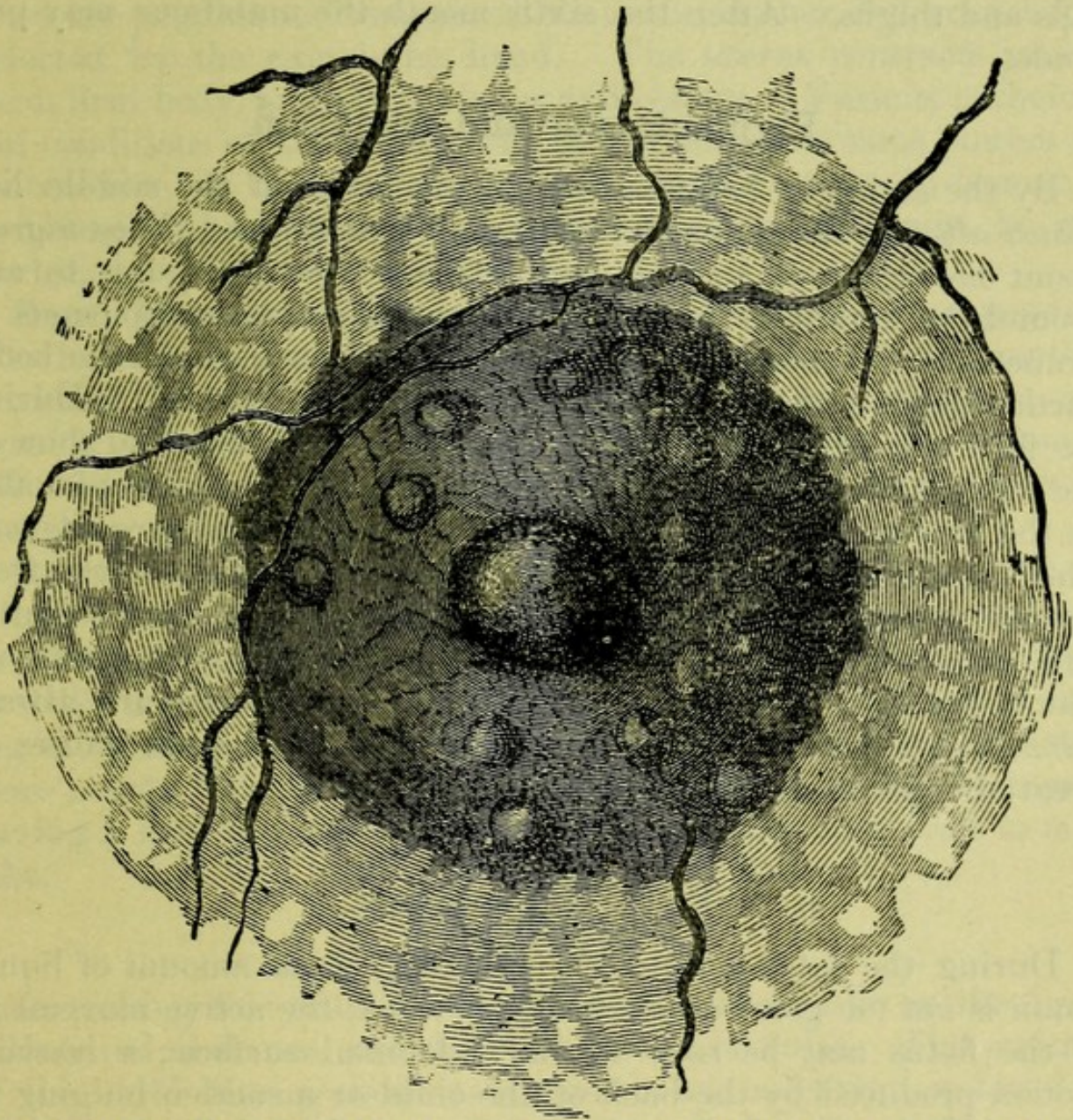
### The Breasts.

These become larger and firmer from the development of the individual lobules, which have an irregular, knotted feel. A deposit of fat also takes place between the lobules and in other parts of the gland. The nipples increase in size, are harder to the touch, become more erectile, and project more prominently. As early as the third month a few drops of a turbid fluid, *colostrum*, may be pressed from the nipple, which is usually capped by a few branny scales. The **primary areolæ, or rings** (Fig. 11) around the nipples, are broadened and slightly elevated above the surrounding skin, and there is a marked increase in their pigmentation, the color varying with the complexion of the individual from reddish-pink to brown or black. The **secondary areolæ** develop about the fifth or sixth month, external to the primary bands. They are much fainter in color, and are broken by spots of a lighter hue. The **sebaceous follicles** (**Montgomery's**) in the primary areolæ, ten or more in number, hypertrophy and project one-sixteenth to one-eighth of an inch above the surface. The **superficial veins** enlarge and become more distinct, appearing as



faint bluish streaks coursing over the projecting breast. After the middle of pregnancy, in excessive mammary distention, bluish-silvery lines are also seen at the periphery of the gland.

FIG. 11.



The primary and secondary areola and Montgomery's glands in pregnancy (Parvin).

### The Abdomen.

At the second month there are slight flattening of the hypogastrium, due to the sinking of the uterus, and an increased retraction of the umbilicus. After the third month, when the uterus begins to ascend out of the pelvis, a progressive enlargement of the abdomen begins and continues until near the end of pregnancy, when



the uterus again sinks, and so-called "lightening" occurs. The protrusion of the abdomen is more marked on the right side, on account of torsion of the uterus, whereby the left horn of the organ is brought more to the front. An increased deposit of fat often takes place in the lower portion of the abdomen, as well as on the hips and thighs. After the sixth month the umbilicus may protrude.

### Pigmentation and Striation.

By the eighth or twelfth week pigmentation of the middle line (*linea alba*) of the abdomen begins, and a dark band (*linea nigra*), about one eighth of an inch wide, extends from the pubis to and around the umbilicus or even higher. It is most conspicuous in brunettes. Discolorations also appear on other parts of the body, particularly on the face—*chloasma*, or "moth-patches." During the fifth or sixth month reddish or bluish streaks begin to show on the lower half of the abdomen, particularly at the sides, and often on the hips and thighs—the *linea albicantes* or *striæ gravidarum*. They are largely due to atrophic changes in the skin-layers from excessive stretching, and are more or less permanent. Similar striæ may be caused by tumors or other pathological conditions which greatly distend the abdomen. Recent striæ are always *pink*, and old striæ from former pregnancies or other causes of great abdominal distention are uniformly *white*.

### Fœtal Movements.

During the later months of pregnancy, if the amount of liquor amnii is not too great or the walls too thick, the active movements of the fœtus may be seen on the abdominal surface; a heaving motion produced by the back of the child or a sudden bulging at one point, as a fœtal extremity is thrust against the uterine envelope.

### Palpation.

By this is determined the size, shape, and consistency of the uterine tumor, its character, and the active and passive movements of the fœtus. At first the uterus is a flattened, pyriform organ. As pregnancy advances it becomes more spherical, and after the fourth month it assumes an ovoid shape. Enlargement of the



abdomen from ascites, increased deposit of fat, tympanitic distention, and the presence of tumors must be differentiated.

**Intermittent Contractions of the Uterus (Braxton Hick's Sign).**

—These begin about the third month, and continue at intervals of about ten minutes or more during the whole period of gestation. They are painless and unappreciable to the mother, but are readily detected by the examining hand. The uterus contracts into a hard, firm body, and then relaxes and softens. Various pathological conditions of the non-gravid uterus have the same powers of contraction, as fibroid growths, thick-walled cysts, hydrometra, hæmatometra, and even a distended bladder, and must be excluded.

**Fœtal Movements.**—These may be either active or passive. The hand laid upon the abdomen may feel the heaving motion produced by the fœtal back or the sharp tap or push of an extremity. A few drops of cold water sprinkled upon the abdomen will often stimulate the fœtal movements reflexly, when otherwise they may appear to be absent.

**External Ballottement.**—If the hands are placed flat, one on either side of the abdomen, and a quick thrust is made by one, the fœtal parts are displaced and float away in the amniotic fluid to strike against the opposite hand. This is best undertaken during the sixth and seventh months of pregnancy, before the fœtus more nearly fills the uterine cavity. A floating kidney, a tumor having a long pedicle, or a stone in the bladder may lead to mistake.

## Auscultation.

In making this examination the woman should lie on the back with bared abdomen, and the room should be quiet. The position of the child having been ascertained by palpation, a towel is placed over the abdomen and the ear applied to the surface,—the *mediate method*,—or, without a towel, the stethoscope is used,—the *immediate method*. *Three sounds*, possibly *four*, may be heard—the *uterine souffle* or *bruit*; the *fœtal heart-beat*; the *fœtal shock*; and the *funic souffle*.

**The Uterine Souffle.**—This is a soft, blowing murmur synchronous with the maternal pulse, and is heard along the sides of the uterus. It is most distinct during the later months in the left flank, on account of the torsion of the uterus, which brings that



side to the front. It may be heard by the fourth month, sometimes earlier, and is produced by the rushing of the blood through the tortuous uterine vessels. The uterine souffle continues for several days following delivery. It may also be heard in fibroid and ovarian tumors and in chronic metritis. For this reason it is of doubtful value in the diagnosis of pregnancy.

**The Foetal Heart-beat.**—This is the one positive sign of pregnancy. It may be heard as early as the sixteenth or twentieth week, and has been compared to the ticking of a watch under a pillow. It is a double sound, ranging in frequency from 110 to 150 to the minute, but is subject to great variations, being influenced by the movements of the child, fever, nervous and mental states of the mother, and other conditions. In listening to the foetal heart it must be remembered that the beat is independent of the mother's pulse; by bearing this in mind the transmitted impulse of the maternal aorta or the mother's heart-beat cannot be mistaken for it. In *anterior cephalic presentations* the foetal heart-sounds may be heard of greatest intensity over a limited area one inch below and to the left or right of the navel; in *breech presentations* at corresponding points above. In *posterior positions* the point of maximum intensity is over one or the other flank, just above or below a line from the umbilicus. In *transverse presentations* the heart-beat is heard just above the symphysis. When doubt exists, repeated examinations, at intervals of two or three days, should be made. The failure to detect the foetal heart-sounds does not exclude pregnancy, for the foetus may be dead. An excess of liquor amnii or very thick abdominal walls may render the heart-sounds indistinct or unhearable and sometimes posterior positions also.

The **foetal shock** is the sound imparted by the foetal movements and is similar to that produced by tapping the back of the partially closed hand held near the ear.

The **funic souffle** is an intermittent, high-pitched, whistling or sibilant murmur, synchronous with the foetal heart-beat. It is caused by some interference with the circulation in the cord, as when this is coiled about the child's body or neck or is abnormally long or short. It is usually best heard over the foetal back, but is present only in about 15 per cent. of cases. When heard, it is diagnostic of pregnancy. In characteristics it is identical with the "*venous hum*" very commonly heard over the veins of the neck in anæmia.



## Pelvic Signs.

**Purplish Coloration of the Vagina.**—As early as the first month of pregnancy a faint violet color of the anterior vaginal wall, especially just below the meatus urinarius, may be distinguished ; by the third month the color has deepened to purplish and become pronounced. This sign, present in 80 per cent. of cases (Chadwick), is due to the engorgement of the vaginal vessels. A similar coloration may result from uterine neoplasms, heart-disease, and other conditions.

**Purplish Coloration of the Cervix.**—"A more or less marked lividity of the vaginal portion of the cervix may be observed from the first month after conception. The purplish color of the cervix is not only developed earlier, but is more constantly present than that of the vagina" (Jewett).

**Strong Pulsation of the Vaginal Arteries (Osiander's Sign).**—This is usually present in pregnancy ; and during the later months the labia become more or less swollen, relaxed, softened, and moist from increased secretion.

**Softening of the Cervix (Goodell's Sign).**—This may be distinguished as early as the sixth week. At first the sensation imparted to the examining finger is like that of a velvety covering over a harder underlying substance, but as pregnancy advances the whole neck becomes involved. There is also an increased secretion from the cervical glands, the canal—especially in *multi-paræ*—is more open, and it is filled by a tenacious mucus plug. Cancer, syphilis, and other pathological conditions of the cervix may give rise to softening of the part, but this is not progressive, as in pregnancy. In connection with other signs, this one is of value.

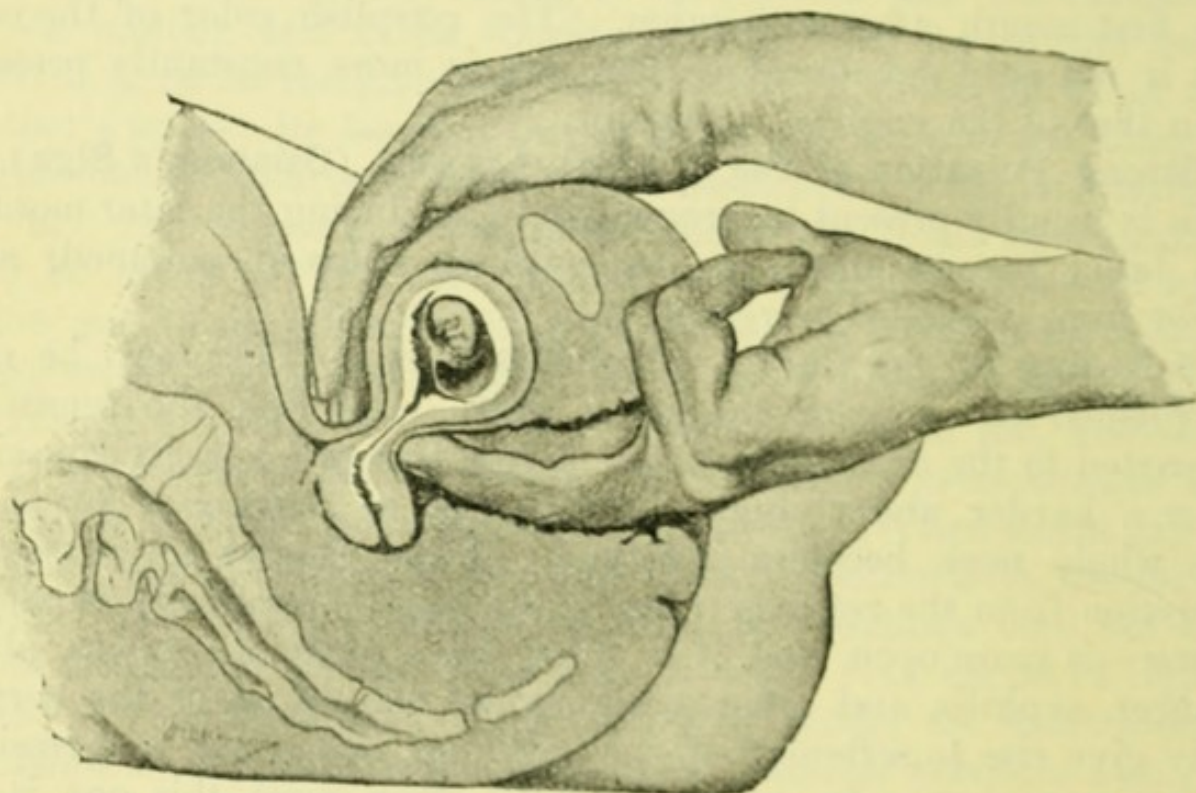
**Hegar's Sign.**—This consists in the **compressibility of the isthmus**, usually the hardest part of the neck, and is obtained by bimanual examination (Fig. 12). Two fingers in the vagina are placed either in front of or behind the cervix, while the fingers of the external hand deeply depress the abdominal wall and uterus at the same point, until both internal and external fingers are brought in close proximity. The thickness of the isthmus is thus gauged. Or the forefinger may be introduced well up into the rectum and the thumb into the vagina, the cervix being between the two, while the external hand depresses the



uterus. The cervix and body thus appear as distinct objects or as connected only by thin longitudinal bands. This sign is not always appreciable, and may also, though rarely, occur under other circumstances, as when fluid is retained within the uterus. When determined, it is one of the most reliable indications of early pregnancy. It may be demonstrated as early as the sixth or eighth week.

*During early pregnancy the uterus appears as a rounded tumor given off abruptly from the cervix, and is felt bulging into the lateral fornices; or it may seem to overlap the cervix, giving rise*

FIG. 12.



Bimanual examination for compressibility of the isthmus at the sixth week (Jewett).

*to a ridge or fold surrounding the latter, most marked in front and behind.*

**Internal Ballottement.**—To obtain this sign the axis of the uterus must be vertical, the patient being in a semirecumbent position or standing with one foot raised on a stool. Two fingers are introduced into the vagina in front of the cervix, while the external hand rests upon the fundus to steady it. By a sudden push of the fingers in the vagina the presenting part is displaced, the foetus floats upward in the amniotic fluid, and then settles with



a gentle tap against the examining finger. Internal ballottement is best effected during the fifth and sixth months of pregnancy; previous to this time the foetus is too light and the amount of waters too small, while later the child's body too completely fills the uterine space. A stone in the bladder, a pedunculated subserous fibroid, and, possibly, a retroflexed fundus may give rise to errors. Scanty liquor amnii, transverse presentations, twins, placenta prævia, and other conditions may prevent internal ballottement.

### DIAGNOSIS OF PREGNANCY.

The patient should first be questioned concerning menstruation—its character and regularity previous to cessation. Digestive disturbances should then be inquired into, and the condition of the bladder and bowels. Finally the state of the breasts must be ascertained, whether sensations in them have been experienced, and enlargement, with darkening of the areolæ noticed. When as complete a history as possible has been obtained, a physical examination should be made. The bands about the waist must be loosened so as to expose the abdomen, and the breasts must be rendered accessible. The woman is then placed in the recumbent position upon the table or couch, and covered with a sheet, the part under examination only being exposed. The breasts are to be inspected first, and the conditions already mentioned noted. Attention is then turned to the abdomen, and its size, shape, and pigmentation observed. The uterine or other tumor is then carefully palpated, and its consistence, contour, and general characteristics determined. Percussion is then performed, and afterward auscultation. Lastly a vaginal examination is made. The character and amount of the secretion are noticed, the condition of the cervix and os is ascertained, and the finger is swept in all directions to determine roughly the size of the pelvis.

### Differential Diagnosis of Pregnancy.

Many conditions may lead to confusion and uncertainty as to the presence of pregnancy, and the observer should ever be on the alert to distinguish between these and uterogestation, in order that he may avoid disappointment and mortification to the patient and censure for himself. In some instances it is quite impossible to



render a positive diagnosis, especially during the early months, but in every case time will satisfactorily settle the question. It is no discredit to the physician to say that he is unable to arrive at definite conclusions as to the conditions present, but, on the other hand, a hasty and unfounded diagnosis may lead to humiliation and chagrin.

The following conditions are those most likely to mislead :

**Fat.**—This may be associated with scanty menstruation or amenorrhœa, as in anæmia. With the patient on the back, the abdomen will present a more uniformly rotund appearance than in pregnancy, and evidences of fat deposit will appear on other parts of the body. Grasped by the hand, the abdominal wall may be raised as a thick fold which moves quite freely upon the underlying muscles. The percussion-note is faintly resonant. Bimanually, the body of the uterus will be felt to be normal in size, while the cervix remains unaffected. Mammary signs and other symptoms are absent.

**Subinvolution.**—This can be mistaken for pregnancy only at an early period of the former, when a positive diagnosis under any circumstances is impossible. The uterus, while enlarged and softened, is still much firmer than in pregnancy, and it retains, to a large degree, its original shape. The condition is also associated with symptoms of uterine disease.

**Fibroid Tumors.**—These growths are generally hard, often irregular in form, and may develop from one part of the uterus or involve its whole upper portion. Growth is usually slow. Menstruation is ordinarily profuse, or, if absent, the decline will have been gradual. When large and situated low in the pelvis, fibroids may give rise to purplish coloration of the vagina, as already mentioned, and the cervix may be softened from pressure and venous congestion. When pregnancy and fibroids coexist, the latter take on a rapid growth, but they as quickly subside or disappear following delivery. The diagnosis in the presence of both conditions may at first be impossible, but time will usually clear the doubt. As already stated, a bruit is heard over fibroids, the same as in pregnancy.

**Ovarian Tumors.**—During the early development of these growths the tumor is situated at one side of the uterus and is readily distinguishable. When the cyst occupies the larger part of the abdominal cavity, the uterus will be found displaced later-



ally, anteriorly, or posteriorly. The cervix remains unchanged. Fluctuation will be pronounced, and the general sensation imparted to the hand is different from that of the pregnant womb. Menstruation usually occurs, and the pain at the periods is often increased. Hydramnios may give rise to error, but the presence of the other signs and symptoms of pregnancy should assist in rendering a diagnosis possible. The coexistence of an ovarian cyst and pregnancy may render the diagnosis exceedingly difficult.

**Ascites.**—A careful examination of the patient with attention to the history of the case should render mistake impossible. In ascites the abdomen is prominent, but less so than in pregnancy, and when distention is great the umbilicus protrudes. With the patient on the back the percussion-note is tympanitic in front and dull at the sides, but change in posture produces a corresponding change in the note, as the intestines float to the top of the fluid. Intestines in front of the uterus are rarely seen in pregnancy. Other signs and symptoms are absent.

**Tympanites.**—In this condition the size of the abdomen differs at different times of the day—it is softer, and the walls can be pressed backward to the spinal column. The percussion-note is usually resonant. Positive signs of pregnancy are always wanting.

**Hæmatometra.**—The retention of blood within the uterus is most likely to occur in girls who have never menstruated, and there is a history of recurring monthly pains without discharge. The enlargement of the uterus is periodical, and not regular and progressive. Examination will reveal an occlusion at some part of the genital tract which prevents an escape of the blood. In marked cases increase of the prominent abdomen takes place appreciably and definitely only during a few days at the regular menstrual interval, for instance, during four days in every twenty-eight. Throughout other parts of the month no change in size occurs.

**False Pregnancy (Pseudocyesis).**—In phantom tumor all the subjective symptoms of pregnancy may be present and the patient go on to term with the full expectation of delivery. It usually occurs in hysterical, sterile women desirous of offspring, especially near the menopause. The abdominal enlargement is due to fat accumulation and gas; the other conditions are “sympathetic.” The uterus will be found small, with its neck unchanged, but, on



account of the abdominal enlargement, a bimanual examination may be unsatisfactory. A resort to an anæsthetic will cause the disappearance of the abdominal swelling, and the pelvic organs can then be readily palpated.

### Diagnosis of Previous Pregnancies.

If several years have elapsed since delivery and no great damage was done to the soft parts at the time, it may be impossible to distinguish between a woman who has borne a child at term and one who has not. As a rule, however, in primiparæ the abdomen is tense and resisting to the touch, and the striæ are of a pink or purplish-red color. The mammary glands are round, full, and prominent, and the nipples are small and undeveloped. The fourchette is unruptured, the vaginal chink is closed, the walls of the canal are firm and rugous, and the cervix is long and conical. In multiparæ, on the other hand, the abdominal walls are lax and yielding, and are marked by old white striæ; the breasts are flaccid and more or less dependent, the nipples are large, and may be well developed. The perineum is relaxed or torn, and seamed by cicatrices; the vaginal opening gapes; carunculæ myrtiformes are present; the vagina is relaxed and smooth; the cervix is large and truncate; the os is enlarged by lacerations or is puckered.

### Diagnosis of Death of the Fœtus.

This is sometimes very difficult or impossible. During the early months the products of conception may become entirely absorbed, the uterus remaining for a time somewhat enlarged. At a later period the ovum may degenerate into a mole. Toward the end of the second trimester and later the absence of foetal movements, which have formerly been active, the absence of foetal heart-sounds, a cessation of progressive enlargement of the uterus, or decrease in the size of the abdomen, and a flabby condition of the breasts, which at the same time may contain milk, may be taken as presumptive evidences of foetal death. If the head presents, the cranial bones may be felt softened and yielding, and pressure may elicit a crackling sensation if decomposition is going on. At the same time there is likely to be a foetid discharge from the vagina. Under these conditions septic symptoms may be manifested in the mother and there may be pelvic pains and tenesmus.



### Diagnosis of Sex of the Fœtus.

Although numerous observations have been made relative to the diagnosis of the sex of the fœtus *in utero*, no data have as yet been established upon which may be based a reliable prediction. It has been assumed that a very rapid heart-beat—over 145 to the minute—is indicative of a female, while below this number of pulsations the sex is either doubtful or probably a male. So many influences, however, both on the side of the mother and of the fœtus, may cause variation of the cardiac pulsations that the sign is quite unreliable and has been discarded.

### Duration of Pregnancy.

As insemination does not necessarily mean fertilization, the duration of pregnancy in a given case can be determined only approximately. While for all practical purposes two hundred and eighty days, nine calendar or ten lunar months, may be considered as representing the average duration of uterogestation, some women fall short, while others run over, this period, and the number of days may also vary in the same woman in different pregnancies.

### Estimation of the Probable Date of Confinement.

**Nægele's Rule.**—This is the simplest and most convenient for this purpose. This consists in counting backward three months from the first day of the last menstruation, and adding seven days to the date thus obtained. To be more accurate, in April and September only six days should be added; in December and January, five days; and in February, four days. This rule cannot, of course, be applied in those cases where pregnancy takes place prior to the establishment of menstruation, or during lactation before the function has been resumed, or when menstruation is very irregular. In such instances the estimation of the date of confinement becomes still more uncertain, and can be arrived at only very approximately by the consideration of other physical signs. Quickening, although unreliable, as already pointed out, affords some evidence, and the height of the uterine fundus at different months may give an unsatisfactory clue. At *four months* the fundus has risen above the pelvic brim; at *five months*

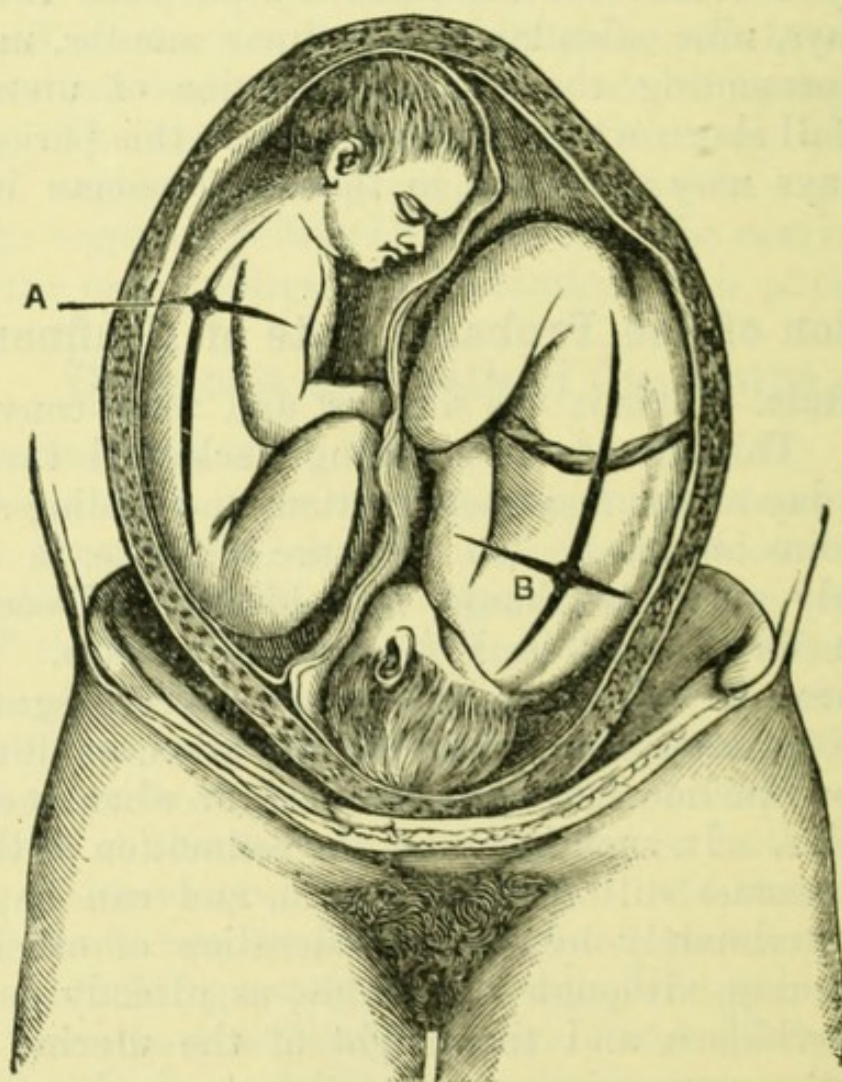


it is midway between the symphysis and the navel; at *six months* it is at the umbilicus; at *seven months* it is four finger-breadths above the navel; at *eight months* it is midway between the umbilicus and the ensiform cartilage; at *nine months* it is at the ensiform cartilage. From the *middle to the end of the ninth month* the fundus sinks to about the level occupied at the eighth month. The umbilicus, however, is not a fixed point, and in pendulous bellies the fundus is thrown further forward than when the abdominal walls are stiff and unyielding.

### MULTIPLE PREGNANCY.

*Twins* occur in about 90 to 120, *triplets* once in 1875, and *quadruplets* once in 371,126 pregnancies. The causes of multiple

FIG. 13.



First child presenting by the vertex; second by the pelvis (Parvin). B and A, points of maxima of intensity of sounds of the foetal heart.



foetation are unknown, all theories being purely speculative. Twin conception is more common in women who have borne children, and more so in elderly than in young primiparæ. Twins arise from a single ovum, the germ dividing, from two separate ova from the same Graafian follicle, from two ova from the same ovary, or from one ovum from each ovary.

**Sex.**—Children from the same ovum are always of the same sex. In general, of twins, more than one-third are males, less than one-third females, and in the remaining third both sexes occur.

**Arrangement of the Membranes.**—The decidua vera is always single. The reflexa is single for one-egg twins; double when two ova are concerned. The chorion is single for one-egg, double for two-egg twins. The amnion and placenta are always, at least at first, double.

**Diagnosis.**—In multiple conception the symptoms and disorders of pregnancy are apt to be exaggerated, and suprapubic œdema is almost always present during the later months. The abdomen is of unusual size, and broader than in single pregnancies, and a *depression may divide the abdominal wall into two spaces*. The uterus is tensely distended, and its walls are thin. Fœtal small parts may be felt at different parts of the uterus, and two heads may be distinguished—one above and one below. The fœtal heart sounds are non-synchronous, and may be heard at different parts of the abdomen. One fœtus, however, may be dead. Ballottement is not obtainable.

### Superfoetation.

This implies the impregnation of an ovum during such time as another ovum from a previous ovulation is in process of uterogestation.

### Superfæcundation.

This is the fertilization of more than one ovum discharged at the same ovulation by separate acts of insemination at short intervals.

### QUESTIONS.

Name and describe the principal subjective symptoms of pregnancy.

What conditions may give rise to error in diagnosis in each of these?

What is "quickening," and when does it occur?

What are the chief objective signs of pregnancy?



How should the examination of the patient be conducted?

Describe palpation.

What is Braxton Hicks' sign?

What is external ballottement, and how is it performed?

Describe "mediate" and "immediate" auscultation, and name the points where the foetal heart-beat can be heard?

What is the uterine souffle, and how is it produced?

What is the funic souffle—where is it best heard, and how does it originate?

What is meant by foetal shock?

What are the pelvic signs of pregnancy?

To what conditions is the coloration of the vagina and cervix due?

What is Goodell's sign?

What is Hegar's sign, and how is it determined?

Of what value is this sign?

What is internal ballottement, and how is it effected?

In the differential diagnosis of pregnancy, what conditions may give rise to error, and how may they be excluded?

How can a diagnosis of previous pregnancies be made—in primiparæ? in multiparæ?

How can the death of the foetus be determined?

Can the diagnosis of the sex of the foetus *in utero* be made?

What is the duration of pregnancy?

How can the probable date of confinement be estimated?

What is the height of the uterine fundus at the different months of pregnancy?

Define multiple pregnancy.

How often do twins, triplets, and quadruplets occur?

How do twins arise?

What is the sex of twins—from the same ovum? from different ova?

Describe the arrangements of the membranes in twin pregnancies.

How can twin pregnancy be diagnosed?

What is superfœtation?

What is superfœcundation?

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## CHAPTER V.

### THE HYGIENE, MANAGEMENT, AND PATHOLOGY OF PREGNANCY.

#### HYGIENE AND MANAGEMENT.

IN pregnancy the dividing-line between health and disease is often so shadowy that every precaution and safeguard should be thrown around the *enceinte* woman in order that she may be protected from the multitude of dangers which inevitably threaten her condition. The hygiene of pregnancy, therefore, must include attention to clothing, food, exercise, rest, sleep, bathing, excretory functions, the breasts, the nervous system, and the mind.



### Clothing.

This should be loose, the heavier garments being suspended from the shoulders. Excepting, possibly, during the warmest weather, flannels should be worn next the skin. Taking cold and sudden chilling of the surface should be avoided. As soon as the uterus has risen out of the pelvis—during the fourth month—the corset should be absolutely abandoned, *since pressure upon the enlarging uterus tends to albuminuria and uræmia*. In the later months, especially when the abdominal enlargement is great, a linen or elastic bandage may be worn with comfort, but it must be so adjusted as to support and not press upon the womb.

### Food.

This should be simple, wholesome, nutritious, easily digested, and abundant, but excessive eating should be avoided. It is not desirable, in the majority of cases, that a special diet should be prescribed or followed, a mixed diet being preferable for the well-being of the mother and the development of the child. Meat, however, should be sparingly indulged in, on account of the effect on the kidneys, and all foods which are likely to produce indigestion, dyspepsia, heart-burn, or irritation of the kidneys, such as sweets, fried and highly spiced foods, and pastry should not be indulged in. The heartiest meal should be taken near the middle of the day, and the stomach, especially at night, should never be overloaded. Water should be partaken of freely.

### Bathing.

The skin should be kept active by daily or frequent baths, followed by brisk rubbing with a rough towel. Extremes of hot or cold bathing should be avoided.

### The Bowels and Bladder.

The bowels, usually constipated, should be kept open by fruit and coarse foods, and, when indicated, mild laxatives; mineral waters and enemas preferably may be prescribed. It must not be forgotten that in some women injections into the rectum are liable to bring on uterine contractions. Pregnant women are exceedingly wont to be negligent in their attention to these functions, and



decided discomfort—if not ill-health—may result from improper elimination. The bladder is usually irritable during the early and later months of pregnancy, owing to the pressure of the womb. In occasional instances a mild cystitis may arise. As already mentioned, albumin is found in from 5 to 10 per cent. of pregnant women, and occasionally glycosuria is present. To insure sufficient renal secretion and flush the kidneys, water, either pure, still, or effervescing, should be taken freely. *In order that the physician may keep himself informed regarding the condition of the kidneys, the urine of every pregnant woman should be examined, both chemically and microscopically, every two weeks from the beginning of gravidity; during the late months of pregnancy the urinalysis should be made weekly. Catheterized specimens should be used because leucorrhœal discharges, so common in pregnancy, may give the albumin reaction.*

### **Exercise, Rest, and Sleep.**

Sufficient exercise in the open air should be taken daily to maintain bodily health—indeed, the pregnant woman demands all the fresh air that she can get; but all excessive exertion and fatigue must be avoided. Eight hours of sleep nightly are necessary, and an hour or two in the recumbent position during the forenoon and again in the afternoon is desirable.

### **The Sexual Tract.**

Intercourse should be restricted during the early and late months of pregnancy, particularly at the time of month when normal menstruation would occur. Coitus is occasionally productive of discomfort and distress, and in some women may lead to abortion, especially during the early months. When a profuse leucorrhœal discharge is present, due to a preceding endometrial catarrh, a daily douche is indicated. This should consist of a quart of warm saturated solution of boric acid or an equal amount of a mild carbolic lotion (1:80). It should not be too hot,—not above 100° F.,—and must be injected slowly and without force to the stream.

### **The Breasts and Nipples.**

Until the last month or so of pregnancy the breasts and nipples should be bathed once or twice daily in cool or tepid water. The



application of astringents to the nipples, under the mistaken idea of hardening them, is exceedingly undesirable. When the nipples are small, undeveloped, or retracted, they should be pulled out several times daily by the fingers (*massaged*), which will usually stimulate their growth. During the last month cocoa-butter or castor oil may be applied.

### **The Nervous System and the Mind.**

On account of the nervous and mental susceptibility of the pregnant woman, all annoying conditions of her social and domestic surroundings should be removed as far as possible and excitement of every kind avoided. Her immediate home life should be made as bright and cheerful as can be, and she should be treated with protective care and considerate kindness.

## **DISORDERS OF PREGNANCY.**

### **Nausea and Vomiting.**

The simple nausea and vomiting of pregnancy require no treatment. They generally disappear by the third or fourth month, but may persist in a mild degree throughout the greater part of gestation. Regulation of the diet and attention to the bowels are generally all that are necessary in the way of treatment. When the condition is annoying, much relief will often be obtained by the administration of the following powder:

R	Ingluvin,	gr. v ;
	Oxalate of cerium,	gr. v.
M. and Sig.—Repeat every one or two hours as required.		

### **Indigestion and Heart-burn.**

These should be treated as under other conditions. The various preparations of pepsin, together with carminatives, are useful. It must be borne in mind that digestive disturbances are due in many instances to the displacement of the intestines and stomach by the enlarging womb, and that the best results may be obtained through diet and the regulation of the excretory functions. For pyrosis, dilute hydrochloric acid with nux vomica may be tried, or the popular remedy, magnesia, in some form may be given.



## Hyperemesis.

The etiology of this condition has been ascribed to an infinite number of causes, but it is probably a functional neurosis. In the pernicious vomiting of pregnancy the mild symptoms gradually increase in severity until the patient is unable to keep down either solid or liquid food, and the violent retching continues even after the stomach is empty. The patient at an early stage often becomes mentally depressed, and is apprehensive of her recovery. In some there is an excessive susceptibility to odors (*hyperosmia*), which comes on periodically and disappears when the vomiting sets in. Following the ejection of food the vomited matter may contain mucus, bile, fresh blood, and *coffee-grounds* material. As the result of the constant emesis exhaustion sets in, the patient becomes rapidly emaciated, and constitutional symptoms develop. During the first period of the disorder there is no rise of temperature, but later this is elevated ( $103^{\circ}$  F. or more), at first only at night, then continuously. The pulse is small, compressible, irregular, and accelerated (140). The throat becomes dry, and the tongue parched and brown. Thirst is excessive from the quantity of fluid vomited. If the mouth is not well cared for, stomatitis may develop, and ptyalism and diarrhœa may arise as complications. The urine is generally diminished and concentrated, the indican increased, the reaction acid, and traces of albumin and bile may be present. Loss of strength accompanies the emaciation, and fainting takes place on the slightest exertion. The sclera and skin may be slightly tinged with yellow. Finally, if the patient survives this long, the emesis ceases from exhaustion of the vomiting centres; the fever continues, the pulse becomes more rapid and weak, hallucinations, delirium, and coma supervene, and death occurs. The whole course of the disorder is that of inanition—starvation.

**Treatment.**—Before treatment is inaugurated it must be determined whether the vomiting is due to pregnancy or to other somatic conditions, as gastric catarrh, ulcer of the stomach, cancer, kidney, heart, liver, or brain disease. This can be settled only after a careful physical examination, together with a thorough scrutiny of the history of the case.

When the vomiting is persistent but occurs only at infrequent intervals and does not affect the general health—indeed, some



patients put on flesh under these circumstances—benefit may be derived from a glass of hot milk taken an hour or so before arising in the morning. This may possibly be ejected later, and the patient then be able to take and retain a hearty breakfast. Neuroses must be controlled by chloral hydrate or bromide of sodium, often considerable doses being required. As a toxæmia (Hadra's theory) may be responsible for the vomiting, careful attention must be given to the excretory organs, especially the kidneys. The treatment of the more serious form is divided into dietetic, medicinal, and operative.

*Dietetic.*—This is of the utmost importance, either alone or in connection with other treatment. When emesis has gone on for some time, the stomach becomes irritable and perhaps a catarrh has developed. Attempts at feeding by the mouth should, therefore, for the time be suspended.

*Rectal alimentation* is here of the greatest service, three or four ounces of the nutrient material being injected every three or four hours. A good nutrient enema may be made as follows :

R	Liquid beef peptonoids,	3iij ;
	White of one egg ;	
	Whiskey,	3iij ;
	Beef-tea or warm water, q. s. ad	3iij.

When the rectum is irritable, tinct. opii, ℥v-x, may be added to the above, also two or more grains of quinin when indicated. *The rectum should be washed out once or twice a day with warm saline solution to remove unabsorbed matter in the interval between rectal feeding.*

*Gastric Alimentation.*—When the stomach is in a condition to receive nourishment, small doses of parched-corn water will sometimes be retained when other fluids are rejected. Carbonated water, besides being grateful to the patient, dissolves the mucus in the stomach and stimulates the organ. Later, milk with lime-water, malted milk, broths, liquid peptonoids, etc., may be given. The rule should be : at the beginning small doses and often, but not too often. Frequently apparently wholly unsuitable articles of diet, when craved by the patient, will be retained and digested.

*Medical Treatment.*—This is of least importance in the relief of this condition, as the source of the disturbance is in the pelvis. Cocaine in  $\frac{1}{8}$ -grain doses ; oxalate of cerium and ingluvin, in large



doses; drop doses of wine of ipecac, iodine, or carbolic acid, well diluted with water and repeated several times daily may be tried. Chloral and the bromides are useful in controlling nervous irritability and may be administered per rectum in milk or water. *Opium is contraindicated.* Cardiac stimulants (strychnin, digitalin, and nitroglycerine) are necessary, especially in the later stages. Lavage is often of service at any stage when the patient is not too weak. A dislocated uterus should be replaced, adhesions broken up, engorgement of the uterus and cervical erosions cured. In some instances dilatation of the cervix results in relief of the symptoms. This may be done with a Goodell dilator or with the finger when the tissues are soft.

*Operative Treatment.*—If, after a careful trial, all the means mentioned fail to give relief, and the patient's condition becomes serious, abortion or premature labor must be induced. *This, however, should never be undertaken without the concurrence of a consultant.*

**Prognosis.**—This may be good or bad, according to the stage of the disease. Recovery may take place spontaneously at any stage except the last. If seen early, under proper treatment the prognosis is good, but later it is grave. The mortality is high—30 to 60 per cent.

### Salivation.

An increased flow of saliva usually accompanies the nausea and vomiting during the early months, but may be present in their absence. Like the latter, it is a reflex disorder. It usually disappears spontaneously. When the secretion is excessive and continues for a prolonged period it may become annoying on account of the constant spitting and dribbling. One or two quarts may be expectorated in a day. The patient's general health is not usually affected by the condition.

**Treatment.**—This is unsatisfactory, and usually of little avail. Astringent gargles and mouth-washes, and atropine in  $\frac{1}{10}$ -grain doses may be tried. In some instances considerable mitigation of the discomfort is derived by chewing stick cinnamon or cloves.

### Dental Caries.

The teeth are often affected during pregnancy, sometimes softening and decaying rapidly, giving rise to severe neuralgia.



This is ascribed to an acid buccal secretion and the action of bacteria. Great care should, therefore, be taken in the way of frequent brushing, and some alkaline fluid, as milk of magnesia, should be held in the mouth for a few minutes once or twice a day, especially just before retiring at night. The lactophosphate of lime in drachm doses may be given three times a day with advantage. When cavities exist, they should be stopped with a temporary filling.

### **Constipation and Diarrhœa.**

Diminished peristalsis due to alteration in the innervation of the bowel, pressure by the enlarging uterus upon the sigmoid flexure and rectum, and dietetic irregularities are among the causes of constipation at this time. Daily free movements from the bowels are necessary to prevent overwork of the kidneys and toxæmia.

**Treatment.**—One or two tablets of aloin, strychnin and belladonna; cascara sagrada; compound licorice powder, and the laxative mineral waters, as Apenta, Rubinat, Vilacabra, etc., may be employed daily without harmful effect. Diarrhœa may result from constipation, pressure, and nerve irritation the result of toxæmia. If unchecked by the ordinary remedies and intestinal antiseptics, nerve-sedatives should be employed.

### **Dyspnœa.**

This is usually present to a slight degree late in pregnancy, but may become so excessive as to cause considerable distress, especially at night when the patient assumes the recumbent position. It is due to the pressure of the gravid uterus upon the diaphragm.

**Treatment.**—There is none, but the patient should avoid excitement, and sleep with the shoulders well elevated.

### **Varicose Veins and Hemorrhoids.**

These are due to mechanical pressure on the veins and impeded return flow of blood, and occur, as a rule, late in pregnancy. They are seen most frequently on the inner sides of the thighs, the lower extremities, the vulva, and in the anal region. As a rule, they give rise to little trouble. When painful or inflamed,



rest in the recumbent position, elevation of the legs, the use of evaporating lotions, and elastic stockings give relief. When troublesome hemorrhoids exist, the rectum should be emptied by a saline laxative, the parts then thoroughly washed with warm water, protruding pile tumors tucked back, and the following ointment applied to the anus :

R	Morphin. sulph.,	gr. iij ;
	Hydrarg. chlorid. mite,	gr. xij ;
	Vaselini,	℥j.

M. and S.—Apply locally, in small quantity, as directed.

Great relief may be often obtained by the application of hot fomentations of witch-hazel. The application of equal parts of belladonna and tannic acid ointments is also useful. The following suppository in internal hemorrhoids affords relief :

R	Acid. carbolic.,	gtt. ss ;
	Cocain. muriat.,	gr. $\frac{1}{4}$ ;
	Morph. sulph.,	gr. $\frac{1}{8}$ ;
	Ext. hydrastis,	gr. j ;
	Cocoa-butter,	q. s.

Ft. suppositories No. vi.  
M. and Sig.—Use one in rectum two or three times a day.

### **Œdema of the Lower Extremities and Vulva.**

This results from pressure on the veins, and is best treated by rest and elevation of the hips. Relief is sometimes afforded by bathing the extremities in hot or cold water and swathing in flannel. Diaphoretics are rarely indicated. Œdema from anæmia calls for the exhibition of ferruginous tonics. When associated with albuminuria treatment should be directed to the kidneys. Œdema of the vulva, if slight, may be relieved by rest and the application of cold ; when excessive it may require puncture and drainage of the parts. In doing this the strictest asepsis should be observed.

### **Anæmia.**

An anæmic condition at the beginning of pregnancy is due to the increased watery elements of the blood and the relative dimi-



nution of the red cells ; later both the quantity and quality of the blood are augmented to meet the increased demands of maternal and foetal nutrition. A persistent anæmia may lead to serious complications for both mother and child, and run into the pernicious form.

**Treatment.**—It demands energetic measures. The hygienic surroundings of the patient should receive attention ; she should have an abundance of fresh air and sunlight, and a liberal diet of the most nutritious and easily assimilated food. Passive exercise (massage) is often of the greatest benefit in promoting assimilation. The bowels must be kept freely open, and the skin active by frequent baths and rubbings. Iron tonics combined with arsenic, strychnin, and capsicum should be given.

R	Ferri sulph. exsic.,	
	Potass. carbonat.,	āā ʒij ;
	Acid. arsenosi,	gr. j ;
	Strych. sulph.,	gr. ss ;
	Oleoresin. capsici,	gr. j.
	Ft. capsulæ No. lxxx.	
	M. and Sig.—One three times a day.	

The elixir of manganese and peptonate of iron in two-drachm doses three or four times a day is an excellent remedy, and full doses of extract of red bone-marrow will be found of service. In those rare instances in which all other means fail to restore the mother to a state approximating health, the induction of abortion or premature labor must be considered.

### Palpitation and Syncope.

These call for no especial treatment. If due to altered innervation, the aromatic spirits of ammonia in drachm doses, well diluted with water, will give temporary relief. If arising from gastric causes, the treatment is the same as in the non-pregnant condition. Patients who are subject to syncope should not be allowed on the street unattended.

### Cardiac Disease.

The mitral valve is oftenest involved, and next the aortic. Pregnancy has a decided tendency to aggravate the condition, and



perhaps hasten the fatal termination, although many patients affected with chronic cardiac lesions pass through pregnancy safely and with comparatively little inconvenience. In fatal cases death usually occurs at the end of the second stage of labor or early in the puerperium. In those who survive, the tendency to post-partum hemorrhage is increased. Fortunately, cardiac disease predisposes to abortion.

**Treatment.**—This is the same as in heart disease under other circumstances. In grave conditions abortion should be induced at a sufficiently early period before the life of the mother becomes jeopardized.

**Prognosis.**—Endocarditis which was giving symptoms before pregnancy, either of the steadily progressing or relapsing type, is necessarily more serious than that which is stationary and whose lesions are fully compensated.

### Mental and Nervous Diseases.

The mind is often affected in pregnancy, and hysterical conditions are common. **Melancholia** is, perhaps, the most frequent form of mental alienation. **Mania** is at times met with.

**Chorea.**—In mild forms this is not an infrequent disorder, but the graver varieties, unless present before conception, are somewhat rare. In the latter, abortion and the death of the mother occur in about one-fourth of the cases. The causation is made up of different elements, in which hysteria and tics are prominent.

**Treatment.**—Administer iron, arsenic, nerve-sedatives, and nutritious food. When the symptoms are severe, the induction of premature delivery or abortion may be necessary. Recovery of the mother usually follows delivery.

**Neuralgias.**—These, especially facial and pelvic, are of common occurrence and are due to caries of the teeth, anæmia, constipation, toxic conditions, etc. They should be treated by removal of the cause, when possible. A certain amount of pelvic and abdominal pain is an inevitable accompaniment of the enlarging uterus. Phenacetine with codeine, chloretone, counter-irritation, and heat are all useful at times.

**Cough.**—Often of reflex origin, and when due to this cause, should be treated by antispasmodics and codeine.

**Insomnia.**—This is troublesome and persistent, and gives rise to mental depression and ill-health.



*Treatment.*—Its management should be largely hygienic, with absolute avoidance of excitement and worry. Of the hypnotics, the bromides, chloral, sulfonal, trional, chloralamid, and chloretone may at times be given with advantage.

**Pruritus.**—This distressing condition most frequently affects the vulva, but may extend over the entire body. In the latter instance it is usually a neurosis, while vulvar pruritus is oftener due to a vaginal discharge.

*Treatment.*—*General* pruritus should be treated by the careful regulation of the diet and attention to the eliminatory functions. A soda-bath, sponging in 1 : 80 carbolic lotion, or the application of linseed oil and lime-water will often give relief. The bromides in large doses are also sometimes of benefit. When of diabetic origin, the treatment must be directed to the cause. *Vulvar* pruritus dependent on a leucorrhœal discharge must be treated by applications to the vagina. Bismuth subnitrate may be dusted over the surface daily or every second day, or an application of nitrate of silver—20 grains to 1 ounce—made. Cocaine applied in the same way gives temporary relief. The external parts may be protected by the application of zinc oxide ointment, unguentum, vaseline, or the like. Erosions of the cervix and endocervical catarrh should also receive appropriate attention.

### Albuminuria.

While the urine of about 6 to 10 per cent. of all pregnant women contains albumin, the appearance of this symptom should always be viewed with apprehension. Primiparæ are most frequently affected. Should kidney-disease antedate pregnancy, the albuminuria will appear during the early months; if caused by pressure, increased abdominal tension, toxæmia, etc., it may not be evident until after the sixth month, but both acute and chronic nephritis may develop at any period of gestation. *In the majority of cases the albuminuria is due to the so-called kidney of pregnancy, in which there is no inflammation, but a fatty infiltration of the epithelial cells associated with anæmia of the organ.* Besides albumin, the urine may also contain hyaline and granular casts and fatty epithelium. Whatever the cause of the appearance of albumin, it indicates a renal insufficiency which may lead to most serious consequences to the mother and is always detrimental, if



not fatal, to the foetus. *The dangers to both are greatly increased if the albuminuria develops suddenly.*

**Treatment.**—This consists in regulation of the diet, which in pronounced cases should consist entirely of milk, the patient taking three or four quarts daily. Meat, pastry, and sweets should be prohibited, but vegetables—squash, spinach, salads, etc.—may be added to the dietary of ordinary cases. Vichy water, either alone or with the milk, may be taken liberally. The bowels must be kept freely open in order to relieve the work of the kidneys. For this purpose citrate of magnesia, sulphate of magnesia in peppermint-water, Apenta or Vilacabra waters may be given. When anæmia exists, iron tonics are also indicated. One of the best of these is Basham's mixture (*mistura ferri et ammonii acetatis*) on account of its diuretic action. It may be given in 2- to 4-drachm doses well diluted, three or four times a day. Exercise in the open air should be indulged in in moderation. The clothing should be warm and loose, and flannel should be worn next the skin. Exposure to cold and draughts is to be avoided. Acute and chronic nephritis must be treated as under other conditions. If, in spite of treatment, more serious symptoms appear, such as persistent (usually frontal) headache, vertigo, ringing in the ears, black or bright spots floating before the eyes, obscurity of vision or blindness,—*indicating albuminuric retinitis*,—abortion or miscarriage should be induced without delay. *In all cases of albuminuria the urine should be examined at frequent intervals, and the total amount during twenty-four hours occasionally measured in order to determine the totality of solids, particularly urea, excreted. Under normal conditions from 300 to 600 grains of the latter are excreted daily.*

Some authorities state that the total urea excreted in twenty-four hours by a pregnant, should always be in excess of that excreted by a non-pregnant woman. This excess should increase regularly with the advance of gestation, and in the later months be almost double the normal. This view is not yet fully corroborated, but is certainly rational and suggestive and probably entirely correct. *It will, therefore, be well to examine at short fixed intervals for the total of urea. By those who have formulated this theory it is claimed that any failure of this increased urea excretion is the very earliest sign of renal damage due to gestation.*



## Eclampsia.

All forms of convulsions may occur during pregnancy, as at other times; among these *epileptic* and *cerebral* only need be mentioned. *The most characteristic and common variety is eclampsia.* In this a series of tonic and clonic convulsions occur, affecting at first the voluntary muscles, and finally extending to the involuntary, accompanied by complete loss of consciousness and terminating in coma, and perhaps death.

The **cause** of the disorder is not definitely known, but the manifestations are the result of functional insufficiency—that is, inability of the kidneys to eliminate some poisonous product, be it urea, carbonate of ammonia, or a toxine, from the system, the nervous system possibly becoming intoxicated, contraction of the arterioles probably taking place, and an acute anæmia of the brain with convulsions resulting. The attacks occur more commonly in late pregnancy,—the last three months,—less often during labor, and more rarely in the puerperium. The kidneys may or may not be *pathologically* involved.

The **frequency** varies from 1 in 300 to 1 in 500 cases. Eclampsia occurs in primiparæ as to multiparæ in the proportion of 3 to 1: is more common in multiple than in single gestations, and is seen in hydramnios, hydræmia, generally contracted pelvis, etc. As many as 125 seizures have been observed in twenty-four hours. Eclampsia is a symptom-complex, and no single cause can be put down as the essential agent in producing the convulsions in all cases.

**Symptoms.**—These are those of the *prodrome* and those of the *attack*. *The prodromal symptoms*, some of which occur in about one-fourth of the cases, are frontal headache, restlessness, epigastric pain, bright particles floating before the eyes, dimness of vision, vertigo, tinnitus aurium, œdema of the face, mental hebetude, stupor, occasionally gastric disturbances, and vomiting. *The urine always contains albumin, preceding, during, or following the attack, and casts and blood-corpuscles may be present.*

The *attack* is ushered in by a staring expression, the eyeballs roll upward, the pupils are at first contracted and later widely dilated, twitching of the eyelids and muscles of the nose and mouth, cyanosis of the face, and violent pulsating of the carotids occur. The head may be bent backward, and opisthotonos takes



place. The hands are clinched, with the thumbs in the palms. Tonic rigidity lasts from ten to twenty seconds, and is followed by clonic convulsions. The head is now rapidly turned from side to side, the muscles of the neck, chest, and arms twitch and tremble, and finally the trunk becomes involved in the convulsive movements. The attack lasts from one to two minutes, and is followed by coma and stertorous breathing, which may continue for half an hour or more. The patient either partially regains consciousness and sensibility and falls into a deep sleep to awake without knowledge of what has taken place,—in favorable cases,—or the convulsions recur with increasing violence and terminate in death. With each succeeding convulsion the temperature rises until, in fatal cases, it reaches 104° F. or more. Pulmonary œdema is apt to develop during the period of coma. Death results from exhaustion, apoplexy, pulmonary and cerebral œdema, paralysis of the heart, and asphyxia.

**Diagnosis.**—Eclampsia must be differentiated from *epilepsy*, *hysteria*, *hemorrhage*, *apoplexy*, *meningitis*, and the *convulsions due to cerebral tumors and disease*, the symptoms of which do not differ from those under other conditions. *The principal diagnostic data are found in the urine.* Albuminuria occurs in about 84 per cent. of cases *before, during, or after* the convulsive attack. A bedside test of the urine should be made in all instances where the condition has not previously been determined. A catheter should be passed, and sufficient urine obtained for this purpose, and the urine either boiled in a spoon over a gas-jet or tested with nitric acid. Sugar, casts, and blood-corpuscles are also frequently present.

*Since the vast majority of pregnant women have a leucorrhœal discharge which in any available specimen may give the albumin reaction, it is always essential to make this test with a catheterized specimen.*

**Prognosis.**—**For the mother** this is always grave, the mortality varying from 5 to 30 per cent. **The fetal death-rate** is about 50 per cent.

**Treatment.**—The first essential is to control the convulsions, which is best accomplished by the inhalation of chloroform during the attack. If the anæsthetic is not at hand, a large dose of morphine—from  $\frac{1}{2}$  to 1 grain—may be given hypodermically until the chloroform can be procured. Chloral hydrate, in 30- to 60-



grain doses in 3 ounces of water, may be given by rectum, and repeated up to 3 drachms or more during the twenty-four hours. At the same time the elimination of the poison from the system must be promoted. This is accomplished through the skin and bowels. The patient is placed in a hot-water or vapor bath, or, what is more convenient, wrapped in blankets wrung out of hot water, over which the bedding is piled until a profuse perspiration breaks out. The hot wet blankets may require changing at frequent intervals during several hours before this is accomplished. If the patient is unconscious, free catharsis may be obtained by drop doses of croton oil in olive oil placed on the back of the tongue. Elaterium in  $\frac{1}{4}$ -grain doses may be used in the same way. When the patient is able to swallow, 2 drachms of a saturated solution of sulphate of magnesia may be given every fifteen minutes until a copious evacuation from the bowels takes place. Diuresis and diaphoresis are greatly promoted by the transfusion of normal saline solution, a pint or more of this being injected under each breast or into the rectum or a vein. If the pulse is full and bounding, *veratrum viride* may be administered in 10-drop doses by mouth or 5-drop doses hypodermically every two or three hours until the pulse-rate is reduced. It is better to give 5 drops by mouth and 3 hypodermically every twenty minutes until the pulse softens or up to three or four doses, and then at one-, two-, or three-hour intervals. It is necessary to correct the pulse as promptly as possible. Convulsions rarely occur with a soft pulse of 60 or fewer beats to the minute. In strong plethoric subjects venesection may be employed with advantage, a pint or more of blood being removed from the arm. The resort to bleeding in such cases, to be of use, must be had before symptoms of pulmonary œdema develop. If the convulsions do not yield to treatment, the uterus must be evacuated as rapidly as is consistent with the avoidance of injury. The os usually dilates during the convulsive attacks, and when of the size of a silver dollar, the membranes may be ruptured, and, if the head has entered the brim, the forceps applied. If the head is still high, version should be done, the feet brought down, and the child delivered. In breech-presentations the feet are brought down and extraction done without delay. When the os is undilated, Barnes' bags or Hegar's dilators may be used, and, if haste is important, when the internal os has disappeared the cervix may



be deeply incised. All operative manipulations must be conducted under deep anæsthesia. During the convulsion, if the tongue is in danger of being bitten, a folded towel should be placed between the teeth. *Since gestation is the cause of this condition, it is best in all cases to empty the uterus.*

**Eclampsia occurring during labor** is treated in the manner just described; postpartum convulsions by chloroform, transfusion of saline solution, evacuants, and sedatives. The maternal mortality in postpartum eclampsia is about 7 per cent. The after-treatment of eclamptic patients is the same as that given for the albuminuria of pregnancy.

### Displacements of the Uterus.

The uterus may be displaced downward, forward, backward, or laterally.

**Anteflexion** is an exaggeration of the normal position, and is usually corrected as pregnancy advances. When due to adhesions or previous operative measures, such as suspension or fixation, an expansion of the posterior wall of the uterus may take place, leading to abortion or difficult labor.

**Treatment.**—When adhesions exist, it consists in pelvic massage through the anterior vaginal vault, the use of cotton tampons, the upper one of which should be soaked in boroglycerid with ichthyol, iodoform, etc., or the adjustment of an anteversion pessary. If these measures fail and threatening symptoms arise, it has been suggested that the abdomen be opened and bands and adhesions broken up and severed. Such radical measures, however, will be found necessary only very exceptionally. In lax and pendulous abdomens the uterus is liable to fall forward, and if there is wide separation (*diastasis*) of the recti muscles, a hernia may result. The treatment consists in the application of a snug bandage. In extremely rare instances the uterus may occupy the sac of an inguinal hernia.

**Retroflexion and Retroversion.**—These are by far the most common and serious of uterine displacements, and usually occur before the fourth month.

The **causes** are pregnancy in a previously retrodisplaced uterus, which may be bound down by adhesions, the pressure of fibroid or ovarian tumors, etc. When the displacement is persistent, a



pelvic deformity is usually present. In acute cases, falls, blows, or pressure on the abdomen may give rise to the displacement.

The **symptoms** are irritation of the bladder and difficult or painful micturition, backache, and pelvic pain with rectal tenesmus. As pregnancy advances the uterus usually straightens itself spontaneously and rises out of the pelvis. Should this fail to take place, incarceration of the fundus below the sacral promontory results if the condition is not relieved. The symptoms are then increased, the bladder may become enormously distended from pressure on its neck, and inflammation (*cystitis*), ulceration, and even sloughing from the continued retention of urine may occur. Uræmic poisoning is also possible. In extreme cases gangrene of the uterus may supervene, followed by fatal peritonitis.

**Treatment.**—On examination, the fundus of the uterus will be found occupying the hollow of the sacrum, while the cervix is usually high up toward the pubis. An attempt should be made to replace the uterus at once. The bladder and rectum should be emptied, and the patient placed in the lithotomy position. With two fingers in the vagina gentle pressure is made against the uterine fundus, the uterus being allowed to take its own course around the sacral promontory. Or two fingers of one hand may be inserted into the rectum, while a finger of the other hand in the vagina pulls down and steadies the cervix. Should these measures prove unsuccessful, the patient must be put in the knee-chest position and the perineum hooked back with the fingers or a Sims speculum. Often the inrush of air into the vagina will suffice to effect a replacement. If not, the uterus may be pushed downward and forward by the fingers, or a well-wrapped cotton-stick or forceps. Occasionally it will be found necessary to supplement these manipulations by fastening a tenaculum into the anterior lip of the uterus and making slight traction downward. If, in spite of all, the uterus fails to go back into place and the conditions are not urgent, much may often be accomplished by the use of a dilated rubber ring or bag in the vagina or a Barnes bag in the rectum, or by tamponing the posterior cul-de-sac with cotton, the upper layers of which have been moistened with glycerin or some medicament, as mentioned under antelexions. This not only relieves the congestion, but the continued pressure alone may be sufficient to reduce the displacement. When replacement has been effected, the uterus must be held in position either by means of



cotton or wool tampons or an inflated rubber ring pessary, until it has risen well out of the pelvis. Several attempts at replacement may be made at intervals of a day or two, but if failure follows, the induction of abortion may become necessary to save the woman's life. In extreme cases the abdomen may be opened, adhesions broken up, and the uterus replaced from inside.

The **prognosis** in these cases is favorable to both mother and foetus, provided proper treatment is adopted early.

**Prolapse of the Uterus.**—This is of rare occurrence and arises from a preëxisting prolapse, retroversion, or relaxed vagina and vulva. In many cases, as pregnancy advances, the condition cures itself, or it may terminate in abortion.

**Treatment.**—The uterus should be replaced and held up by a suitable ball pessary supported by a T-bandage.

### Relaxation of the Pelvic Joints.

During pregnancy a limited relaxation of the pelvic joints takes place, but this is ordinarily imperceptible. Occasionally it is excessive at the pubic symphysis, and may occasion painful and difficult locomotion. The condition may be detected by grasping the symphysis between the thumb and forefinger, the latter in the vagina, and having the woman take a step or two. A see-sawing motion between the ends of the two pubic bones will be felt.

The **treatment** consists in rest in bed for several weeks, and the immobilization of the joint by a strong, tightly secured bandage.

## COMPLICATIONS OF PREGNANCY.

The pregnant woman is subject to the same general diseases as the non-pregnant, but some of these materially influence the course of her condition, and may be of serious consequence to the woman and the unborn child.

### Erysipelas.

This is of not infrequent occurrence. If mild and confined to the face and upper parts of the body, no untoward results may follow, even should abortion take place. When, however, erysipelas develops in the lower extremities or the genital tract, it presents a more serious aspect, from the liability to septic infection.

The **symptoms** are the same as those under other conditions.



The **treatment** consists in supporting the patient's strength and avoidance of all unnecessary manipulations about the parts. In severe cases the injection of antistreptococcus serum should be tried. Labor is usually premature and infection of the foetus is likely to occur before birth.

### Variola.

Small-pox is said to attack pregnant women more frequently than any of the other eruptive fevers, but is, fortunately, very rare in this country. When developed late in pregnancy, it usually assumes the confluent form, and is almost always fatal to both mother and child. Should abortion not take place and pregnancy continue to term, the child may suffer from the disease *intra utero*, and at birth present the characteristic pitting of the skin. During epidemics of variola pregnant women should be subjected to vaccination. The effects of such inoculation have been demonstrated on the child.

### Measles.

This is an infrequent complication, and usually results in premature delivery from the accompanying endometritis, continued high temperature, or, when the bronchi of the mother are much affected from efforts in coughing. The *materies morbi* may be transmitted to the child. There is a tendency to the development of pneumonia and hemorrhage in the woman.

### Scarlet Fever.

Still less frequent in pregnancy, it may give rise to fatal sepsis of the mother, and, from its effects upon the kidneys, lead to grave and even fatal issue. Abortion and premature labor are the rule in this disease.

### Malaria.

This may manifest itself in a pregnant woman, and the malarial poison be transmitted to the foetus, evidences of the disease being manifested after birth. Abortion is liable to result if the disorder is not subdued by treatment.

The **treatment** consists in the administration of large doses of quinine to the mother.



### **Typhoid Fever.**

Enteric fever is a rare complication. The disease may directly affect the fœtus, and abortion or premature delivery results in nearly three-fourths of the cases.

### **Pneumonia.**

This is a serious complication of pregnancy, and during the later months, by reason of the already limited lung space, may prove fatal to both mother and child. The high and continued febrile movement is likely to cause abortion.

### **Phthisis.**

This disease is aggravated by pregnancy, and the fatal termination to the mother hastened. Abortion is a frequent result. Women thus affected should not marry.

### **Syphilis.**

If the mother or both parents are affected prior to conception, the disease is communicated to the fœtus. If the mother becomes tainted during pregnancy, the fœtus may not be affected, although syphilis by conception is not uncommon. In any instance there is a decided tendency to abortion, but this is most marked when the mother has been previously infected. Children of syphilitic parents either die at an early age or develop the disease after a period of weeks or months. Syphilis contracted at the time of conception is generally exceedingly virulent in its primary manifestations, but mild in its secondary symptoms. Both local and constitutional treatment of the mother is indicated in the interests of the child.

## **INJURIES AND SURGICAL OPERATIONS.**

Severe injuries are liable to be followed by abortion. Surgical operations, pelvic, abdominal, and general, are justifiable when absolutely demanded. Abortion does not always result. Neurotic women, however, may miscarry following the most insignificant procedures.

## **MATERNAL IMPRESSIONS.**

The fœtus may be affected through the nervous system of the mother and malformations result from shock, accidents, disgusting



and terrifying sights, etc. An explanation of the phenomenon is wanting.

### QUESTIONS.

- What should the hygiene of pregnancy include?
- What rules should be observed regarding clothing, food, bathing, the excretory functions, exercise and rest, and the sexual tract?
- How should the breasts and nipples be cared for?
- What is the treatment of the nausea and vomiting of pregnancy?
- What is hyperemesis? give the symptoms, course, and treatment.
- What is the treatment of salivation?
- How should constipation and diarrhœa be treated?
- Give the cause and treatment of dyspnœa.
- What is the treatment of varicose veins and hemorrhoids?
- Give the treatment for œdema of the lower extremities and vulva.
- What are the dangers of anæmia, and how must it be treated?
- What are the causes of palpitation and syncope?
- In cardiac disease what valves are most frequently affected, and at what period is death most likely to occur?
- Give the causes of neuralgias and the treatment.
- What is the treatment of insomnia?
- What effect has pregnancy on the teeth, and how should the latter be cared for?
- Give the causes and treatment of pruritus.
- To what is the albuminuria of pregnancy due, and how should it be treated?
- Describe the symptoms and course of eclampsia.
- What is the treatment of eclampsia?
- What displacements occur during pregnancy?
- How should a retroflexion or version of the uterus be managed?
- What is the cause, and what the treatment, of relaxation of the pelvic joints?
- What acute infectious diseases may affect the pregnant woman?
- What dangers may arise from erysipelas, small-pox, measles, scarlet fever, pneumonia, malaria, and phthisis in pregnancy?
- What can be said of syphilis in pregnancy?
- What effect have injuries during pregnancy?
- What can be said of maternal impressions?

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## CHAPTER VI.

### EXTRA-UTERINE (ECTOPIC) PREGNANCY.

#### TUBAL AND OVARIAN PREGNANCY.

**Definition.**—By this is meant the arrest and development of the impregnated ovum outside the uterine cavity. It may take place in the tube, the ovary, or the abdomen. It is most commonly met with in women between the ages of twenty and thirty, but may



occur in younger or older women and in those who have been sterile for a considerable period.

The **causes** are those which interfere with the migration of the ovum through the tube, such as chronic tubal inflammations with narrowing of the lumen or destruction of the cilia, congenital anomalies of the tube, undue participation of the tubal mucous membrane in menstruation, tubal polypi, atresias, adhesions from previous pelvic inflammations, etc.

**Varieties.**—(1) The tubal variety is the most common and is divided into (a) *tubo-uterine* or *interstitial*, the ovum developing in that portion of the tube which runs through the uterine wall; (b) *true tubal*, in which the ovum is in the extra-uterine portion—the isthmus or the ampulla; (c) *tubo-ovarian* or *infundibular*, in which the ovum is attached to the fimbriated portion of the tube.

(2) The ovum develops within the Graafian follicle, constituting the *true ovarian* type: very rare; (3) in the *abdominal* variety, within the abdomen. In all probability the abdominal variety represents merely a change in the position of an ovum, which, having begun its development elsewhere, is extruded into the abdominal cavity.

**Course and Duration of Tubal Pregnancy.**—Following arrest of the ovum a tubal decidua vera, and probably a decidua reflexa, is formed, the serotina being that portion of the tube where the placenta will develop. The ovum increases in size and acquires a chorion. The tube dilates to its fullest extent, but finally, from prolonged and excessive stretching, its fibres draw apart and rupture occurs, usually some time prior to the fourth month. The direction of the rupture is either into the abdominal cavity (*intra-peritoneal*) or between the leaves of the broad ligament (*extra-peritoneal*), both varieties being known as *primary rupture*. If in the latter variety one leaf of the lateral ligament gives way, the extraperitoneal rupture is converted into an intraperitoneal, and this is known as *secondary rupture*.

While ovular development is going on within the tube or elsewhere, the uterine mucosa hypertrophies and develops a decidua, as in normal pregnancy, but this is usually cast off whole or in shreds at about the twelfth week, often leading to the erroneous supposition that an abortion has taken place. Should the embryo die, involution changes take place in the uterus, but should it live, the uterus may continue to enlarge slightly for some time.



The embryo may perish at any stage in the tube and become absorbed ; it may die at the time of rupture and escape into the abdominal cavity, sometimes to undergo mummification, calcification, or adipocere changes ; or it may continue to flourish in the abdominal cavity to term, the placenta becoming implanted upon the peritoneum. If hemorrhage takes place into the foetal sac, the embryo is destroyed, and a *tubal mole* is formed. When the ovum is developed near the fimbriated end of the tube, it may be extruded into the abdominal cavity, giving rise to what is known as *tubal abortion*.

**Symptoms.**—During the early stages of ectopic gestation the symptoms are the same as in normal pregnancy, but *the condition is usually associated with severe pelvic pains referable to one side or the other*. Mammary changes are present, the cervix softens, and the uterus gradually enlarges up to the fifth month or longer, but the increase in size is not commensurate with the period of gestation. Menstruation may cease, but at times there is an irregular bloody discharge. The bladder is often irritable, and constipation is usually marked. When rupture occurs, all the symptoms of profound shock appear, often agonizing pain, nausea and vomiting, a small, rapid, thready pulse, and collapse. Death may ensue within a few hours from profuse internal hemorrhage, or *the paroxysms may be slight and repeated at intervals of days, weeks, or even months*. If the hemorrhage is large, as stated, the patient succumbs either to this or to septic infection ; when repeated bleedings occur, the fatal result is usually due to anæmia. The blood and gestation-remains may, however, become incapsulated and the woman make a gradual recovery, often to a life of invalidism. In some instances the foetal remains are subsequently discharged through the bladder, rectum, or, rarely, through the abdominal wall.

**Diagnosis.**—This is often difficult or impossible before rupture occurs, and the condition is rarely discovered, for the reason that the patient does not present herself for examination. Particular significance should be placed on the history of the case, prolonged sterility, the symptoms of pregnancy, menstrual cessation or irregular flow, with discharge of membrane from the uterus, associated with severe, colic-like pains referable to one or the other iliac region. In the acute attack the sudden occurrence of pain, fainting, “air-hunger,” and more or less severe shock and collapse are



present. When rupture takes place into the broad ligament the pain is more severe, but the shock is less pronounced. On pelvic examination the abdomen is found to be generally sensitive, the vagina is discolored, the cervix is soft, the uterus enlarged, and the fornix is obliterated on the affected side, while a more or less movable tumor is found adjacent to and connected with the uterus. A differentiation must be made between ectopic pregnancy and a *retroflexed gravid uterus*, a *small fibroid or ovarian cyst* with twisted pedicle, a *floating kidney*, etc. After rupture, a fluctuating mass may sometimes be felt when the blood is fluid, or an irregular mass when clots and adhesions have formed.

**Treatment.**—Whenever ectopic gestation is discovered before rupture, the abdomen should be opened and the offending tube removed at once. After rupture has taken place, the course of action must be determined by the condition of the patient. If she is moribund, nothing can be done. If, however, there is a chance to save life, the usual preparations for an aseptic cœliotomy should be hastily carried out. The site of operation, instruments, sponges, the physician's hands and arms, and whatever is to come in contact with the wound must be sterilized. The patient is then placed on a table, or, if this cannot be had, on the edge of the bed, and a median incision made through the abdominal parietes. As soon as the peritoneum is opened, the hand is introduced into the abdomen and the tube of the affected side, previously determined by examination, seized between the thumb and forefinger, and forceps clamped on either side of the ruptured point. The broad ligament is then ligated with catgut or silk, and the ovary and tube cut away. The peritoneum is then quickly cleansed of blood and clots, and the abdominal wound closed by interrupted silkworm-gut sutures. Drainage is not often necessary. The operation is much facilitated with the patient in the Trendelenburg position. Before operation a quart of warm saline solution should be injected into the rectum, and during the procedure a pint of the solution may be transfused under each breast. The after-treatment is the same as in other abdominal cases.

### ABDOMINAL PREGNANCY.

The ovum having escaped into the abdominal cavity, may go on developing to full term. The placenta becomes implanted on



the peritoneum, and adhesions are set up. The symptoms are as in normal pregnancy, including abdominal enlargement. Ballotement may be obtained, as well as the placental bruit, and in later stages the foetal heart-beat may be heard and the movements of the foetus immediately beneath the hand may be appreciated. Peritonitis with the formation of adhesions is common. When the condition goes on to term, spurious labor sets up and regular uterine contractions, lasting for a variable period, take place, and the foetus dies. Retrograde changes in the maternal organs and in the foetal sac follow. If the products of conception are shut off from the general peritoneal cavity, the child may be carried for years, becoming mummified, etc.; or the contents of the sac may break down and a pus-like material form. When the child is alive and the maternal condition favorable, interference should not be attempted until near term. The abdomen must then be opened, the sac incised at a point where there are fewest bloodvessels, and the child extracted. The sac is then to be stitched to the abdominal wall, and either irrigated daily with an antiseptic solution or packed with gauze. *On account of the dangers from hemorrhage the placenta should not be disturbed, but left to separate spontaneously.* Should the child die at any period of pregnancy, it should be removed by coeliotomy as just described. In such instances the placenta will usually be found detached.

### PREGNANCY IN A BICORNATE UTERUS.

If the horn is rudimentary, the condition is similar to that of an ectopic gestation and should receive the same treatment. The symptoms are those of ordinary pregnancy, and rupture takes place as in the tubal variety. A diagnosis is hardly possible. If the horn is well developed, pregnancy may continue to term and delivery be effected through the natural passages.

### QUESTIONS.

Define extra-uterine pregnancy, and state where it may take place.

What are the causes?

Into how many varieties is tubal pregnancy divided?

What are the course and duration of tubal pregnancy?

What changes take place in the tube-wall in this condition?

What is a tubal mole?

What is meant by tubal abortion?

What are the early symptoms of tubal pregnancy?



What symptoms arise following rupture of the tube?

What are the chief symptoms of ectopic gestation upon which a diagnosis may be made?

What is the treatment of tubal pregnancy after rupture has taken place?

What is abdominal pregnancy?

What are its course and termination?

What is the treatment of abdominal pregnancy?

How should the placenta be managed—(a) when the fœtus is dead? (b) when the fœtus is alive?

What are the symptoms of pregnancy in a bicornate uterus?

How is the diagnosis made in this condition?

What is the treatment?

## CHAPTER VII.

### DISEASES OF THE DECIDUÆ, OVUM, AND FÆTUS.

#### DISEASES OF THE DECIDUÆ.

##### Inflammations of the Decidua.

EITHER acute or chronic inflammation of the decidua may take place. The former is seen in the acute infectious diseases; the latter is the result of a preëxisting endometritis. In the catarrhal form the glands are chiefly affected, and their secretion is increased. Unless the secretion finds ready exit, cysts form; otherwise the fluid escapes between the membranes and is discharged in sudden gushes, a pint or more being lost at a time. This condition is known as *hydrorrhœa gravidarum*, and the discharge of the thin mucous fluid is often supposed to be due to premature rupture of the membranes. The fluid may be differentiated from liquor amnii by the absence of urea and the presence of flakes of vernix caseosa. Hydrorrhœa may develop at any period of pregnancy, but is most likely to occur during the later months. Following repeated discharges of the fluid labor may set in, but, as a rule, the uterine contractions subside and pregnancy continues.

**Treatment** consists in rest in bed and the administration of uterine sedatives, the bromides, viburnum prunifolium, etc. When premature expulsion of the ovum is feared, opium in the form of the tincture may be given by the rectum.

In **polypoid endometritis** the mucosa becomes thickened, uneven,



and polypoid in character. Death of the fœtus and abortion are the usual results.

### Atrophy of the Decidua.

Atrophic changes may take place in the decidua, so that the ovum finally is attached only by a slender pedicle to the uterine wall. It may then be forced down into the cervix, giving rise to cervical pregnancy. The fœtus dies, and abortion results.

## DISEASES OF THE OVUM.

### Oligohydramnios.

The normal amount of the liquor amnii is from one to two pints. In oligohydramnios it is so diminished that fœtal development is seriously interfered with. As the result of friction of the fœtal parts, ulcers may be produced, or the fœtus may become adherent at points to the uterine wall. Amniotic bands may also be formed, and fœtal deformities and mutilations result. Diagnosis is rarely possible, and there is no treatment.

### Hydramnios.

Dropsy of the amnion is an excessive accumulation of the liquor amnii, which in some instances may amount to several gallons. The condition is about twice as frequent in multiparæ as in primiparæ, and it is frequently associated with multiple pregnancy. The source of the fluid is either maternal, fœtal, or both. On the maternal side, hydræmia, syphilis, heart-disease, and albuminuria are given as causes; on the fœtal side, any condition which increases the blood-pressure in the umbilical vein, as in twisted cord, etc., excessive excretion from the kidneys, excessive secretion from the skin; from both mother and fœtus, certain cases of syphilis or a combination of the conditions mentioned. When the accumulation of the fluid is rapid, the condition is known as *acute hydramnios*.

**Symptoms.**—The disorder does not usually begin until about the fifth month of pregnancy. In the *usual chronic* form, as the uterus develops and becomes more rounded, a variety of reflex disturbances, as nausea and vomiting, appear, and pressure symptoms, as pain in the sides, dyspnœa, palpitation, œdema of the



extremities and genitals, albuminuria, and even jaundice develop, and great discomfort is experienced from the overdistention of the abdomen and stretching of the skin. Premature labor takes place in about 50 per cent. of cases.

**Diagnosis** in extreme cases is impossible from the tension of the abdominal walls. The foetal mobility is greatly increased or may not be detected, and malpositions are common. The heart-tones are muffled or indistinct, or may not be heard. Ballottement may or may not be possible. The condition must be distinguished from *ascites, with or without coincident pregnancy, uterine and ovarian neoplasms, distended bladder, and twin pregnancy.*

The **prognosis** depends upon the cause. It is usually poor for the foetus, largely on account of disease of the latter and the frequency of premature delivery; and it is unfavorable for the mother, because of the dangers from exhaustion, rupture of the uterus, infection, and hemorrhage.

**Treatment.**—In the majority of cases no treatment is required. When the distention is excessive and during the early months the symptoms are threatening, puncture of the membranes or induced labor must be carried out. An endeavor to prolong gestation until the child is of viable age should be made. During labor the membranes should be ruptured at the beginning of the first stage, but the evacuation of the fluid must be retarded by the fingers plugging the cervix, to prevent prolapse of the cord, malposition of the child, hemorrhage from sudden detachment of the placenta, and syncope. Atony of the uterine walls is common in the third stage of labor, and postpartum hemorrhage is, therefore, liable to occur.

### Hydatidiform Mole (Vesicular Mole).

This is a rare condition, occurring about once in 1000 or 2000 cases, and consists in a myxomatous degeneration of the chorionic villi, which begins in the syncytium and deeper layers. Cysts varying in size from a millet-seed to a hen's egg attached to one another by pedicles are formed, the whole mass somewhat resembling a bunch of grapes. Such a mole may be covered more or less entirely by the decidua, and a foetus or its remains may or may not be present in the contents. The disorder usually begins before the third month, when all the chorion becomes involved, but it may not arise until later, and be confined to a particular portion, as the placenta.



When the whole chorion is affected, the embryo dies and the mass is thrown off, but this may be delayed until the sixth month or later. On account of the possible relationship between *myxomatous degeneration of the chorion* and *deciduoma malignum* (cancer), the condition is at present considered of a more serious nature than was formerly accredited it. Hydatidiform mole is, fortunately, rare; it occurs between the ages of twenty and forty, and most frequently in women who have previously borne children.

**Symptoms.**—The condition is preceded by all the symptoms of pregnancy, the nausea and vomiting often being pronounced. At an early period there are repeated discharges of blood, followed by the escape of watery fluid, often of a fœtid odor. The uterus is enlarged out of all proportion to the period of pregnancy when the degeneration is general, but when this is limited, the uterine growth is less. Usually there is little to direct attention to the disorder until the advent of supposed abortion.

**Diagnosis** is impossible, as a rule, until the final expulsive symptoms set in. The possibility of the presence of vesicular mole is suggested by the sanguino-watery discharge, the rapid enlargement of the uterus, and the absence of palpatory and auscultatory signs. If cysts are discharged, the diagnosis is rendered positive. The disorder must be differentiated from hydramnios, twins, and threatened abortion.

**Treatment.**—As soon as the condition is discovered the uterus should be evacuated at once. When necessary, the cervix may be dilated by Goodell's or Hegar's dilator or a Barnes bag. The growth is then removed by the fingers, placental forceps, and the curette, but the last must be employed with great caution on account of the thinness of the uterine walls and the liability of rupture or perforation. Counterpressure from outside the abdomen should be made during these manipulations. The dangers to be apprehended for the mother are hemorrhage and infection. The former may be obviated by the hypodermic use of ergot and the hot antiseptic intra-uterine douche; the latter by strict asepticism in the conduct of the case.

## DISEASES OF THE PLACENTA.

Anomalies in size, thickness, number, and insertion of the placenta occur, but these are of no practical importance except when more than one placenta is formed.



**Placenta Succenturiata.**

In this one or more portions (cotyledons) may be left behind in the uterus following delivery, and give rise to hemorrhage, sometimes of a fatal nature, or septicæmia from decomposition.

**Placenta Prævia.**

The condition when the implantation of the placenta is low, encroaching upon the dilating portion of the uterus, and is discussed in detail in the following pages.

**Placentitis.**

In this condition there is no inflammation in the ordinary sense of the term, the changes taking place mainly affecting the fibrous tissue around the bloodvessels and the villi. When associated with endometritis, dense adhesions form between the placenta and the uterine wall, rendering, in some instances, even the manual removal of the after-birth a matter of great difficulty. Under these circumstances the placental tissue may be brought away piecemeal, but strings and bands of fibrous tissue remain behind which it is impossible to remove, and the dangers of infection are thereby greatly increased.

**Placental Syphilis.**

The most frequent form of this condition consists in hypertrophy of the placental villi, combined with a granular hyperplasia of the tissues. The villi enlarge and become distorted in shape, and hemorrhagic foci, thrombosis, fatty degeneration, and thickening of the vessel-walls with diminution of their calibre are also present. Other diseases of the placenta, such as fatty and calcareous degeneration, hemorrhagic and white infarcts, cysts, and tumors are also met with.

**THE UMBILICAL CORD.**

Abnormally long cords have little significance beyond the possibility of the child, during its movements in the uterus, passing through a loop and forming a knot. Such knots are rarely drawn tight enough to interfere with the foetal circulation, but occasionally this occurs, with resulting death of the child. Coils



of the cord may pass around the child's neck or body, in the former instance sometimes resulting in strangulation. Rarely a cord drawn tightly around an extremity will occasion amputation of the part. A very short cord may greatly prolong the second stage of labor by preventing the engagement or the descent of the presenting part, or by undue traction may give rise to a premature separation of the placenta, and, in prolonged labor, resulting asphyxia of the child. Cords of undue length are apt to prolapse when the bag of waters breaks.

## DISEASES OF THE FŒTUS.

### Umbilical Hernia.

This is caused by an arrest of development of the anterior abdominal wall, the opening being sufficient to allow the escape of some of the abdominal viscera, usually omentum and intestines, at the point of insertion of the cord.

The **treatment** consists in the immediate replacement of the extruded viscera after labor and the application of a pad over the opening, held in place by an abdominal bandage. A rubber umbilical hernia band with inflated pad may be used. When replacement of the viscera is impossible on account of the smallness of the opening in the parietes, the edges of the constricting ring must be incised sufficiently to allow of the return of the protruding parts, and the opening closed by sutures. A supporting pad and bandage should be applied and worn for some time subsequently. In the after-treatment the infant must be kept warm and its strength maintained by stimulants and artificial food until the mother's milk comes in. The results from operation in these cases are not satisfactory.

### Hydrocephalus.

This is an enlargement of the head due to an accumulation of serum in the ventricles of the brain. The cranial bones are forced apart, the fontanelles greatly enlarged, and the sutures widened. When the fluid is collected within the membranes covering the brain, the tumor is called a *hydromeningocele*. When a defect exists in the cranium, usually in the occipital bone, the contents of the skull may escape. If the tumor contains brain-matter, it is known as an *encephalocele*.



### Anomalies and Malformations.

A large number of malformations of the fœtus may exist, in which there is either total or partial lack of development of parts, or in which the development is excessive or supernumerary. When the defects are insignificant, such as harelip, extra fingers or toes, etc., they are called *anomalies*; when the defects are more extensive, they are classed under the general term *monstrosity*. Of these, the *anencephalic monsters* are most common. In these there is absence of a brain with defective vertex (*acrania*); the head is usually small and rests directly upon the shoulders, the eyes protrude and look almost directly upward. *Double monstrosities* are of two varieties—(a) those in which two complete fœtuses are normally developed, but are united in the *sacral, cephalic, abdominal, or thoracic* regions; (b) those in which two heads with a single body are developed, or various supernumerary parts or extremities spring from a single otherwise normal body.

### Infectious Diseases.

All the eruptive fevers may be transmitted from the mother to the fœtus, such as *scarlatina, measles, small-pox, erysipelas*, etc. Death and abortion of the fœtus are the rule. *Septic and pyæmic fevers* and *malaria* are also transmissible, and *poisoning of the mother* from lead, sewer-gas, etc., is manifested in the offspring. *Tuberculosis* may, in rare instances, be inherited.

**Syphilis.**—This, as already mentioned, is of frequent occurrence during intra-uterine life, and may be transmitted from either the maternal or the paternal side. It is the most common of all causes, other than traumatism, of abortion during the early months of pregnancy. When carried to term, the child may be born with all of the characteristic appearances of the disease—the skin eruption, condylomata, inflammation of the serous and mucous membranes, gumma, and involvement of the osseous system. In occasional instances the syphilitic manifestations may not appear for days or even weeks after birth.

**Treatment.**—When syphilis is present in either parent or both prior to impregnation, a thorough antisyphilitic treatment should be undertaken in the case of the affected individual, but following conception the mother alone may be treated by mercury and iodide of potash. The most satisfactory method of administering



mercury during pregnancy is by inunction, 20 to 60 grains of mercurial ointment being rubbed into the skin, best along the inner sides of the arms, thighs, and flanks, at night, and washed off in the morning by a bath of warm water and soap. If signs of irritation or salivation, swollen, tender gums, increased salivary flow, etc., appear, the treatment should be discontinued for a few days and then resumed. The course of treatment should cover a period of six or seven weeks at least, and should be continued during the whole of pregnancy, with intervals of cessation of treatment. Iodide of potassium in 10- to 15-grain doses may be administered in milk after meals during the whole of gestation.

QUESTIONS.

- What diseases of the deciduæ may occur?
- What is hydrorrhœa gravidarum?
- What are its symptoms, diagnosis, and treatment?
- What is cervical pregnancy, and how does it occur?
- What is oligohydramnios?
- To what conditions of the fœtus may it give rise?
- What is a hydatidiform mole?
- At what period of pregnancy does it most commonly develop?
- What are the symptoms, diagnosis, and treatment of vesicular mole?
- What important anomalies of the placenta may occur?
- What is placentitis?
- What changes take place in placental syphilis?
- What are the dangers to be anticipated from abnormally long or short umbilical cord?
- What is umbilical hernia, and how is it to be treated?
- What are some of the ordinary malformations of the fœtus?
- What effect have the infectious diseases of the mother on the fœtus?
- What effect has poisoning by lead, sewer-gas, etc., of the mother on the fœtus?
- What effect does maternal syphilis have on the child?
- What effect has the treatment of syphilis in the mother on the child?
- What is the best method of treating syphilis of the mother during pregnancy?



## CHAPTER VIII.

ABORTION, MISCARRIAGE, AND PREMATURE LABOR.  
THE HEMORRHAGES OF PREGNANCY. PLACENTA  
PRÆVIA.

## ABORTION, MISCARRIAGE, PREMATURE LABOR.

**Definition.**—These three terms indicate the premature expulsion of the products of conception, but a somewhat arbitrary distinction is made in their application, according to the period of gestation at which the ejection occurs. Thus, *abortion* implies the expulsion of the ovum prior to the sixteenth week; *miscarriage*, the expulsion of the foetus between the sixteenth and twenty-eighth weeks; and *premature labor*, from this time until a few weeks before the normal termination of pregnancy.

## Abortion and Miscarriage.

**Frequency and Time.**—Abortion is said to take place about once in four or five pregnancies. It is most frequent in those who have borne children, occurring generally in the third or fourth pregnancy or toward the end of the child-bearing period, and it takes place between the ninth and sixteenth weeks, when the placenta is in process of formation. It is liable to occur at the time of month when the normal menstruation would be due.

**Causes.**—These may be maternal, paternal, or foetal.

*Maternal causes* include the acute infectious diseases and all fevers accompanied by high temperature, syphilis, tuberculosis, malaria, organic disease of the heart and kidneys, constitutional diseases, such as diabetes mellitus, anæmia, and systemic poisoning; nervous disturbances, as shock, fright, sorrow, convulsions, and chorea; mechanical causes, as violent exercise, blows, falls, coughing, vomiting, excessive coitus; local causes, as malposition of the uterus, endometritis, metritis, malformations and overdistention of the uterus.

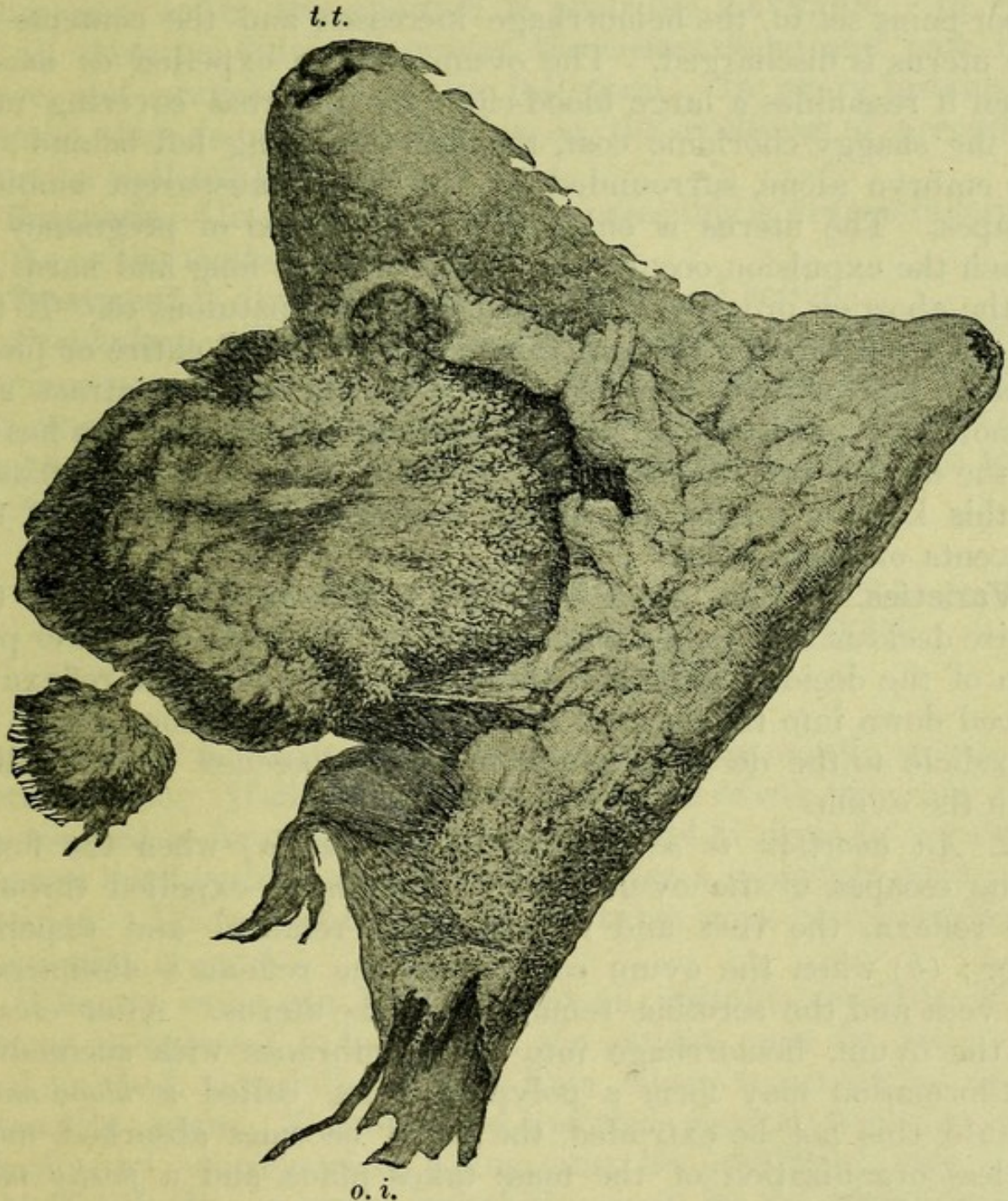
*Paternal Causes.*—Syphilis, alcoholism, lead-poisoning, excessive venery, extremes of youth or old age.

*Foetal Causes.*—Diseases of the amnion, chorion, placenta, and cord, death of foetus, placenta prævia (Fig. 15).



**Symptoms of Abortion.**—In early abortion the symptoms are those of profuse menstruation, sometimes accompanied by a slight

FIG. 14.



Aborted ovum. Deciduæ and ovum complete (Jewett): *o. i.* corresponds to the decidua situated at the os internum; *t. t.*, to the decidua situated at the openings of the tubes.

increase of the usual painful sensations. The ovum is so small that it escapes unnoticed in the clots of blood. When the accident occurs later in pregnancy, there are two constant symptoms which,



together with the history of the case, render diagnosis easy. These are pain and hemorrhage. These symptoms may be preceded by a bearing-down sensation in the pelvis, backache, frequent micturition, and a muco-watery discharge from the vagina. Finally, labor-pains set in, the hemorrhage increases, and the contents of the uterus is discharged. The ovum may be expelled *en masse*, when it resembles a large blood-clot; the external covering may be the shaggy chorionic coat, the deciduæ being left behind; or the embryo alone, surrounded by the thin, transparent amnion, escapes. The uterus is enlarged to the period of pregnancy at which the expulsion occurs, the cervix may be long and hard, or, as the abortion progresses, softened, and with patulous os. If the placenta has already formed, this may be cast off entire or piecemeal. The embryo may escape, the cervix again contract, and hemorrhage persist for an almost indefinite period, until the health of the mother becomes seriously affected. Persistent hemorrhage of this kind is almost always due to retention of portions of the placenta or membranes.

**Varieties.**—1. *An abortion is said to be complete* (a) when the entire decidua is expelled with the ovum; (b) when the lower portion of the decidua splits and the ovum covered by the reflexa is forced down into the cervical canal, remaining attached above by a pedicle to the decidua, which is finally loosened and expelled with the ovum.

2. *An abortion is said to be incomplete* (a) when the fœtus alone escapes, or the ovum with its chorion is expelled through the reflexa, the vera and reflexa being retained and expelled later; (b) when the ovum covered by the reflexa is discharged, the vera and the serotina remaining in the uterus. After escape of the ovum, hemorrhage into the membranes with succeeding clot-formation may form a polypoid mass, called a *blood-mole*. Should this not be extruded, the blood becomes absorbed, more or less organization of the mass takes place, and a *fleshy mole* is formed.

3, 4. Abortion is further divided into *threatened* and *inevitable*.

**Diagnosis of Threatened Abortion.**—If in a woman presenting the signs and symptoms of pregnancy hemorrhage of the uterus takes place, abortion may be assumed to threaten. The discharge of blood, however, may arise from some other source, as pathological conditions of the cervix. Differentiation is not always pos-



sible, but can usually be made by a careful visual and digital examination.

**Diagnosis of Inevitable Abortion.**—Should the hemorrhage become persistent and free, the cervix softened, the os dilated, and labor-pains set in, the abortion is probably inevitable. In spite of all these conditions, however, the hemorrhage and pain may cease, and pregnancy go on to full term. In every instance to assume that an abortion is going on, the evidences of pregnancy must be well established.

**Prognosis.**—In properly conducted cases this is always favorable as far as the mother is concerned.

**Treatment** is divided into prophylactic and active.

*Prophylactic Treatment.*—In cases where repeated abortions have occurred the cause should be carefully sought for. If syphilis exists, treatment should be inaugurated at the beginning of pregnancy, but earlier if possible. When the stomach will tolerate it, the following formula is useful:

R	Red iodide of mercury,	$\frac{1}{24}$ grain ;
	Iodide of potassium,	10 grains.
M.—Ft. pil. j.	S.—pil j t. i. d. p. c.	

Inunctions of mercury, with potassium iodide by mouth, are usually better borne. If displacement of the uterus exists, the organ must be restored to its normal position and held in place by a suitable pessary until its increased size will prevent a repetition of the malposition. Diseases of the uterus and tubes must be treated before conception occurs.

When no cause can be found and an irritable condition of the uterus is supposed to be present, the patient must be kept quiet and in bed, especially at the time when menstruation would normally occur. She must be guarded against fright, nervous shock, and over-exertion, coitus must be prohibited, and drugs which will allay nervous irritability, such as the bromides, fluid extract of viburnum prunifolium, in half-drachm doses, given. Chlorate of potassium is highly spoken of, and may be given in five-grain doses in water three times a day.

All existing somatic disorders should also receive appropriate treatment.

*Treatment of Threatened Abortion.*—Absolute rest in the re-



cumbent position and quiet, both physical and mental, are essential. The sheet-anchor in this condition is opium. When it is necessary to obtain a quick action of the remedy, hypodermics of morphine may be given. Otherwise it may be given by mouth in the form of the tincture, twenty drops repeated cautiously every three or four hours as required, or laudanum may be given in thirty-drop doses combined with a couple of ounces of starch water by the rectum. Extract of opium in pill form, one grain three times a day by mouth, or a suppository of opium (1 grain) combined with viburnum may be inserted into the rectum every four to six hours. Women in this condition are markedly tolerant of this drug. The bromide of potassium and chloral, either by mouth or rectum, are also valuable. When the bleeding and pain cease, the emergency has probably passed, but rest in bed and quiet should be continued for a week or more, and during the rest of the pregnancy at the usual time of the menstrual period the woman should remain in bed for several days.

*Treatment of Inevitable Abortion.*—If the cervix is hard and the canal undilated, especially if the hemorrhage is free, the vagina should be packed at once, preferably with iodoform gauze. Convenient rolls five yards in length and two inches wide are to be had, adapted to this purpose. A Graves' or Sims' speculum is introduced into the vagina, and the gauze first packed tightly into the fornices, then over the cervix and well down to the introitus. A T-bandage is then put on to hold the gauze in place. In from twelve to twenty-four hours the gauze may be removed, and the ovum will generally be found lying upon the upper layers of the packing, or in the now dilated cervical canal, from which it may be removed by the fingers or the forceps. Should the cervix, however, still remain undilated, the packing must be renewed for another twelve hours. Following the expulsion of the ovum an antiseptic vaginal douche should be given twice a day for a week or longer.

If at the first examination the cervix is found softened and the os patulous, but the contents of the uterus is still retained, the finger may be introduced into the uterus and the ovum and membranes detached and brought away. The placental forceps or curette may also be used for this purpose. During the evacuation of the uterus counterpressure should be made over the abdomen, and if instruments are used, the greatest care must



be observed not to penetrate the uterine walls. After the uterus has been cleared, an antiseptic intra-uterine douche should be given, followed by the usual vaginal douche. Both for the prevention and control of hemorrhage, always pack these uteri for twenty-four hours.

The **after-treatment** of abortion is the same as that following labor. The woman should not be allowed to leave her bed too soon, certainly not before the tenth day.

### **Premature Labor.**

The conditions here are the same as in labor at term, and the conduct of the case does not differ.

### **Missed Abortion.**

In this the embryo dies, threatened abortion is present, the symptoms subside, and the products of conception are retained for a varying period. When a diagnosis has been made, the cervix should be dilated by Goodell's or Hegar's dilators, and the uterus emptied of its contents in the same manner as given under inevitable abortion.

## **THE HEMORRHAGES OF PREGNANCY.**

### **Early Hemorrhage.**

The forms of hemorrhage occurring during the first three months of pregnancy are, (1) in rare instances, bleeding from the uterine wall at the regular menstrual periods; (2) bloody discharge from pathological conditions of the cervix, as from hypercongestion, erosions, lacerations, polypi, and cancer; (3) from placenta prævia.

The **treatment** in the simpler conditions consists in the local application of tincture of iodine; nitrate of silver, 20 grains to the ounce of water; or iodoform and tannic acid powder, of each, 60 grains to the ounce of glycerine. In cancer the cervix feels hard and indurated, nodular and irregular, and there is often a foetid watery discharge. The slightest disturbance of the parts gives rise to free bleeding. If the condition is slight, abortion should be



induced at this period, but if a considerable portion of the cervix is involved, the question of immediate hysterectomy or waiting until the child is viable and Cesarean section will arise.

### Late Hemorrhage.

During the later months of pregnancy hemorrhage from the uterus may be "*accidental*," when it is due to the premature detachment of the normally situated placenta, or "*unavoidable*," when due to a low implantation of the placenta (*placenta prævia*).

### Accidental Hemorrhage.

This is either *apparent* (*frank*) or *concealed*. In the former the blood dissects between the membranes and the uterine wall and escapes through the cervix. In the concealed variety the placenta becomes separated near its centre and the blood is held back by the membranes, which are detached for only a short distance from the placental margin. A blood-clot in the cervix or the foetal head acting as a valve will also prevent the escape of the blood. Occasionally the membranes rupture and the blood is poured into the amniotic sac.

The **causes** of premature separation of the placenta are not always apparent. It may be due to disease of the decidua or of the placenta itself, to nephritis and the acute eruptive fevers, to syphilis and tuberculosis, to anæmia and impaired health of the mother, and to traumatism, such as falls, blows, and violent muscular exercise. It may also occur during sleep without apparent cause. Premature separation of the placenta usually takes place in the last three months of pregnancy or during the first stage of labor.

**Prognosis.**—This is bad when the hemorrhage is concealed, better, for the mother, when it is apparent. According to Goodell, 54 mothers perished out of 107 cases, and but 7 children of the 108 (one case of twins) were saved. The maternal mortality is due to shock and exhaustion, anæmia, sepsis, or to postpartum hemorrhage.

**Diagnosis.**—Accidental hemorrhage may occur as early as the fourth month, but at this period abortion is likely to take place. During the late months of pregnancy and the first stage of labor



shock and the symptoms of internal hemorrhage—pallor, perhaps syncope, disturbed respiration, and a small, rapid pulse—are present. The uterus is enlarged and there is severe pain, usually at the placental site. The uterine contractions become feebler, and finally cease. When the hemorrhage is retroplacental, a more or less marked bulging at this point may sometimes be felt. Accidental hemorrhage must be differentiated from ruptured uterus, placenta prævia, and, when concealed, from ruptured ectopic gestation. The changes in the size and contour of the uterus are essentially sudden in their occurrence and accompany the other symptoms.

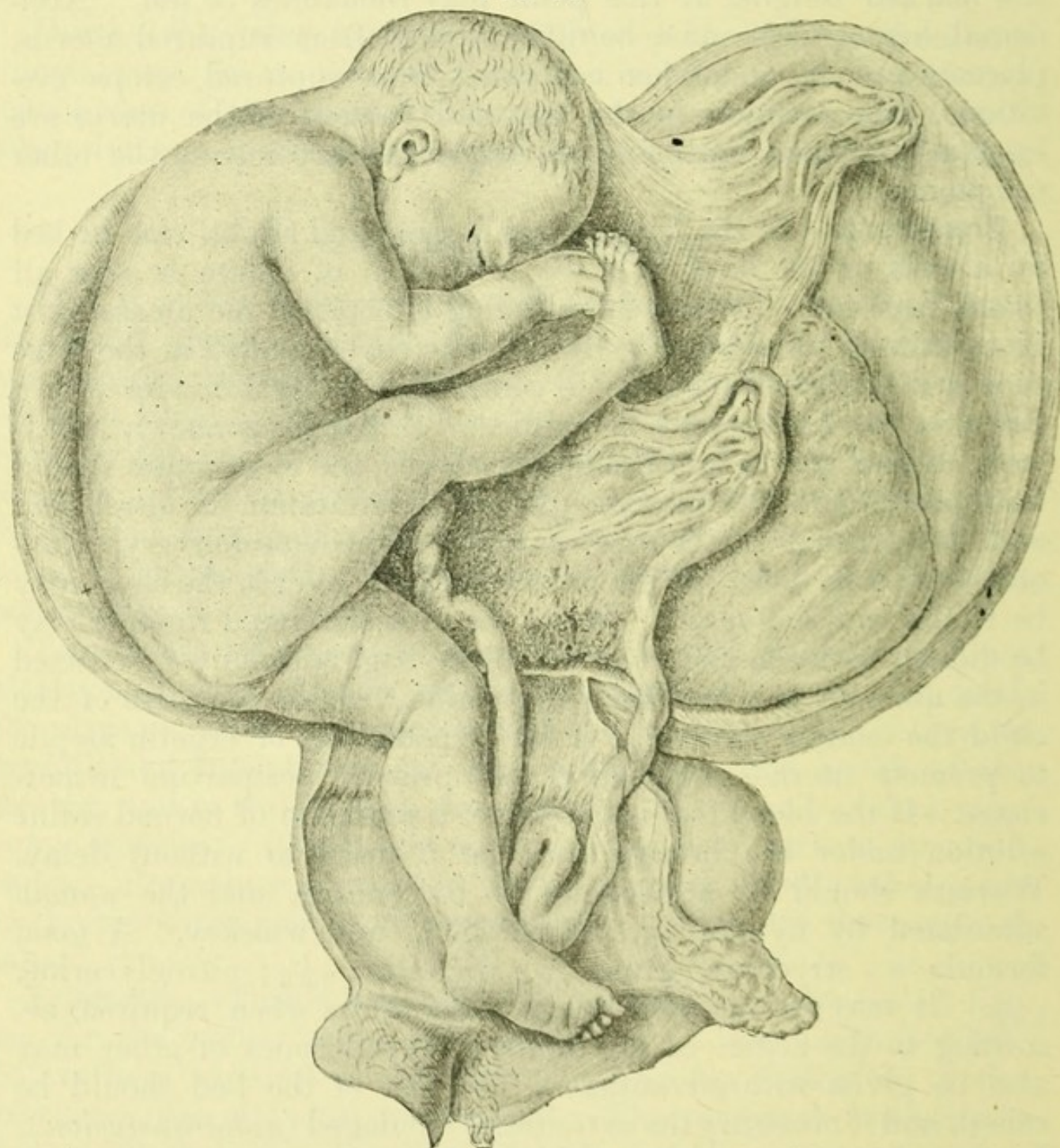
**Treatment.**—If the hemorrhage is open and slight, rest in bed for a week or ten days with the exhibition of opium is often all that is necessary. When the bleeding is copious, the uterus must be evacuated immediately. In order to compress and at the same time to stimulate the uterus to contraction, a tight binder with a pad over the fundus may be applied. In late pregnancy a sufficiently dilated cervix and the head engaged, the membranes should be ruptured and the forceps applied; if dilatation is insufficient and the urgency of the case demands immediate delivery, craniotomy must be done. If the presenting part is high, the child may be turned and delivered. When the os is small and rigid, it may be dilated with the fingers or a Barnes' bag, and delivery effected in the quickest and best manner possible. After the birth of the child the mother should be given hypodermics of ergotin aseptic to promote uterine contraction and prevent postpartum hemorrhage. If the blood loss is excessive, transfusion of normal saline solution under the breasts must be resorted to without delay. Warmth should be applied to the extremities, and the woman stimulated by hypodermics of strychnin and whiskey. A good formula is: strychnin, grain,  $\frac{1}{30}$ ; digitalin,  $\frac{1}{100}$ ; nitroglycerine,  $\frac{1}{100}$ . It may be repeated every three hours when required, according to the action of the heart. Hypodermics of ether may also be given with advantage. The foot of the bed should be raised, and if necessary the extremities bandaged (*autotransfusion*). In the after-treatment ergot should be given in 20- to 30-drop doses for several days in order to maintain the contraction of the uterine muscle and lessen the tendency to postpartum hemorrhage and sepsis. The diet should at first be liquid and nourishing, and iron in some easily assimilable form is indicated.



### PLACENTA PRÆVIA.

The placenta is prævia when it is situated in the lower, contracting segment of the uterus. Four varieties are described :

FIG. 15.



Placenta prævia and breech presentation. Placenta in lower uterine segment and internal os. (Runge.)

(1) *Central*, when the centre of the placenta lies over the internal os ; (2) *partial*, when the bulk of the placenta lies to one



side but a considerable segment covers the os; (3) *marginal*, when the margin of the placenta extends over the os; (4) *lateral*, when the placenta is situated at one side of the lower segment with a border projecting into the cervical canal. The decidua at the internal os being thinner than in other portions, the placenta at this point is imperfectly developed and thinner, its attachment is less secure, and the formation of separate cotyledons (*placentæ succenturiatæ*) is not uncommon. The remainder of the placenta is frequently abnormally adherent.

**Frequency.**—A low insertion of the placenta occurs about once in 1000 or 1200 pregnancies.

The **causes** are not satisfactorily determined, but one of the principal predisposing conditions is probably a chronic endometrial catarrh which has destroyed the cilia of the uterine mucosa and enlarged the uterine cavity so that the ovum drops to a lower position than normal. The cause of the bleeding is the opening up of the lower uterine segment, giving rise to a greater or less detachment of the placenta. The source of the bleeding is the *maternal* blood-sinuses. In the separation of the normally placed placenta the sinus-mouths are closed by the contracting uterine muscular fibres; with a previal placenta the opposite takes place.

**Symptoms.**—Hemorrhage is the characteristic symptom. It may occur at any period of gestation subsequent to the formation of the placenta, but when early, it brings on abortion. Usually the hemorrhage appears from the seventh to the ninth month or during labor. The onset is without appreciable cause; there is no pain. The amount of blood lost at the first attack may be so slight as to almost escape notice, or so copious as greatly to endanger the mother's life. When the escape of blood is small but persistent, or recurs at short intervals, the woman's health is seriously compromised; when the blood-loss is copious, it may prove rapidly fatal with all the clinical manifestations of acute anæmia—pallid anxious countenance, cold extremities, perspiration, a small rapid pulse, sighing respiration, air-hunger, dimness of vision, nausea, fainting, or collapse. If during the course of the pregnancy the hemorrhage occurs at intervals in increasing amounts, the greater will be the loss of blood during labor.

The **prognosis** is always grave. The maternal mortality has been placed at from 30 to 65 per cent., but according to Winckel, under modern treatment this should be reduced to 5 or 10 per



cent. The foetal death-rate is between 50 and 75 per cent. The dangers to the mother are not alone from blood-loss, but arise from operative intervention, shock, septicæmia, and postpartum hemorrhage. Malpositions and presentations are common in placenta prævia on account of the inability of the presenting part to engage. Prolapse of the funis is a common accident.

**Diagnosis.**—Hemorrhage occurring during pregnancy, especially after the seventh month, should suggest placenta prævia and demand investigation. Abdominal palpation will at times reveal the position of the placenta, especially if it is situated anteriorly. The foetal parts can be made out distinctly except at this point. Per vaginam the cervix will feel enlarged and the vaginal vault soft and boggy, and through this the presenting part is only indistinctly appreciated. If the os is dilated or dilatable, the finger pushed through it will come upon the placenta, which has a spongy, gritty feel. To determine whether the attachment is complete or partial, the finger must be swept around the cervix and the edge of the placenta found. If this cannot be located, the insertion is probably central.

**Treatment.**—Previous to the seventh month there is little danger of serious hemorrhage, and an expectant treatment may be adopted, but the woman should be closely watched. Rest in bed, the avoidance of muscular exercise and coitus, and the administration of sedatives may bridge the patient over until the child is viable. If the child is dead, the uterus should be emptied at once. After the seventh month expectant treatment is no longer admissible, and the pregnancy should be terminated without delay. The woman must be anæsthetized and placed in the lithotomy position, the legs being supported by assistants or a crutch. The hands and arms of the accoucheur and everything that is to be used must be rendered sterile as for a surgical operation. An antiseptic douche of 1 : 80 carbolic acid, 1 : 4000 bichloride, or a drachm of lysol to the quart of water is then given, and the hand of the operator introduced into the vagina. If the os is not already well opened, it must be dilated with the fingers. First one finger is introduced, then two, then the thumb and the other fingers successively. The placenta should be located, bipolar version performed, the membranes ruptured, and a leg brought down so that the knee appears at the vulva. As soon as the cervix is plugged by the breech the hemorrhage will stop.



If after waiting an hour or so labor does not progress, the child may be extracted. Instead of the above, if the os is undilated, the vagina may be tightly packed with iodoform gauze, or a Barnes' bag introduced into the cervix. In the course of two or three hours the packing or bag may be removed, and usually dilatation will be found sufficient to permit the carrying out of the details just mentioned. If dilatation is still insufficient, the antiseptic douche is repeated and the vagina again packed, or a larger bag introduced. When the placenta is centrally located, it must be perforated by the fingers of the operator and a leg of the child brought down. Should labor not progress, extraction is indicated.

As the hemorrhage in this instance is profuse, the procedure must be quickly executed, but all rough and violent manipulations must be avoided, in order that the maternal shock may be as slight as possible. The application of a tight binder and pad over the uterus is desirable. Shock must be combated in the manner already described. Following delivery, ergot should be given hypodermically, and contraction and retraction of the uterus maintained, and the patient carefully watched for evidences of postpartum hemorrhage.

The question of Cesarean section for placenta prævia is still *sub judice*, but as a scientific procedure with a greatly lessening maternal mortality and, if undertaken sufficiently early, with a practically clean record in life-saving for the child, it must soon become recognized as a rational and legitimate interference.

### QUESTIONS.

Define abortion.

What is the frequency, and what the time, when abortion usually takes place?

What are the causes of abortion?

What are the symptoms of abortion?

What is complete abortion?

What is incomplete abortion?

What is a blood-mole?

What is a fleshy mole?

What is the diagnosis of threatened abortion?

What is the diagnosis of inevitable abortion?

What is the prognosis of abortion?

What is the prophylactic treatment of abortion?

What is the treatment of threatened abortion?

What is the treatment of inevitable abortion?

What is meant by premature labor?

What is missed abortion?



From what sources may hemorrhage during pregnancy take place?

What is the treatment of pathological conditions of the cervix during pregnancy—(a) simple? (b) malignant?

What is accidental hemorrhage?

What is unavoidable hemorrhage?

How many kinds of accidental hemorrhage are there?

What is the prognosis in accidental hemorrhage?

What are the symptoms of accidental hemorrhage?

What is the treatment of accidental hemorrhage?

What is placenta prævia?

How many varieties of placenta prævia are there?

What is the frequency of placenta prævia?

What are the symptoms of placenta prævia?

What is the prognosis of placenta prævia?

What is the diagnosis of placenta prævia?

What is the treatment of placenta prævia?

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## CHAPTER IX.

### CAUSES AND STAGES OF LABOR; PRESENTATIONS AND POSITIONS; ABDOMINAL PALPATION.

#### LABOR.

**Definition.**—Labor may be defined as the physiological termination of pregnancy whereby the mature foetus and its appendages are separated from the maternal organism.

The **causes** of the onset of labor are not known, but may be the result of:

1. *Maturity of the Ovum.*—A fatty degeneration of the ovular attachments takes place, more or less separation results, and the foetus, acting as a foreign body, sets up uterine contractions.

2. *Overdistention of the Uterus.*—When the uterine distention has reached its limit, expulsive contractions are set up. Similar conditions are observed in the instance of an overfull bladder or rectum.

3. *Excess of Carbon Dioxide in the Blood.*—During the later months of pregnancy thrombi are formed in the placental vessels, the circulation is interfered with, and excrementitious products, including carbonic acid, accumulating in the blood, irritate the motor centres and thus bring about uterine contractions. Besides these, *periodicity, heredity, mental emotion*, and other causes are



given as factors in the initiation of labor. It is probable that not one but several causes are active in producing the uterine contractions. The efficient agent in labor is the uterus itself, reinforced later by the abdominal muscles.

**Premonitory Signs of Labor.**—Usually from one to two weeks before the onset of labor the uterus sinks down in the abdomen, the head of the foetus entering the lower uterine segment and pelvic cavity, so-called *lightening* taking place. The waist line becomes smaller, breathing is less embarrassed, and the general well-being of the woman is enhanced. As the result of uterine descent and the consequent pressure, irritation of the bladder and rectum may occur—the vaginal and cervical glands secrete more actively, varices enlarge, œdema of the extremities, if present, is increased, and the uterine contractions of pregnancy, usually painless, begin to cause more and more discomfort.

These *false* or *preparatory pains* recur at regular intervals,—of hours or even days,—and generally at night, last for a varying period, and usually disappear in the morning. They are often deceptive, leading to the belief that labor has already begun. Examination as to the condition of the cervix will reveal that this is not so.

The **beginning of labor** is characterized by recurring pains (*uterine contractions*) at regular intervals and of increasing intensity. There is also a profuse discharge of mucus from the vagina, and this is sometimes tinged with blood—the *show*. By examination a shortened cervix and beginning dilatation of the os are found. At the beginning of labor the pains are usually in the back and radiate to the abdomen and down the thighs, but they may be first felt in the abdomen. They return every half-hour or twenty minutes, but as labor progresses the interval is shortened so that toward the close of the second stage they appear to be continuous, and the patient feels as if encircled by a belt of pain. A pain rarely lasts more than one minute. The cause of the suffering is at first probably due to the pressure on the terminal nerve-fibres by the contracting uterine musculature; later to the pressure of the uterus upon the pelvic nerves, and the child upon the vaginal nerves.

**Effect of the Uterine Contractions.**—The body of the uterus is divided into two segments—an upper or contracting two-thirds, and a lower or dilating third. The latter, together with the cervix,



must be opened for the passage of the child. As the uterine contractions continue the upper segment becomes thickened while the lower is thinned, the dividing-line between the two being marked by a ridge, the *ring of Bandl*, or the *contraction- or retraction-ring*. The upper uterine segment contracting as a whole forces the liquor amnii toward the point of least resistance and contained within the lower portion of the membranes it enters the cervical canal, previously softened during labor, and forms a hydrostatic wedge, a mechanical dilator of great importance. Coincidentally the foetal body is driven downward in the same direction and the longitudinal fibres of the upper segment draw the lower segment upward over the presenting part of the child. When the membranes rupture prematurely, labor is retarded (*dry labor*), since the foetal head being larger and harder is a much less effective dilator than the bag of waters. The expelling force of the uterus and abdominal muscles is said to be from seventeen to fifty-five pounds; the strength of the membranes varies from four to forty pounds (Duncan). When the os has become wholly or nearly effaced, the membranes usually rupture spontaneously, but they may remain intact until near the close of the second stage and even protrude from the vulva, or require to be ruptured artificially.

### Stages of Labor.

Labor is divided into three stages: The *first stage* includes all of that period between the beginning of labor and the complete dilatation of the os. The *second stage* is from the complete dilatation of the os to the expulsion of the child. The *third stage* is from the delivery of the child to the expulsion of the placenta.

**First Stage of Labor.**—The uterine contractions are involuntary, being mainly under the control of the sympathetic nervous system. Unless unusually protracted or painful they cause little or no exhaustion, but the patient may become discouraged, believing that her suffering is unproductive of results. The amount of pain experienced varies greatly, according to the temperament of the patient; in neurotic women it may be excessive. During this stage the woman prefers to sit, stand, or walk about. When the pains come on her appearance is one of more or less intense suffering. As dilatation nears completion locomotion is generally impossible, and the recumbent position is assumed. The *average*



*duration* of the first stage is from ten to fourteen hours for primiparæ, and six to eight hours for multiparæ.

**Second Stage of Labor.**—With the complete dilatation of the os the character of the pains becomes entirely changed, the patient now manifesting a strong desire to expel the contents of the womb. With each contraction she takes a deep inspiration, sets her teeth, fixes the diaphragm, contracts the abdominal muscles, and bears down with all the strength at her command. These acts are repeated until the child is born. The *average duration* of the second stage of labor is about two hours for primiparæ and one hour for multiparæ.

**Third Stage of Labor.**—Then following the delivery of the child there is a short resting period, the uterine contractions commonly cease, and the organ becomes smaller through retraction. After a few minutes the pains begin again, the placenta is separated from its uterine attachment, and, together with the membranes, is extruded into the vaginal canal and vulvar opening. The expulsion of the placenta is accompanied by a greater or less amount of blood and clots, but undue hemorrhage is prevented by the tonic contraction of the uterine muscles, which constrict the vessels and promote the formation of thrombi at their mouths. The mechanism by which the placenta is expelled is of two kinds: in the first decrease in the area of attachment loosens the placenta and its membranes from the uterine wall and, as with each contraction detachment is increased, it is gradually forced downward edge foremost into the vagina. In the second form a retroplacental blood-clot is formed which increases with each uterine contraction until liberation is completed and the after-birth is extruded like an inverted umbrella, the membranes trailing after. When this takes place the blood is collected within the membranes and does not appear until the placenta is cast off. If left to nature, the placenta may remain in the lower segment of the uterus for hours or even days. The *average* third stage lasts fifteen minutes.

### The Mechanism of Labor.

By this is understood the manner in which the child passes through the parturient canal and is expelled. As the foetus floating in the liquor amnii may assume any position, it is necessary to determine with the advent of labor which end of the child, if



either, has entered the bony canal,—*presentation*,—and the relation of that part to the passage through which it has to travel—*position*.

### Presentation.

This has been defined as “the relation of the long axis of the foetal ovoid to the uterine axis.” Thus, there may be a *longitudinal* presentation in which either the head or the breech of the child offers at the pelvic brim, or a *transverse* presentation in which the length of the child lies across the long axis of the uterus.

**Head or cephalic presentations** are the most common and occur in 95.5 per cent. of all labors. They are divided into *vertex*, *face*, and *brow* presentations. Of these, 95 per cent. are vertex, and  $\frac{1}{2}$  of 1 per cent. face, while brow presentations are exceedingly rare. The **breech** presents in about 3 per cent. of cases, and is subdivided into *sacral*, *knee*, and *foot* presentations. The **foetus lies transversely** in about  $\frac{1}{2}$  of 1 per cent. of cases, in which the *shoulder*, *arm*, or *hand* presents.

The reason for the preponderance of cephalic presentations lies in the fact that the head is heaviest and, under strictly normal conditions, sinks to the lowest part of the uterus (*gravity*). Moreover, in this position the body and extremities of the child are best accommodated, the expanded portion of the uterus permitting greater freedom of movement (*adaptation*).

### Position.

This is “the relation of the presenting part to the quadrants of the pelvis.” Four positions are assumed for each of the presenting parts.

### Vertex Positions.

- Left occipito-anterior, L. O. A., first position.
- Right occipito-anterior, R. O. A., second position.
- Right occipito-posterior, R. O. P., third position.
- Left occipito-posterior, L. O. P., fourth position.

### Face Positions.

- Left mento-anterior, L. M. A., first position.
- Right mento-anterior, R. M. A., second position.



Right mento-posterior, R. M. P., third position.  
Left mento-posterior, L. M. P., fourth position.

### Breech Positions.

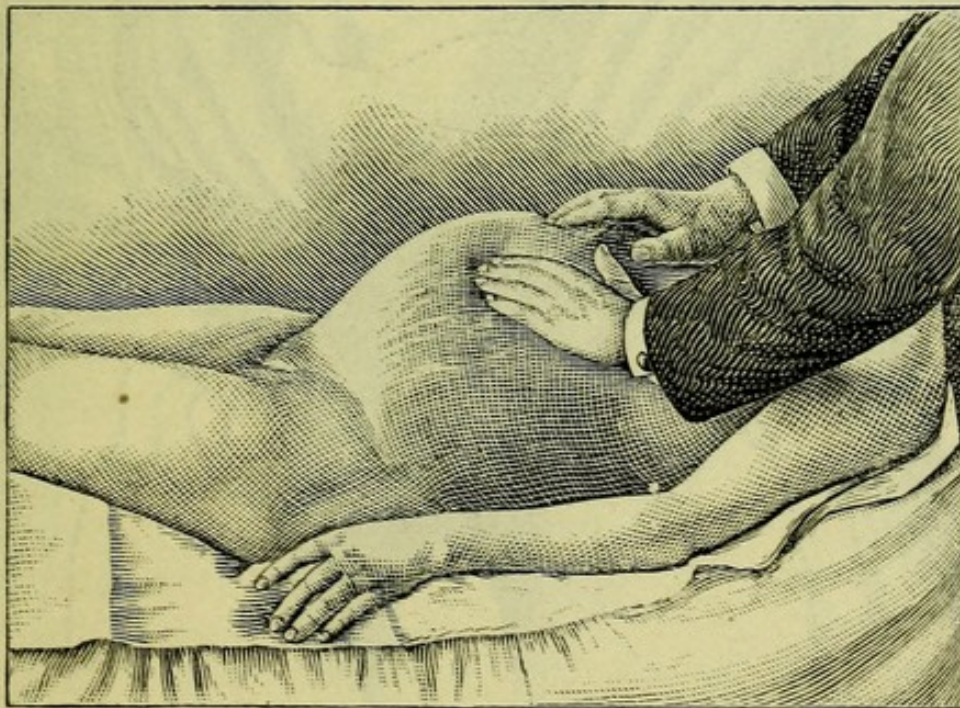
Left sacro-anterior, L. S. A., first position.  
Right sacro-anterior, R. S. A., second position.  
Right sacro-posterior, R. S. P., third position.  
Left sacro-posterior, L. S. P., fourth position.

### Transverse or Shoulder Positions.

Left scapulo-anterior, L. Sc. A., first position.  
Right scapulo-anterior, R. Sc. A., second position.  
Right scapulo-posterior, R. Sc. P., third position.  
Left scapulo-posterior, L. Sc. P., fourth position.

**Frequency.**—About 75 per cent. of vertex cases are of the L. O. A. position, then follows the second position (20 per cent.), the

FIG. 16.



Abdominal palpation.

third (4 per cent.), and the fourth (1 per cent.). The reason for the greater frequency of the first position is because the left oblique diameter is shorter than the right on account of the position of the

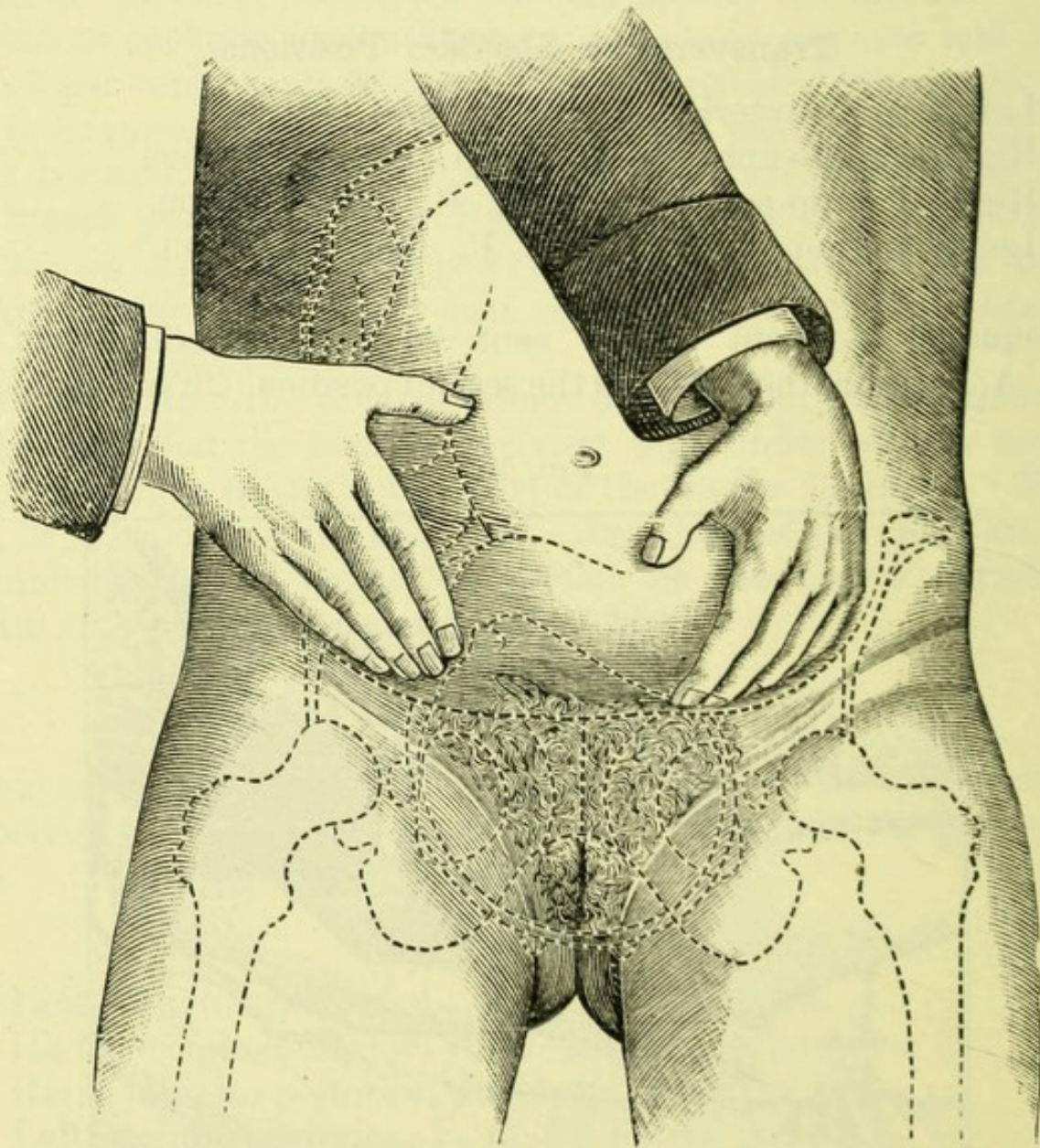


rectum, and the long diameter of the head adapts itself to the largest available diameter of the brim.

### The Posture of the Fœtus in Utero.

This is one of flexion; the head is flexed on the breast, the arms are crossed over the chest, the legs are flexed on the thighs

FIG. 17.



Examination of excavation (after Pinard).

and the thighs on the abdomen, and the back is arched, the whole fœtal body thus forming an ovoid. On account of the projecting lumbar spinal column the fœtus adapts itself to the containing

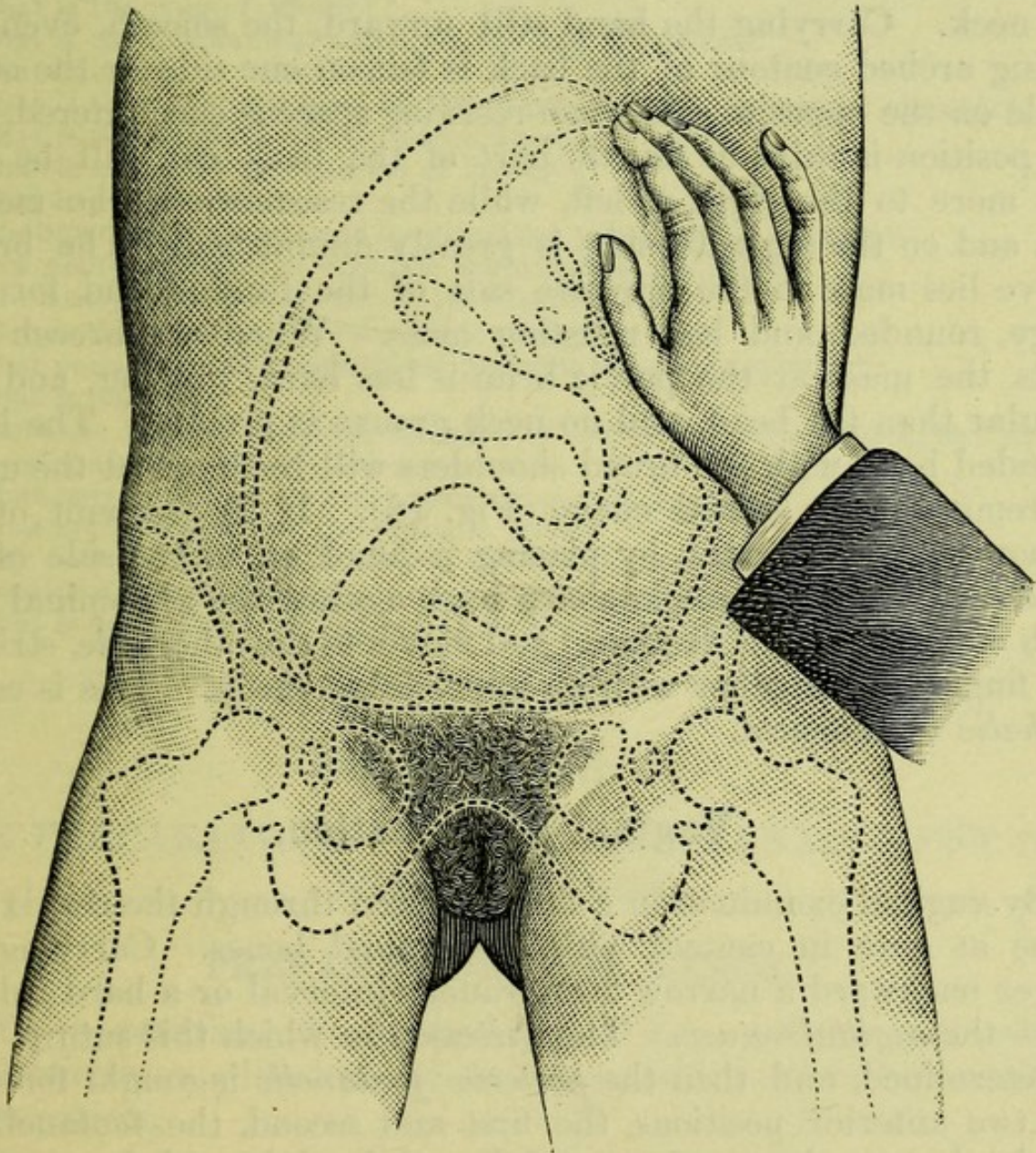


body, the back is turned forward toward the mother's abdomen, and, because of the uterine obliquity, somewhat to the right.

### Abdominal Palpation.

By palpating the abdomen the height of the fundus uteri, the relative amount of liquor amnii, and the size, presentation, and position of the foetus are determined. In performing palpation the

FIG. 18.



Detection of foetal head in pelvic presentations (after Pinard).

woman should lie on the back with the abdomen exposed from the waist to the pubis, the physician standing either to the right or the



left side. The flat hand is placed just above the pubis and carried upward, gentle pressure being made (Fig. 16). Over the uterine tumor marked resistance is encountered, but this ceases above the level of the fundus.

The tips of the fingers of both hands are then pressed deeply into each iliac fossa just above Poupart's ligament, and a slight side-to-side motion made (Fig. 17). If the head presents, a hard, regular, rounded mass will be felt in the pelvic cavity or at the brim. By moving the hands slightly upward a groove between the head and the back of the child may perhaps be distinguished—the neck. Carrying the hand still upward, the smooth, even, resisting arched contour of the back is felt on one side or the other, while on the opposite side a non-resisting space is encountered. If the position is third or fourth, part of the back can still be felt, but more to the right or left, while the resistance in the median line and on the opposite side is greatly diminished. The breech above lies more to the opposite side of the fundus, and forms a large, rounded, and less resisting mass. When the breech presents, the mass at the pelvic brim is less hard, broader, and less regular than the head, and no neck groove is present. The hard, rounded head with the broad shoulders will be found at the upper extremity of the dorsal curve (Fig. 18). If the amount of the liquor amnii is normal, by placing a hand on either side of the head and making a quick, sharp push against the abdominal wall with one, the head is displaced and moves to the other side, striking the fingers of the other with an appreciable shock. This is called *cephalic ballottement*.

### Vaginal Examination.

By vaginal examination a finger passed through the cervix will come at once in contact with the cranial bones. Carrying the finger backward a narrow membranous interval or a hard ridge is felt—the *sagittal suture*. The direction in which this suture runs is determined, and then the *posterior fontanelle* is sought for. In the two anterior positions, the first and second, the fontanelle is felt in the anterior quadrants of the pelvis, right or left, as a small depression having three sutures running from its angles. In the two posterior positions it is generally possible to feel both fontanelles, owing to the lack of normal flexion of the head. The



*anterior fontanelle* is much larger than the posterior, is diamond shape, and has four sutures running from its angles.

### QUESTIONS.

Define labor.

What are the causes of labor?

Into how many stages is labor divided?

Describe each stage of labor.

What are the premonitory signs of labor?

What are false pains?

How is beginning labor characterized?

What is the effect of the uterine contractions?

What is the ring of Bandl?

What is the mechanical action of the bag of waters?

What is meant by "dry labor"?

What is the expelling force of the uterus and the abdominal muscles?

What is the strength of the membranes?

What is meant by mechanism of labor?

What is presentation?

Into how many varieties is longitudinal presentation divided?

How many varieties of cephalic presentation are there?

How many varieties of breech presentation?

What is the cause of cephalic presentation?

What percentage of longitudinal presentations are cephalic?

What is position?

Name the various positions assumed by the vertex, face, breech, and shoulders, and state how these are designated?

What percentage of vertex presentations are L. O. A.?

What is the posture of the foetus *in utero*?

Why does the foetal back usually turn to the front?

Describe abdominal palpation and state its purpose.

What is determined by vaginal examination in labor?

## CHAPTER X.

### THE PREPARATIONS FOR AND THE MANAGEMENT OF NORMAL LABOR.

#### PREPARATIONS FOR LABOR.

THE preparations for labor include those articles with which the physician supplies himself and those which are to be provided by the patient.

#### The Obstetric Bag.

A well-equipped obstetric bag should contain a box of antiseptic soap and sterile nail-brush; a box of carbolated vaseline; cord scis-



sors and sharp pointed scissors; several needles, curved and straight, and needle-holder; several flexible catheters; two tanks of large and small aseptic catgut, and sterile silkworm-gut in a bottle of alcohol; two hemostats, tenaculum forceps; straight uterine dressing forceps; a hollow needle attachable to the syringe tube for hypodermoclysis; a large curette; a blunt-pointed bistoury for episiotomy; a set of Barnes' bags; an intra-uterine douche tube; a glass douche nozzle; a fountain syringe; a hypodermic syringe, with an assortment of tablets; aseptic ligatures for the cord; a package of absorbent cotton; several rolls of two-inch-wide iodoform gauze; bottles containing chloroform, carbolic acid or lysol, bichloride of mercury tablets, ergotin aseptic for hypodermic use, a saturated solution of chloral hydrate, croton oil (1 drop to the drachm of olive oil); an obstetric forceps; a Morris or Kelly pad, and an operating gown. The instruments are best kept in a canvas or heavy Canton-flannel roll.

### The Patient's Preparations.

The family should provide an infant's wardrobe, bath-tub, etc.; a bed or douche pan; a fountain syringe; 2 rubber sheets or sheets of table oil-cloth  $1\frac{1}{2}$  yards square; a jar of carbolated vaseline; 2 pounds of absorbent cotton; 4 ounces of liquid carbolic acid or lysol; 4 ounces of olive oil; 1 cake of ivory soap; 36 sterile occlusive dressings; infant dusting-powder; safety-pins, large and small; cheese-cloth, several yards.

The **occlusive dressings** are to be made as follows: Cut the cheese-cloth into strips 4 inches wide and 18 inches long. Lay four of the strips together, and in the middle—*i. e.*, with two layers of cheese-cloth on each side—place a piece of surgeon's cotton, the size and thickness of the two hands, and tack this in with thread and needle. After the 36 dressings have been made, roll each one separately in a piece of newspaper and pin tight. Put the three dozen little rolls into a larger newspaper, pin tight, and place in a "slow oven" to bake until the outside paper becomes brown and charred. Then set the parcel aside, unopened, until required for use. Very convenient pads, one-half yard or more square, may be made of the cheese-cloth in the same way. The cotton should be fastened by "tacking," like a bed-quilt. The pads should be sterilized as above.



The room selected for the confinement should be clean, well ventilated, lighted, and sunny, and, if possible, should have an open fireplace. If an operating table becomes necessary, a kitchen table may be used for the purpose, and a common chair, back downward, placed upon it for the Trendelenburg position.

### Preparation of the Bed.

The bed should be high, the springs not too soft, and the mattress firm and smooth. It should be so placed that both sides are easily accessible. As in this country it is generally customary to deliver the woman on her left side, the bed should be made up on the right side. Over the mattress is placed one of the rubber sheets, and over this an ordinary muslin sheet, both being secured at the corners of the former to the mattress by safety-pins. This is the *permanent bed*. On top of this the second rubber protective is placed and covered with another muslin sheet, these being also secured by safety-pins. This is the *temporary bed*. All the articles mentioned should be in readiness at the beginning of labor, and the nurse should see that plenty of hot and cold sterile water is at hand.

## MANAGEMENT OF THE FIRST STAGE OF LABOR.

### Preparation of the Patient.

At the beginning of labor the patient receives a full bath, the bowels are moved by a soap-and-water enema, and the external genitals scrupulously cleansed and bathed in some antiseptic solution. A fresh suit of underwear is then to be put on, and over this a loose wrapper. When first called to the confinement the physician should ascertain whether all these preparations have been made. He must then inquire into the general condition of the patient, and as to the frequency, character, and strength of the pains, and, finally, by a physical examination, satisfy himself as to the presentation and position of the child, whether it is living, and the state of the cervix and os. In making the physical examination a routine plan should be adopted. The coat must be removed and the shirt-sleeves rolled up, and the hands and arms washed with soap and water. The abdomen should then be carefully palpated (p. 109) and auscultated. A very



slow (120 or less) foetal heart-beat or a very rapid one (150 or more) may indicate that the child is in danger, and demand a rapid termination of the labor. The hands must now again be washed and *sterilized*, the fingers anointed with carbolated vaseline, and the vaginal examination made. For this the patient should lie on her back, with the knees drawn up. The labia should then be separated by the fingers of one hand, while the examining fingers are introduced into the vagina. *The fingers should never be drawn over the anal region before entering the vagina lest septic material be thus introduced into the parturient tract.*

By this the condition of the vulva, perineum, vagina, and cervix is determined, the presentation and position of the child, as ascribed by abdominal palpation, confirmed, and the size of the pelvis roughly estimated. If the cervix is found to be long and the canal still undilated or only slightly so, and especially if the patient is a primipara, the presence of the physician is unnecessary, and he may safely leave the woman for an hour or two, but should always be within easy reach. *If the dilatation of the os has reached the size of a silver dollar, he should on no account leave the house.*

### Vaginal Examinations.

The frequency of the vaginal examinations will depend somewhat upon the experience of the physician ; in general it may be stated that the fewer the better. With surgically clean hands there is no particular danger to be apprehended for the mother from such examinations, but as strict asepsis is difficult to attain and harder still to maintain, all unnecessary manipulations should be avoided. During the first stage of labor two or three examinations at intervals of several hours are all that is required. In ordinary cases it is undesirable for the patient to lie in bed during the first stage of labor, as the upright position facilitates dilatation of the cervix. She should, therefore, be encouraged to walk about the room, to sit or assume any position most comfortable. During a pain she may stand beside the bed, resting the hands upon the rail, or kneel in front of the bed or a chair. The *duration* of a labor cannot be definitely stated, but some idea may be had from the size of the pelvis and that of the child's head, the condition of the cervix, the character and strength of the uterine



contractions, and the absence of complications. It must not be forgotten that even when other conditions are favorable, an abnormally short cord or a cord wrapped around the child's neck or body may lead to delay in the effacement of the cervix and dilatation of the os, and thus greatly prolong an otherwise normal labor, and, perhaps, necessitate the application of forceps.

*The bladder should be frequently emptied, by catheter if necessary, as a distended viscus retards labor or may even stop the uterine contractions.* As the completion of this stage approaches, the pains become more frequent and severe. Each contraction is now accompanied by straining or bearing-down effort on the part of the woman, and, as a rule, the membranes rupture spontaneously about this time. On escape of the waters, if the patient has not yet lain down, she should be put to bed at once and a vaginal examination made. Should the membranes remain intact after complete dilatation of the os has taken place, they may be ruptured artificially by pressing against the bag of waters when it is tense during a pain; the finger-nail, or the point of a sterile forceps, hair-pin, etc., may be used for this purpose. When the suffering is very severe during this stage, it may be somewhat mitigated by the administration of chloral hydrate—15 grains—well diluted with water, being given every fifteen minutes or half hour until 60 grains have been taken. Lagging pains may, in some instances, be stimulated by a single (15 grains) dose of quinin. The action of the drug for this purpose is, however, uncertain, and its effects are sometimes disagreeable. The patient will often require, and should receive, light nourishment during this stage.

### MANAGEMENT OF THE SECOND STAGE OF LABOR.

After the membranes have ruptured, under normal conditions, the termination of labor may be expected within a reasonable time. The patient should, therefore, remove her clothing and put on a night-dress, which, to prevent soiling, should be rolled well up under the arms. A folded sheet is then placed about the body and extremities, and held in place by a cord around the waist. The opening in the sheet should be on the patient's right side. The position of the patient during the first part of this stage may be left to her own selection. *As the powerful action of the abdom-*



*inal muscles is now brought into play, however, the force is best utilized with the woman on the back.*

During the pains she should be encouraged to bear down, and may be assisted by pulling on a sheet or long towel tied to the foot of the bed or by holding the hand of the nurse. The hand pressed against the sacrum will also afford some relief. In the interval between pains she should rest, remaining absolutely passive. As the suffering experienced at this time is often very severe and sometimes quickly exhausts the woman's strength, she should be relieved so far as is consistent with her best interests by the employment of an *anæsthetic*. Complete anæsthesia, except during operations, is unnecessary and injurious, but analgesia, the taking off the edge of the suffering, is both desirable and humane. Either ether or chloroform may be used, the latter being more desirable on account of the small amount required, and it is equally safe when properly administered. Chloroform is possibly more apt to weaken the uterine contractions than ether, and by some is claimed to predispose to postpartum hemorrhage. During an extensive experience the writer has never observed the latter condition following its use. The *dangers* of anæsthetics are the same when employed for obstetric purposes as in surgery, and their use should be governed by the same rules in each instance. Chloroform should be given either on a handkerchief opened and loosely held over the patient's face or on an Esmarch mask. It should invariably be administered drop by drop; too large a quantity may overwhelm the patient and result disastrously. The administration of the anæsthetic should begin with the onset of a pain, and be discontinued as soon as this has ceased.

### **The Perineal Stage.**

As soon as the head begins to dilate the vulvar orifice the patient may be turned on the left side, with the knees flexed and the body lying diagonally across the bed, the buttocks close to and parallel with the edge. The physician, having put on his gown and sterilized his hands, seats himself on the edge of the bed and watches the further progress of the labor, ready at any moment to render such assistance as may be required. With each succeeding pain the head advances more and more and puts the perineum on the stretch, each contraction being followed by a



pause, during which the head slips back a little and the tension of the soft parts is relieved. When the presenting part is about to escape through the vulvar ring, laceration of the perineum is liable to take place, especially if the contractions are strong, the woman bears down forcibly, and the interval between the pains short, so that the head is forced out before the parts have time completely to dilate. Much may be accomplished by the physician in the way of so-called "perineal support." This consists not in supporting, but in holding the head back and fully flexed, and keeping the occiput well up toward the pubic arch until dilatation is complete. As the head begins to stretch the vulvar ring the left hand of the physician is carried over the woman's abdomen and between her thighs, the right leg being supported by a pillow placed between the knees, and presses the occiput forward and against the pubic arch. The right hand may also press the head upward through the posterior portion of the dilated perineum, but the edge of the latter should always remain uncovered and under ocular inspection. A bowl of hot water with two or three small towels should stand on a chair within easy reach, and one of the latter wrung out of the water constantly held against the perineum to facilitate the softening and dilatation of the tissues. Thus the head advances with each pain and again recedes until dilatation is complete, when it emerges, the perineum slipping backward over the child's face. At the moment when the perineum reaches its maximum distention the anæsthetic should be pushed, or the woman told to open her mouth and cry out, in order that the forces driving the head against the perineum may be lessened. Restitution at once takes place.

### **Episiotomy.**

When laceration of the perineum appears inevitable, the mucous membrane begins to crack, or the parts become œdematous, the constricting vulvar ring should be incised. A probe-pointed bistoury is introduced flat between the child's head and the vaginal wall, the handle being held parallel with the axis of the woman's body, and, when the ring is tense just at the close of a pain, the edge of the knife is turned outward toward the band, and a cut made half an inch long by a quarter of an inch deep. This is repeated on the other side, if necessary. While this operation is



rarely necessary, it is often of decided advantage, and, in the majority of instances, prevents laceration of the central portion of the perineum. Sometimes during the passage of the head the incisions are further enlarged by tearing. The cuts, if deep, should be sutured immediately after delivery. As soon as the head is born it must be supported by one hand and held up toward the mother's abdomen, *while the fingers of the other hand are passed around the child's neck and the cord felt for.* If this is coiled about the neck, by making gentle traction *on the placental side* it may be drawn down and the loops slipped over the head. In very rare instances the cord is so short that this manœuvre cannot be carried out, and the cord must either be tied or clamped with forceps in two places and cut between. As soon as possible after extrusion of the head the child's eyes should be cleansed of smegma and secretions by pledgets of cotton wet in a warm saturated solution of boric acid.

Unless the life of the child is endangered, no attempt should be made to drag the shoulders through the birth-canal, but their expulsion should be left to the natural forces, even though the infant becomes blue in the face. Following delivery of the head a short pause ensues, then renewed uterine contractions and external rotation of the head take place as the shoulders turn into the long diameter of the outlet. The upper shoulder appears first at the symphysis, becomes fixed, and the lower shoulder glides over the perineum, or both may be expelled at about the same instant. *During the birth of the shoulders the perineum should be carefully guarded, as lacerations are exceedingly liable to occur at this time.* If it becomes necessary to hasten this stage of expulsion, slight traction may be made on the child's head, and as soon as a shoulder appears the fingers, passed along the back of the child, may be hooked into the most available axilla, generally the lower, and traction made. The trunk and extremities of the child are now expelled without particular mechanism, followed, as a rule, by a gush of water. The uterus contracts as a firm body behind the pubis, and remains quiescent for a short period. As soon as the trunk is born the child should be laid on the bed behind the mother's thighs, and the cord pulled down to prevent traction upon the placenta. The physician now waits until the pulsations of the funis have ceased,—generally from five to ten minutes,—whereby from one to two ounces of blood are saved to



the child. The cord is then ligated about an inch from the umbilicus, a second ligature is placed an inch or so from the first, and the cord severed between the two, care being taken that a finger or a toe of the child is not included between the blades of the scissors. When the cord is very thick and contains much Wharton's jelly, it should be pinched at the point of ligation, and the contents stripped away before the first ligature is applied. After severing the cord the stump should be wiped off several times to determine that bleeding from the vessels has been permanently arrested. If not, the cord must be tied again. The child is now picked up and placed in the previously warmed receiving-blanket, held by the nurse, and laid in its crib.

### **MANAGEMENT OF THE THIRD STAGE OF LABOR.**

Renewed uterine contractions soon begin, and with the second or third the placenta may be expressed by the Credé method. This consists in grasping the fundus of the uterus with the hand, through the relaxed abdominal parieties, and squeezing and at the same time making downward pressure in the direction of the axis of the brim. The placenta is loosened from the uterus, and slides through the vagina and vulva, and may be caught in a tray held between the patient's legs, or by the hand, and a couple of twists given it in order to roll the membranes together. While this is going on gentle friction should be applied to the fundus of the uterus, when the membranes will slip out without tearing. In the delivery of the placenta no traction on the cord should be made lest it break near its placental insertion, or cupping of the fundus or inversion of the whole organ be produced. From the time when the head escapes from the vulva until the delivery of the placenta the uterus must be controlled by the firm pressure of the hand from above.

When the placenta is separating, the uterus may "balloon up" with blood. Hence it is always wise to have the nurse follow the fundus throughout this stage by keeping her hand upon it, and if, while the physician is attending to the child, the fundus softens and enlarges, she should at once report the fact. Likewise after the uterus is empty she should make friction over the fundus whenever it softens at all, in order to stimulate it to full contraction. This friction should be kept up at intervals for one hour after the placenta and membranes have been delivered.



## QUESTIONS.

What does the preparation for labor include—(a) for the physician? (b) for the patient?

What kind of room should be selected for a confinement?

Describe the preparation of the bed.

What is the permanent bed?

What is the temporary bed?

Describe the preparation of the patient for the first stage of labor?

How should examinations in this stage be conducted?

How should the vaginal examinations at this stage be made?

What is the management of the patient during this stage?

Under what conditions may the physician absent himself from the patient during this stage?

When do the membranes ordinarily rupture?

What drug may be given to alleviate the suffering of this stage?

What drug stimulates contractions in lagging first stage?

How should the patient be prepared for the second stage of labor?

What position should the patient assume?

When should anæsthetics be employed?

What are the dangers of anæsthetics?

How should chloroform and ether be administered?

What should be the position of the patient in the perineal stage of labor?

Describe the management of the perineum during dilatation and the delivery of the head.

What is episiotomy and how is it performed?

What is the object of episiotomy?

What is the after-treatment of the wound thus made?

Describe the delivery of the shoulders.

How should the umbilical cord be managed if around the child's neck?

How should the cord be ligated and cut?

Describe the third stage of labor.

How is Credé's method of placental expression executed?

Why should traction on the funis be avoided during delivery of the placenta?

How should the uterus be managed after the expulsion of the child's head?

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## CHAPTER XI.

### THE MECHANISM OF NORMAL LABOR.

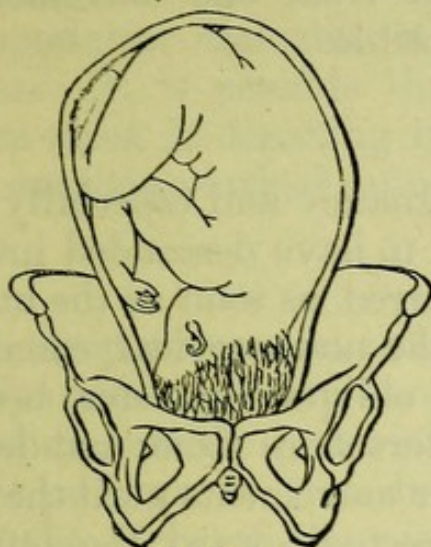
#### MECHANISM OF VERTEX PRESENTATIONS.

##### First Position, L. O. A.

THE movements of the foetal head in its passage through the birth-canal are: (1) Descent; (2) flexion; (3) rotation; (4) extension; and after it has escaped from the vulva: (5) restitution;

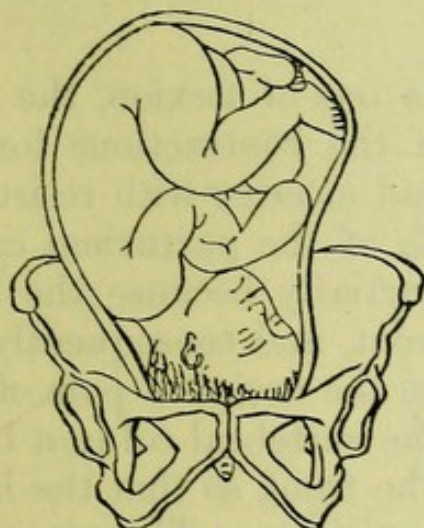


FIG. 19.



L. O. A.

FIG. 21.



R. O. P.

FIG. 23.

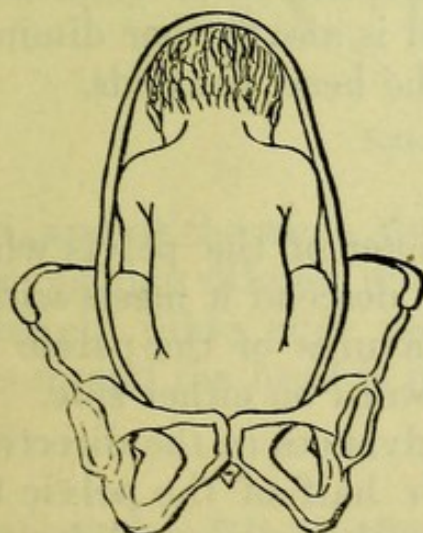
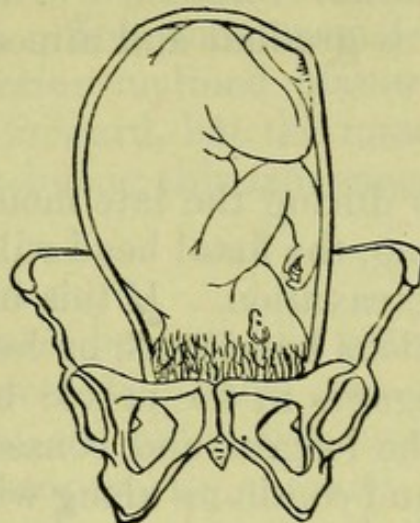
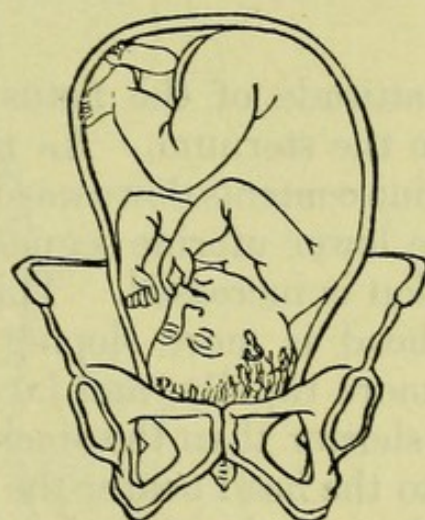


FIG. 20.



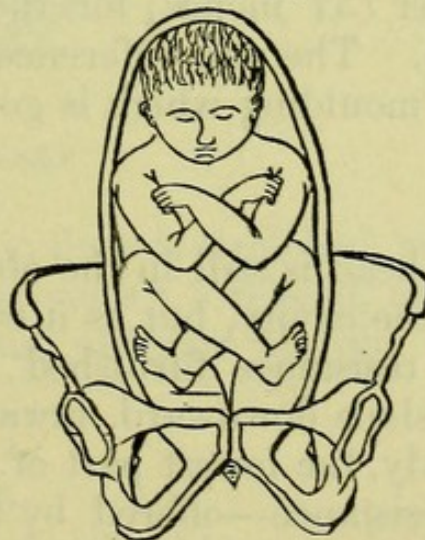
R. O. A.

FIG. 22.



L. O. P.

FIG. 24.



FIGS. 19-22 represent the four positions of the occiput in vertex presentations. FIGS. 23 and 24 show the occiput at the fundus in breech presentations.



(6) external rotation. The transition from one movement to another is gradual and almost imperceptible.

### Descent.

Often during the late months of pregnancy and especially after lightening, the foetal head will be found to have descended into the pelvic excavation. If this has not occurred, as soon as the uterine contractions have more or less dilated the uterocervical canal, the head engages in the pelvic brim in the oblique diameter, because this is the longest, and, consequently, offers more room, and descent begins and continues along with the other movements until the head is born. The occiput at the brim is directed toward the left ilio-pectineal eminence, and the sinciput toward the right sacro-iliac joint.

### Flexion.

The attitude of the foetus *in utero* is one of flexion, the chin being on the sternum. As the result of the contractions forcing the uterine contents downward and the head meeting with resistance from the lower uterine segment and walls of the parturient canal, the flexion is increased. This results partially because the back of the head is more sloping than the front, and consequently advances more rapidly, and largely because the occipital pole of the head is shorter than the sincipital pole, the vertebral column being joined to the head nearer the back than the front, so that the latter is forced upward and the head becomes more bent. The advantage of flexion is that it substitutes the shorter suboccipitobregmatic diameter ( $3\frac{3}{4}$  inches) for the longer occipitofrontal diameter ( $4\frac{1}{2}$  inches). The circumference of the head is also further diminished by the moulding which is going on as the head descends.

### Rotation.

The head is still in the oblique diameter of the pelvis when it enters the cavity, but as it continues to descend it meets with the strong resistance furnished by the structures of the pelvic floor, which slope downward, inward, and forward on either side. Consequently, the lowest part of the head advances in the direction of least resistance—offered by the anterior half of the pelvic floor; in accordance with the well-known law, the occiput glides to the front,—the pubic arch,—while the forehead is directed into the

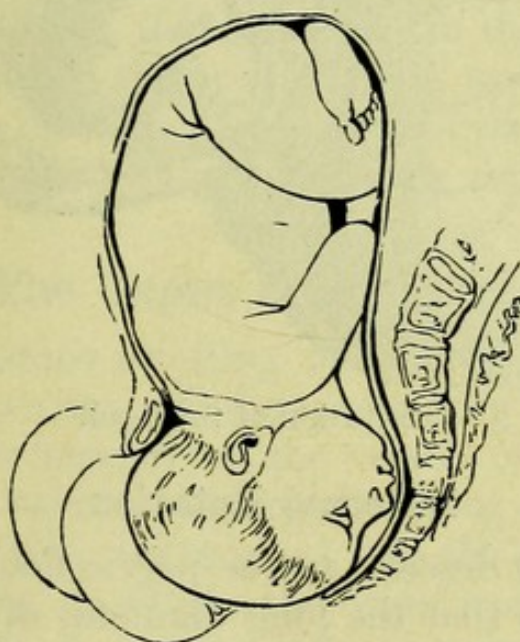


sacral excavation. The long diameter of the head now lies in the anteroposterior diameter of the outlet. This movement is called rotation. It is possible that the anterior inclined planes of the ischium assist in directing the occiput forward, but the intact perineum exerts a marked influence in producing this movement.

### Extension.

The occiput now moves forward, passes beneath the pubic arch, the biparietal diameter engages between the rami, the neck is pressed against the posterior surface of the pubic symphysis, and further progress in this direction is temporarily checked. As a result, the force of the uterine contractions transmitted through the vertebral column is shifted to the anterior cephalic pole, the chin is forced from the sternum, the head is more and more ex-

FIG. 25.



Extension of the head.

tended, and at the same time the pelvic floor is stretched and the vulvar opening dilated, until finally the vertex, forehead, and face successively glide over the thinned-out anterior margin of the perineum and the head is born.

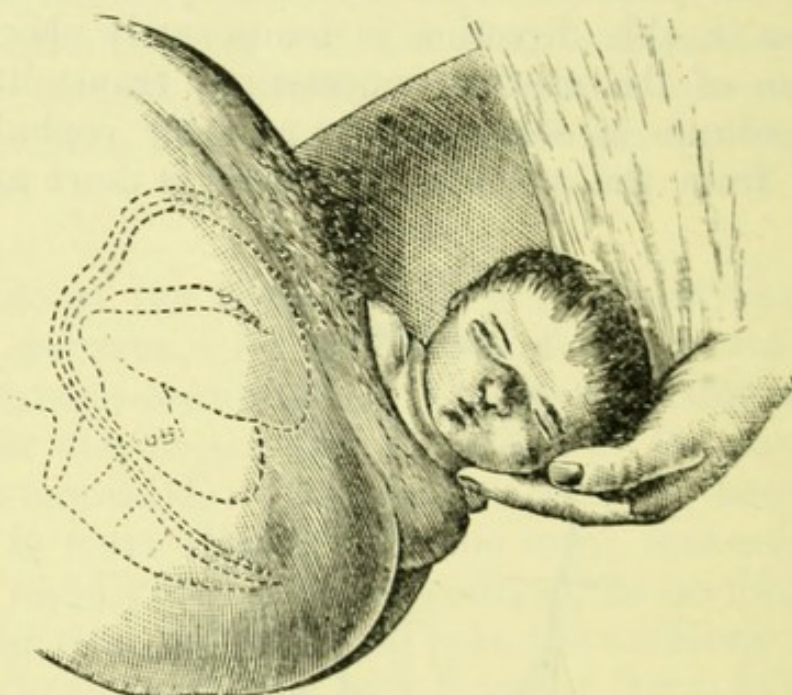
### Restitution.

With the head in the first position the shoulders are in the opposite left oblique diameter. As the head rotates from the oblique



into the anteroposterior diameter, the shoulders remain in practically the same position which they have occupied, for they are still too high up to meet with the resistance of the pelvic floor which has turned the head. The neck of the child becomes, therefore, somewhat twisted, the chin pointing toward the left shoulder. As soon as the head escapes from the vulva it *untwists* and resumes its former position, the face looking to the right and backward. This movement is called restitution.

FIG. 26.



Restitution of the head.

### External Rotation.

The shoulders now descend to the pelvic floor, the right rotating to the pubic arch, so that the long diameter of the shoulders is in the anteroposterior of the outlet. As the shoulders turn, the head is also swung around so that the occiput lies toward the mother's left thigh, while the face is directed to the right. This constitutes external rotation. The shoulders are now expelled—first the posterior, or left, then the anterior, or right, or both simultaneously. The body and legs quickly follow.

### Second Position, R. O. A.

The long diameter of the head lies in the right oblique diameter of the pelvis. The movements are exactly the same as in the first



position, except that rotation takes place from right to left internally and from left to right externally.

### **Third Position, R. O. P.**

In this the long diameter of the head lies in the right oblique diameter of the pelvis, with the occiput behind and the forehead to the front. Descent and flexion take place, but the latter is less complete, and rotation is prolonged on account of the distance through which the occiput must pass and the incomplete flexion of the head. When the occiput reaches the pelvic floor, it turns to the front, just as in the second position, and the further movements are the same as in anterior positions.

### **Fourth Position, L. O. P.**

Here the occiput is to the left and the forehead to the right, so that the long diameter of the head lies in the left oblique of the pelvis. During rotation the occiput turns to the front from left to right. The further movements are as described. Fortunately, in the majority of occiput posterior positions forward rotation takes place.

### **The Caput Succedaneum.**

This is an œdematous swelling of variable size, developed on the uncompressed portion of the presenting part during labor. After rupture of the membranes the vessels of the part within the circle of resistance become engorged during the uterine contractions, and serous effusion takes place into the cellular tissues. In cephalic presentations, L. O. A., the caput succedaneum is located on the right, in R. O. A., on the left, posterior parietal region; in R. O. P. it is on the left, in L. O. P. on the right, anterior parietal region. In prolonged labors, when the membranes have ruptured early, the caput may be of large size and its situation modified; in rapid labors it may be entirely absent. By increasing the length of the head the caput somewhat favors rotation. When developed on the buttocks or other part, it is designated by the same term. In face presentations the caput is formed on the lower malar region, right or left; in mento-anterior cases, near the angle of the mouth; and in mentoposterior cases, on the upper malar region near the angle of the eye.



## DIAGNOSIS OF VERTEX PRESENTATIONS.

### By Auscultation.

In L. O. A. positions the point of maximum intensity of the foetal heart-sounds is midway between the umbilicus and the anterior superior spinous process of the ilium on the left side; in R. O. A., at a corresponding point on the right side; in R. O. P. it is the same as in the second position, but farther around toward the mother's side; in L. O. P. it is as in the first position, but more to the side.

By **abdominal palpation**. This diagnosis has already been described in the preceding pages.

### By Vaginal Examination.

The finger comes upon the membranes, or, if these are ruptured, upon the parietal bone. Passing the finger backward, the sagittal suture is felt. If this runs obliquely backward from left to right, the position is either L. O. A. or R. O. P.; if it passes from right to left, the position is either R. O. A. or L. O. P. The suture is now followed until the posterior fontanelle is found, when the position of the occiput is apparent. In the first two positions this fontanelle is felt anteriorly as a small triangular depression or ridge, with three sutures radiating from its angles. Unless the head is very small or the pelvis large, the anterior fontanelle with its four radiating sutures cannot be touched, as it lies too far back and high up. In the two posterior positions both fontanelles may generally be felt, owing to imperfect flexion of the head.

## MANAGEMENT OF VERTEX PRESENTATIONS.

For normal cases this has already been described, but in posterior rotation efforts should aim to increase and maintain flexion. Much can be done in rectifying the position by posture. During the first stage of labor, and even earlier if the condition has been detected, the patient should assume the knee-chest position, retaining this as long as possible each time, or she may spend much of the time during the first stage of labor kneeling before the bed or a chair. This tends to favor the turning of the child's back to the front through gravity, and promotes anterior rotation of the occiput.



After this the patient should lie on the side opposite to that in which the occiput is directed. If for any reason the genupectoral position cannot be made use of, the woman should lie from the beginning of labor on the side toward which the occiput is directed. It is important in these cases that the membranes should remain intact as long as possible, or until the cervix has become sufficiently dilated to admit the hand. If extension persists or increases, the patient may be anæsthetized, the hand introduced into the cervix, and pressure made against the forehead. The head once flexed, the anæsthetic is discontinued, but the fingers must be kept against the forehead until the uterine contractions have forced the head into the brim. If the head is arrested high in the posterior occipital position, the forceps may be applied or the hand may be introduced, the head and body turned to the front, and the forceps then applied, or version may be performed. The last two procedures are the best.

#### QUESTIONS.

Describe the mechanism of labor in vertex presentations, first position, L. O. A.

Describe the mechanism of labor in the second position, R. O. A.

Describe the mechanism of labor in the third position, R. O. P.

Describe the mechanism of labor in the fourth position, L. O. P.

What is the caput succedaneum, and how is it formed?

What is the position of the caput in the various vertex positions?

How are the vertex positions diagnosticated?

What is the management of normal labor in vertex presentations?

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## CHAPTER XII.

### ABNORMAL LABOR.

#### PERSISTENT OCCIPITOPOSTERIOR POSITIONS.

##### Mechanism of Persistent Occipitoposterior Position.

WHEN the head is small or the resistance is increased or decreased, or for any other reason proper flexion fails to take place, as the head descends the sinciput reaches the posterior segment of the pelvic floor in advance of the occiput, and is rotated to the



front, while the back of the head is turned into the hollow of the sacrum. In this position it is impossible for the face to escape under the pubic arch. The forehead becomes fixed behind the symphysis, the occiput is pushed downward over the greatly distended pelvic floor and perineum, the chin is more and more flexed on the sternum, until, finally, the occiput escapes, the neck presses against the perineum, and the forehead, nose, mouth, and chin escape by extension from behind the symphysis. Under the most favorable circumstances this is accomplished with great difficulty; the head of the child is subjected to dangerous pressure, and the perineum is usually badly lacerated. Instrumental delivery is very frequently necessary in these cases.

### FACE PRESENTATIONS.

These are uncommon, occurring according to various statistics from 1 in 127 to 1 in 497 cases. In general they occur about equally in primi- and multigravidæ. The transformation of vertex to face rarely takes place before the onset of labor, and is then gradually developed. Some of the causes to which this presentation have been ascribed are: increased uterine obliquity, tumors of the neck and thorax, excessive liquor amnii and small child, coiling of the cord about the neck, dolichocephalus, hydrocephalus, and deformed pelvis. In other words, anything which prevents flexion may give rise to a face presentation. The four positions which the face may assume have already been mentioned. The mechanism of delivery is nearly the same as in vertex positions, substituting the forehead for the occiput. The movements of the head are *descent, extension, rotation, flexion, restitution, and external rotation*.

#### Mechanism of Mento-anterior Positions.

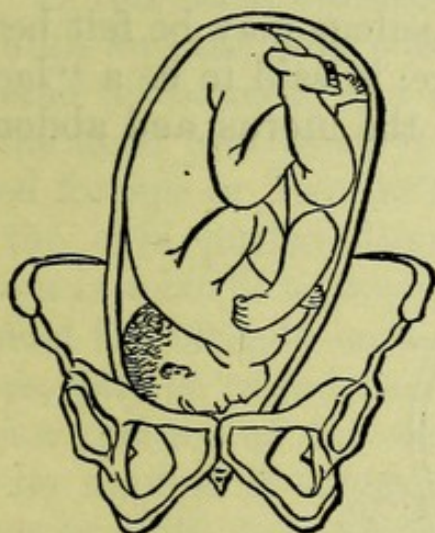
Descent takes place as in vertex cases. Extension is increased as the face, the frontomental diameter of the head, enters the oblique diameter of the brim. The chin, being lowest, first meets with the resistance of the pelvic floor and is turned to the pubic arch, under which it engages (Fig. 31). Flexion then takes place, and the mouth, nose, and eyes sweep over the perineum, followed by the occiput. Restitution and external rotation occur as in vertex presentations, and the trunk and extremities are born.



### Mechanism in Mentoposterior Positions.

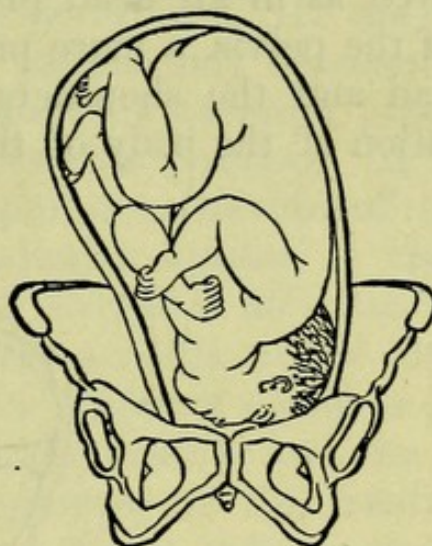
In persistent mentoposterior positions, except when the head is very small, the pelvis roomy, and the pelvic floor very much relaxed, conditions in which the head may pass through the pelvis without any particular mechanism, the delivery of a living child

FIG. 27.



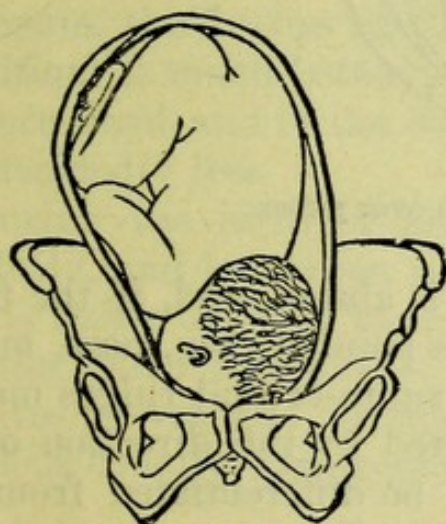
L. M. A.

FIG. 28.



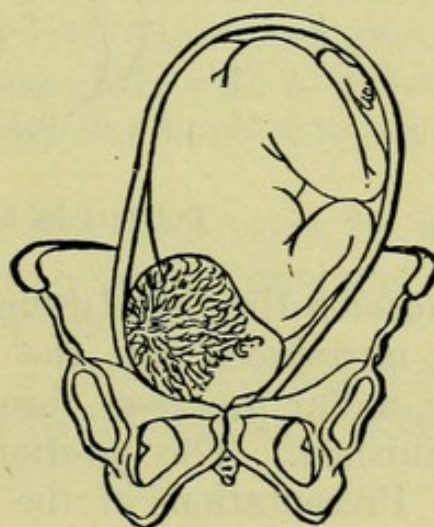
R. M. A.

FIG. 29.



R. M. P.

FIG. 30.



L. M. P.

is impossible. In this position with a normally developed child and pelvis, delivery could be effected only by extreme stretching of the neck, great flattening of the cranial vault, and a simultaneous entering of the shoulders into the pelvis, conditions which would give rise to such extreme pressure on the parts that the child

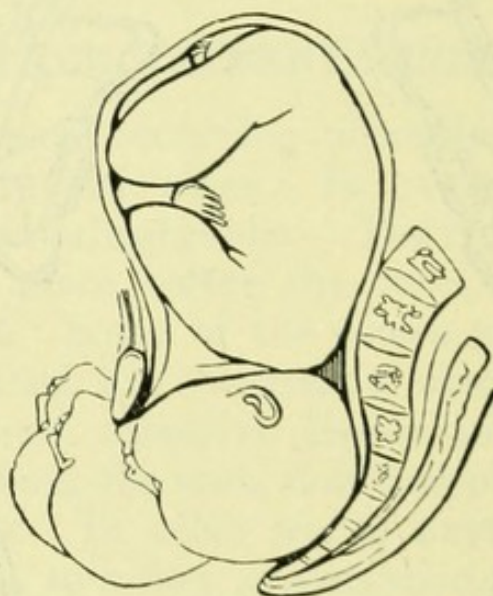


would inevitably perish. In the majority of mentoposterior presentations anterior rotation of the chin eventually takes place.

### Diagnosis of Face Presentations.

Some idea may perhaps be obtained by abdominal palpation, especially if the walls are relaxed. The breech and small parts are above, as in all head presentations; the occiput is above the brim of the pelvis, a more pronounced sulcus may be felt between the head and the shoulders, and there is said to be a "lack of application of the body of the fœtus to the uterus and abdomen."

FIG. 31.



Delivery by flexion of chin over pubes.

*Per vaginam* the broad rounded head is absent, and, if the finger can be introduced into the cervix, the pointed chin, nose, mouth, tongue, malar processes, forehead, and supra-orbital ridges may be distinguished. The position is indicated by the direction of the chin. Presentations of the *face* must be differentiated from presentations of the *breech*, the mouth from the anus, the nose from the coccyx and sacrum, and the supra-orbital margins from the tuberosities of the ischia and pubic arch.

### Management of Face Presentations.

Labor is prolonged, and the dangers to mother and child are increased. The maternal mortality is not much, if any, augmented,



but that of the child is placed at from 6.5 to 20 per cent. The management of the case depends upon the conditions present. It is desirable in all instances that the membranes remain unruptured as long as possible. If the head is high, attempts may be made under anæsthesia, by external manipulations,—combined with internal if the one is not successful,—to raise the body of the child and dislodge the face, converting the presentation into that of vertex. If this fails, version should be performed. If the head is still high and the chin posterior, the patient may be anæsthetized, the hand introduced, and an effort made by external pressure to flex the head and cause it to engage in this position. A narrow-bladed forceps or Tarnier's may be applied to the sides of the head, and the chin pulled down and gradually rotated to the front. *Version is much to be preferred to high forceps in all cases.* When the head has already entered the pelvis, a vectis, or the blade of a forceps, may be introduced beneath the posterior cheek to promote anterior rotation of the chin. When the head is low, the forceps may be applied if labor does not advance or the condition of mother or child demand intervention. Great care must be exercised in directing the tips of the instrument well backward toward the occiput, in order to avoid compression of the vessels of the child's neck. In posterior positions, after bilateral incision of the perineum, the forceps may be applied, but craniotomy under these conditions is much better practice, as the child will, in either event, be born dead, and in the latter procedure the dangers to the mother are decidedly less.

During the birth of the face the perineum must be watched carefully, and laceration anticipated by timely episiotomy. Rupture is liable to occur in spite of every effort.

After birth the face of the child is generally greatly swollen, the eyes closed, and the mouth incapable of nursing. The disfigurement usually disappears within a few days.

### BROW PRESENTATIONS.

This is a partial or modified face presentation, due to semi-extension of the head. It is rarely met with, occurring about once in 1025 labors (Hecker); the causes are the same as in face presentations, and it is generally converted spontaneously into either a face or vertex. In persistent cases the forehead is rotated to the



front and appears at the vulva ; the eyes are under the arch, with the chin behind the pubic symphysis, and the occiput back in the hollow of the sacrum. Flexion then takes place, the cranial vault is forced over the perineum, and, finally, the nose, mouth, and chin escape from under the pubis. The caput succedaneum extends from the root of the nose to the anterior fontanelle.

### Diagnosis of Brow Presentations.

This is difficult, and cannot be made by external examination. The fingers in the cervix may detect the large fontanelle, the root of the nose, margin of the orbits, and the malar bones.

### Management of Brow Presentations.

If the condition is discovered before labor, the same methods may be employed as in face presentations. If a change of presentation is impossible, the treatment should be expectant. When the pelvis is roomy and no complications exist in anterior positions, the prognosis is not bad. When the head is in the pelvis, an attempt should be made to convert the brow into a face by pulling down the chin, or a vertex by pushing up the chin. In anterior positions, when the head is impacted and malrotation exists, the forceps may be applied and the head extracted. When the head is posterior and every effort to change the position fails, craniotomy must be performed.

### PELVIC PRESENTATIONS.

These include *breech*, *knee*, and *foot* presentations. The last two must be considered only as modifications of the former. In labors at term the breech presents about once in 60 cases ; when miscarriages and premature labors are included the proportion is doubled (1 in 30). The causes of breech presentations, among others, are an excessive amount of liquor amnii, lax uterine and abdominal walls, plural pregnancies, death of fœtus, premature delivery, hydrocephalus, placenta prævia, pelvic deformities.

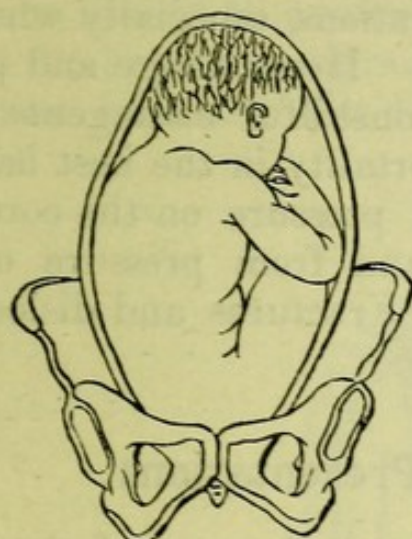
### The Positions of the Breech.

These are four : (1) *Left sacro-anterior*, L. S. A., sacrum to the left acetabulum ; (2) *right sacro-anterior*, R. S. A., sacrum to the



right acetabulum; (3) *right sacroposterior*, R. S. P., sacrum to the right sacro-iliac joint; (4) *left sacroposterior*, L. S. P., sacrum to the left sacro-iliac joint.

FIG. 32.



R. S. A.

FIG. 33.



L. S. A.

FIG. 34.



L. S. P.

FIG. 35.



R. S. P.

### Diagnosis of Breech Presentations.

This has already been referred to under abdominal palpation. By vaginal examination the coccyx, sacrum, and ischial tuberosities, the external genitals, and the anus may be distinguished. If the child is dead, the anus is wide and gaping. Meconium may adhere to the examining finger. The position is determined by



the direction of the coccyx. The breech should not be confounded with the face.

### Prognosis.

The maternal mortality is not increased, but there is added danger of cervical and perineal lacerations, especially when the parts are stiff, as in elderly primiparæ. Hemorrhage and premature separation of the placenta from unskilful management and haste may also occur. The infant mortality in the best hands is about 10 per cent.; from prolapse and pressure on the cord, premature separation of the placenta, and from pressure on and stretching of the vessels of the neck. Fractures and dislocations of the foetal bones are not infrequent.

### Mechanism of Breech Presentations.

**L. S. A. Positions.**—The bitrochanteric diameter of the breech engages in the oblique of the brim. Moulding of the breech occurs with descent. The anterior (left) hip is rotated to the arch, under which it becomes fixed, the trunk undergoes lateral flexion in conformity with the pelvic curve, and the posterior (right) hip descends along the sacral curve to the perineum, which retracts over it. The left hip then emerges from under the symphysis, and the trunk, the legs, the arms, and shoulders are successively born. The head enters the pelvis with its anteroposterior diameter in the oblique or transverse, and when in the cavity the occiput rotates to the front, the chin into the sacral trough. The chin, face, and forehead are then forced over the perineum, followed by the rest of the head. When, instead of being flexed, the legs are extended along the front of the child's body, the flexion of the trunk is impeded and labor may be retarded (Fig. 136).

**R. S. A. Positions.**—The mechanism is the same as just described, except that the head rotates from right to left instead of in the opposite direction.

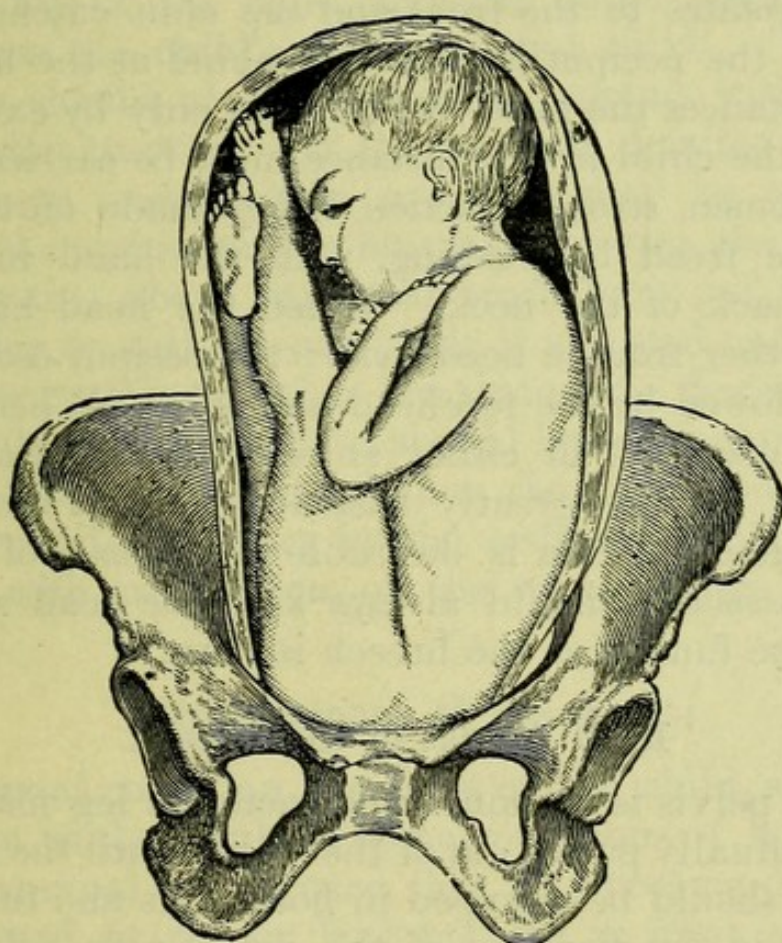
### Management of Breech Presentations.

The pelvic end of the child is a poor dilator, and the cervix is somewhat slower in opening up than when the head presents. The membranes should remain unruptured until dilatation is complete,



or as long as possible. If cervical dilatation is unduly prolonged, it may be hastened by hot-water douches every fifteen minutes, or, after the membranes have ruptured, a Barnes' bag may be introduced into the cervix. In the main, the attitude of the physician should be one of watchfulness toward mother and child, and interference should be avoided unless special indications arise. As soon as the breech appears at the vulva, the woman must be placed across the bed, with the hips well to the edge, and the legs sup-

FIG. 36.



Pelvic presentation with legs extended.

ported by assistants or a crutch of some kind. When the breech is born, it is to be covered with hot towels and supported by the hand and slightly raised from the perineum, but no traction must be made. As soon as the navel appears the cord should be pulled down to prevent undue tension, and carried to that part of the pelvis where there is most room and consequently least pressure. If the funis is too short or coiled about the child's body it must be ligated or clamped in two places and cut between, and the child



delivered by rapid extraction. When the arms appear they must be liberated, and as soon as the head has rotated the child's body must be lowered to promote flexion, but again gradually raised as the face sweeps over the perineum. If at any time the pulsations of the cord become feeble or cease, delivery must be rapidly terminated. After the delivery of the trunk the head should be born without delay; even if the pulsations of the cord are good, not over five minutes should elapse before this is accomplished. If pulsations in the funis are feeble or have ceased, the child may perish within three minutes. In exceptional cases the abdomen of the child rotates to the front and the chin catches at the symphysis, while the occiput is arrested behind at the brim. Under these circumstances the head can be born only by extreme flexion. The body of the child in this instance must be carried up over the mother's abdomen, strong traction being made on the feet, while the occiput is freed by pushing, with the hand in the vagina, against the back of the neck. When the head has entered the pelvis, no further trouble need exist; the occiput escapes over the perineum, followed by the forehead and face. When rapid delivery becomes necessary in either anterior or posterior positions of the head, this may be greatly hastened by suprapubic pressure. Indeed, this manipulation is desirable in all cases of after-coming head. The assistant should always keep the head well flexed by pressing on the fundus as the breech is born.

### High Arrest of the Breech.

Unless the pelvis is too much contracted, a leg may be brought down and gradually pulled out of the vulva until the knee appears, when the leg should be wrapped in hot towels and further traction made, always in the direction of the pelvic axis. If the child is in no danger, and the mother's condition good, the remainder of the delivery may be left to nature. If it becomes necessary to terminate the labor, traction on the leg must be continued, the towel and hands being moved toward the vulva as the child descends. When the other leg escapes, it should also be included in the wrap of the towel and so on to the body. If a leg cannot be brought down, the axis-traction forceps may be applied to the breech. Should the breech become *impacted* in the pelvis, the finger may be hooked into the anterior groin and traction made, or a fillet or blunt hook may be employed for the same purpose.



The fillet consists of a band of linen or silk, which is passed around the thigh of the child, the ends hanging outside of the vulva for traction purposes. To apply the fillet, a large silk catheter with the stylet may be threaded with a loop of string and bent into the form of a blunt hook. The fillet is then fastened to the string, the catheter introduced between the thigh of the child and the vaginal wall, the hooked portion turned around the child's groin, the string seized, and the band pulled through. Traction should always be made in the direction of the sacrum to avoid fracture of the thigh. The blunt hook is introduced flat between the anterior hip of the child and the pubic bone, and the hook turned between the child's abdomen and thigh. The fingers of the physician should always remain in contact with the point of the hook during traction. If the methods detailed are unsuccessful, the forceps (*axis-traction are best*) may be applied to the breech. If the position of the hips is transverse, the forceps should lie with their tips above the great trochanters; if the position is anteroposterior or oblique, one blade is adjusted against the upper sacral vertebræ while the other lies against the flexor surface of the most accessible thigh. Traction should be continuously maintained until the child is delivered. When the impaction of the breech is such as to render delivery by the ordinary methods impossible, embryulcia with perforation of the after-coming head must be performed.

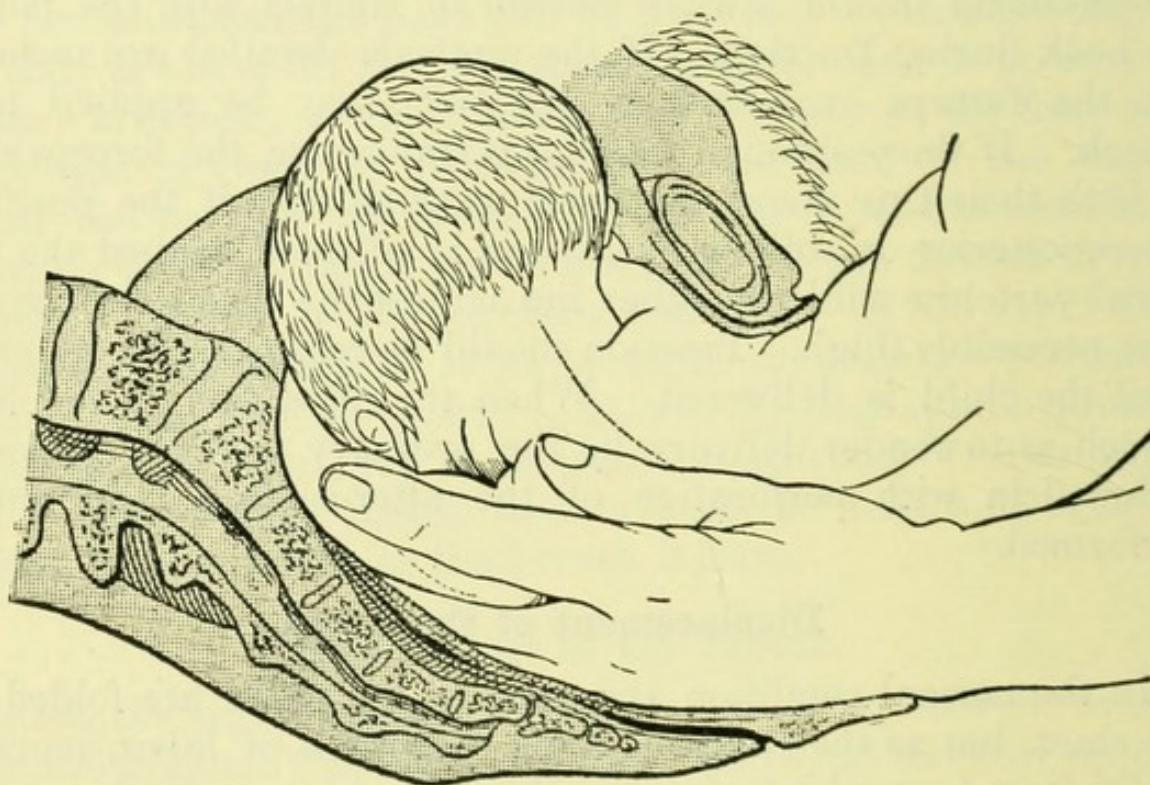
### Displacement of the Arms.

In the normal condition the arms of the child are folded over the chest, but as the result of some conditions of labor, more generally from manual interference, they may become displaced either straight upward, or one or both may be in front, at the sides, or behind the head. If the arms are normally flexed, but, for some reason, fail to come down after they have entered the pelvis, the body of the child must be raised by the feet and drawn to one side, and the free hand of the physician introduced into the vagina over the perineum (Fig. 37). An elbow is then seized and the arm carefully pulled downward across the chest and delivered. If the arms are extended, traction should be made on the body until the shoulder-blades appear. The feet of the child are then seized by the physician's left hand and the body drawn obliquely upward toward the mother's right. The palmar surface of the



right hand is then laid upon the child's back and slid along the sacral groove to the shoulder, two or three fingers following the arm to the elbow, which is depressed and the arm made to sweep across the child's face and thorax into the vagina. The opposite anterior arm must now be released. The child's feet are changed to the operator's right hand, and the body carried obliquely downward toward the left thigh of the mother, while the operator's left hand is carried along the back and arm until the elbow is reached and the arm can be brought down. *If this manipulation is not successful, the body of the child must be rotated so that the anterior*

FIG. 37.



Bringing down an arm. (Faraboeuf and Varnier.)

*arm becomes posterior.* The operator's hands are placed on the sides of the child's thorax, with the thumbs on the back, and the body slowly and carefully turned from left to right until the left arm is behind. The feet of the child are then held in the right hand while the left hand delivers the arm. When one or both arms are impacted behind the head, release is often difficult. As the condition is usually the result of rotation of the child in the presence of extension of the arm, it is best treated by first rotating the child in the direction opposite to that by which the condition

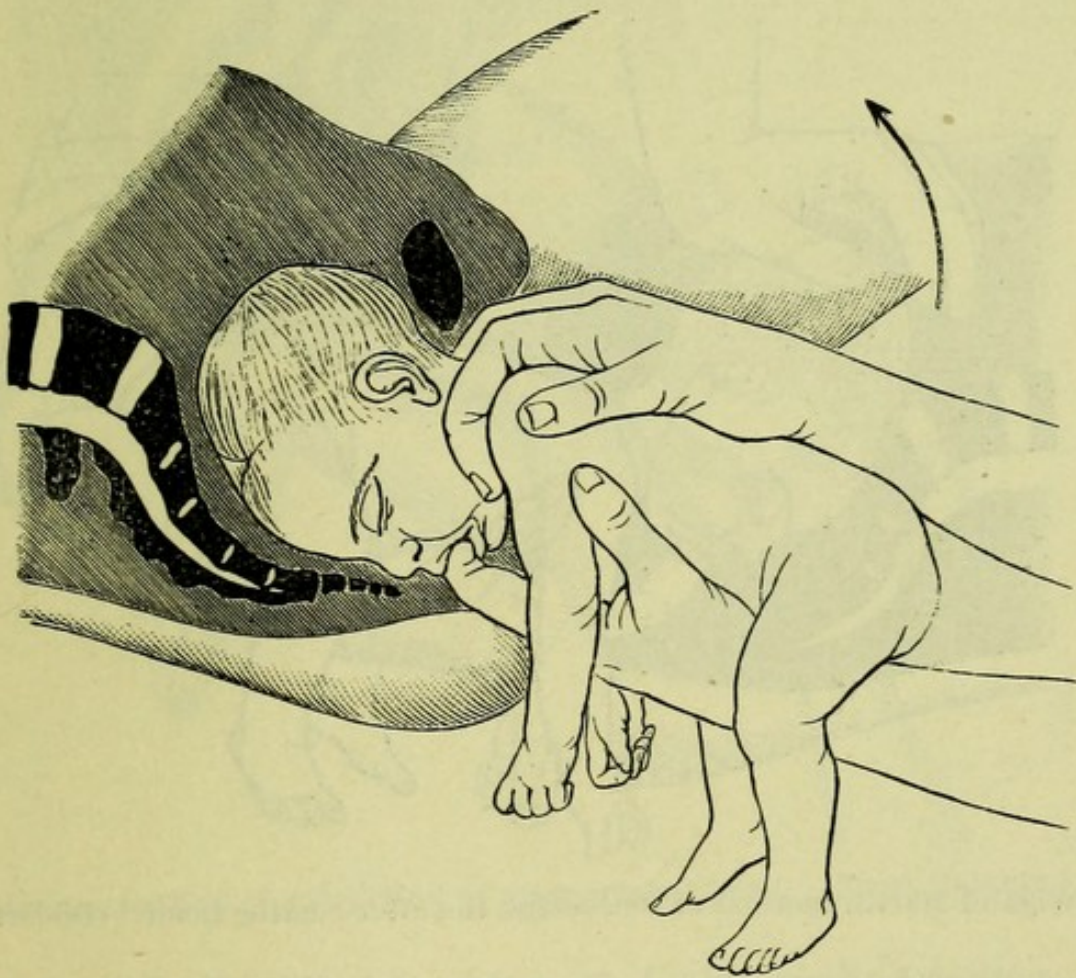


was produced, and then bringing down the arm in the manner just described.

### Delivery of the After-coming Head.

In the interests of the child it is important that the head should be delivered as soon as possible after the expulsion of the trunk, and, as the natural forces are not usually adequate in accomplishing this with sufficient promptness, resource to art must be had. There are several methods of extracting the after-coming head,

FIG. 38.



The Smellie-Veit method of extracting the after-coming head. (Döderlein.)

each of which may be rapidly tried in turn should either not succeed. For these manœuvres the woman must always be on the cross-bed in the lithotomy position, with the hips jutting over the edge.

### DEVENTER'S METHOD.

As soon as the tips of the shoulder-blades appear at the vulva the physician seizes the ankles of the child with one hand and

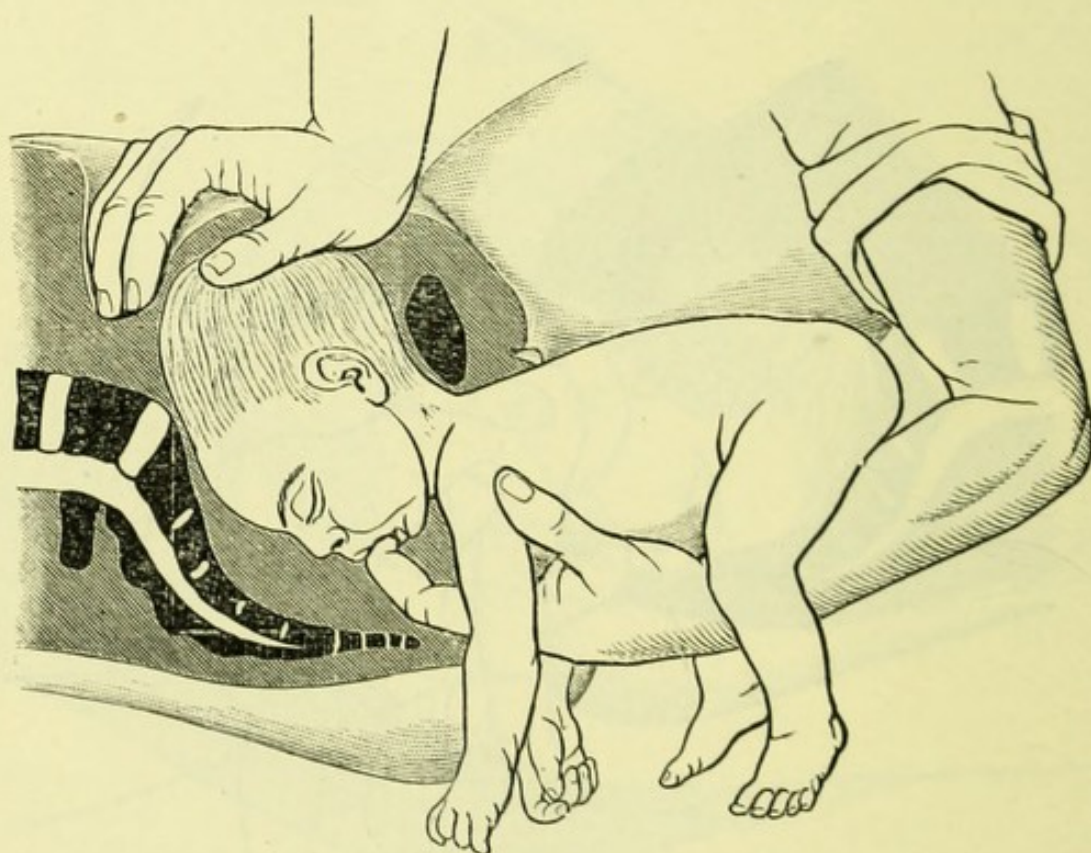


makes vertical downward traction, while with the fingers of the other hand he presses against the upper surface of the shoulders.

### SMELLIE'S GRASP.

The child is placed astride the operator's arm, generally the left. Two fingers of this hand in the vagina are placed, one on each side, in the fossæ at the side of the child's nose and pulled downward. The fingers of the other hand are passed under the

FIG. 39.



The Wigand-Martin method of delivering the after-coming head. (Döderlein.)

pubic arch and press the occiput upward, thus flexing the head. The trunk is then gradually raised and the face escapes over the perineum.

### PRAGUE GRASP.

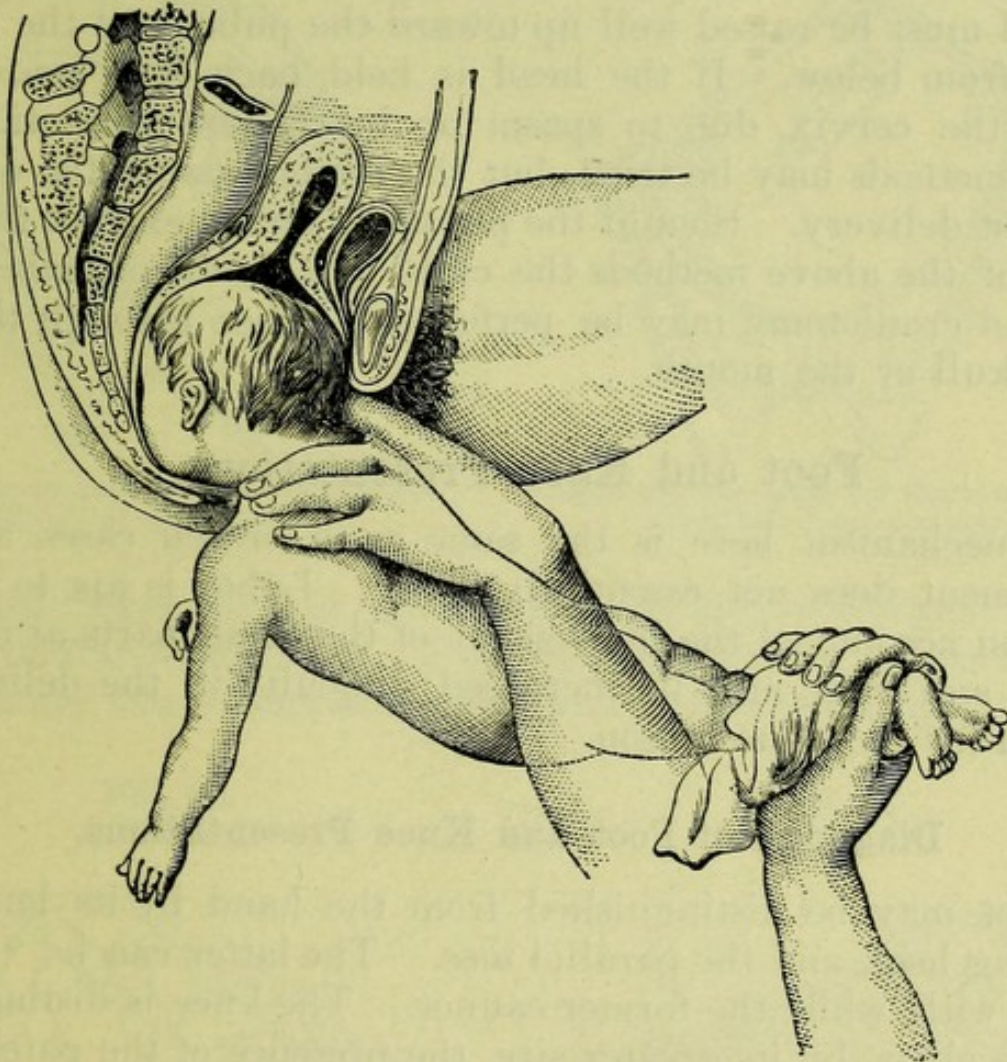
The feet of the child are held by the physician in one hand, while the fingers of the other are hooked over the shoulders. Traction is made at first downward, and then, as the head descends, the body is carried gradually upward (Fig. 40).



MAURICEAU'S, OR SMELLIE-VEIT METHOD.

With the child astride the arm one or two fingers of that hand are introduced into the child's mouth and downward traction made on the jaw. The first two fingers of the other hand are

FIG. 40.



Prague method of extraction of after-coming head. (From Galabin.)

hooked over the child's shoulders and also make traction. The direction is at first downward and then upward (Fig. 38).

WIEGAND-MARTIN METHOD.

With the child astride the arm a finger of that hand is placed in the mouth to guide the head. The physician makes supra-pubic pressure on the head with the other hand and thus expresses it (Fig. 39).

When the chin of the child is to the front the Prague method



should be employed, the fingers being hooked over the shoulders from below. Traction should at first be horizontal, but as the head descends the body of the child must be raised.

#### FORCEPS TO THE AFTER-COMING HEAD.

This is rarely, although occasionally, necessary. The body of the child must be raised well up toward the pubes and the forceps applied from below. If the head is held back by a *constricting ring* of the cervix, due to spasm or insufficient dilatation, the manual methods may be tried, but the forceps assure the quickest and safest delivery. Should the physician fail to extract the head by any of the above methods the child will, in all probability, be dead, and craniotomy may be performed, either through the base of the skull or the mouth.

#### Foot and Knee Presentations.

The mechanism here is the same as in breech cases, and the management does not essentially differ. Labor is apt to be prolonged on account of the inefficiency of the small parts as cervical dilators, and there may be increased difficulty in the delivery of the head for the same reason.

#### Diagnosis of Foot and Knee Presentations.

A foot may be distinguished from the hand by its length, its projecting heel, and the parallel toes. The latter can be "shaken hands" with, while the former cannot. The knee is distinguished from the elbow by its greater size, the presence of the patella, and the absence of the olecranon.

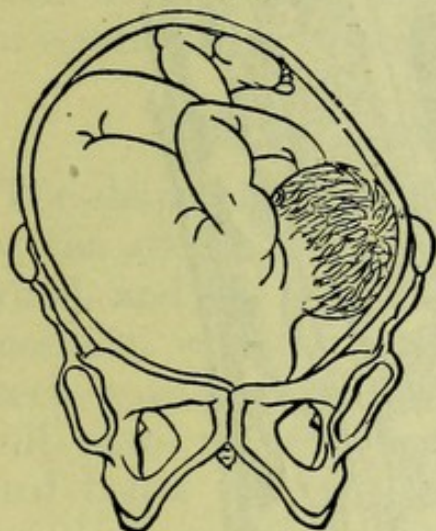
#### TRANSVERSE PRESENTATIONS.

This presentation, also known as cross-birth, is very infrequent and, roughly speaking, occurs only in about one-half of 1 per cent. of labors. The child generally lies in an oblique position in the uterus with the back usually to the front and the head in either the left or right iliac fossa, but any part may present, as the back, trunk, or two arms (Figs. 41-44). The causes are essentially those giving rise to presentation of the breech, pelvic



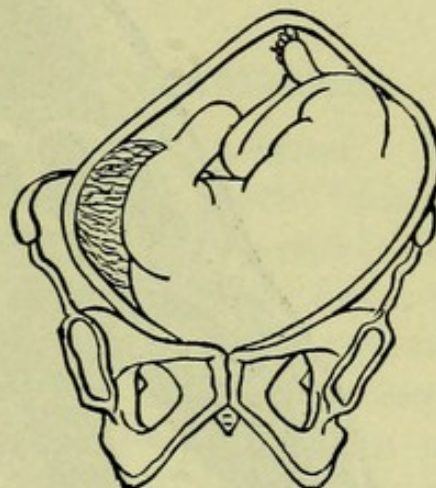
deformities being of particular moment. Under normal conditions of pelvis and child natural delivery can hardly take place in these cases, but with a normal or very large pelvis a small or premature

FIG. 41.



Left cephalo-iliac (or dorso-anterior)  
position of *right* shoulder.

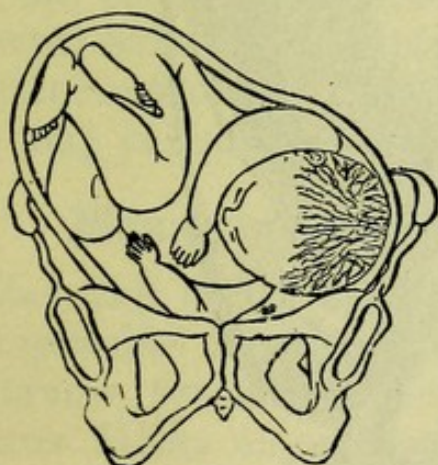
FIG. 42.



Right cephalo-iliac (or dorso-anterior)  
position of *left* shoulder.

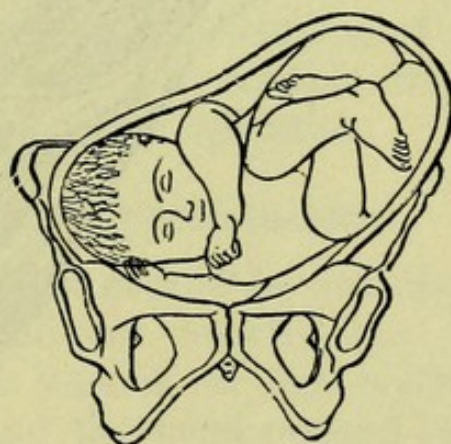
macerated foetus may be forced through the birth-canal without any particular mechanism. Usually the shoulder presents. The positions are two—a dorso-anterior and a dorsoposterior—with the

FIG. 43.



Left cephalo-iliac (or dorsoposterior)  
position of *left* shoulder.

FIG. 44.



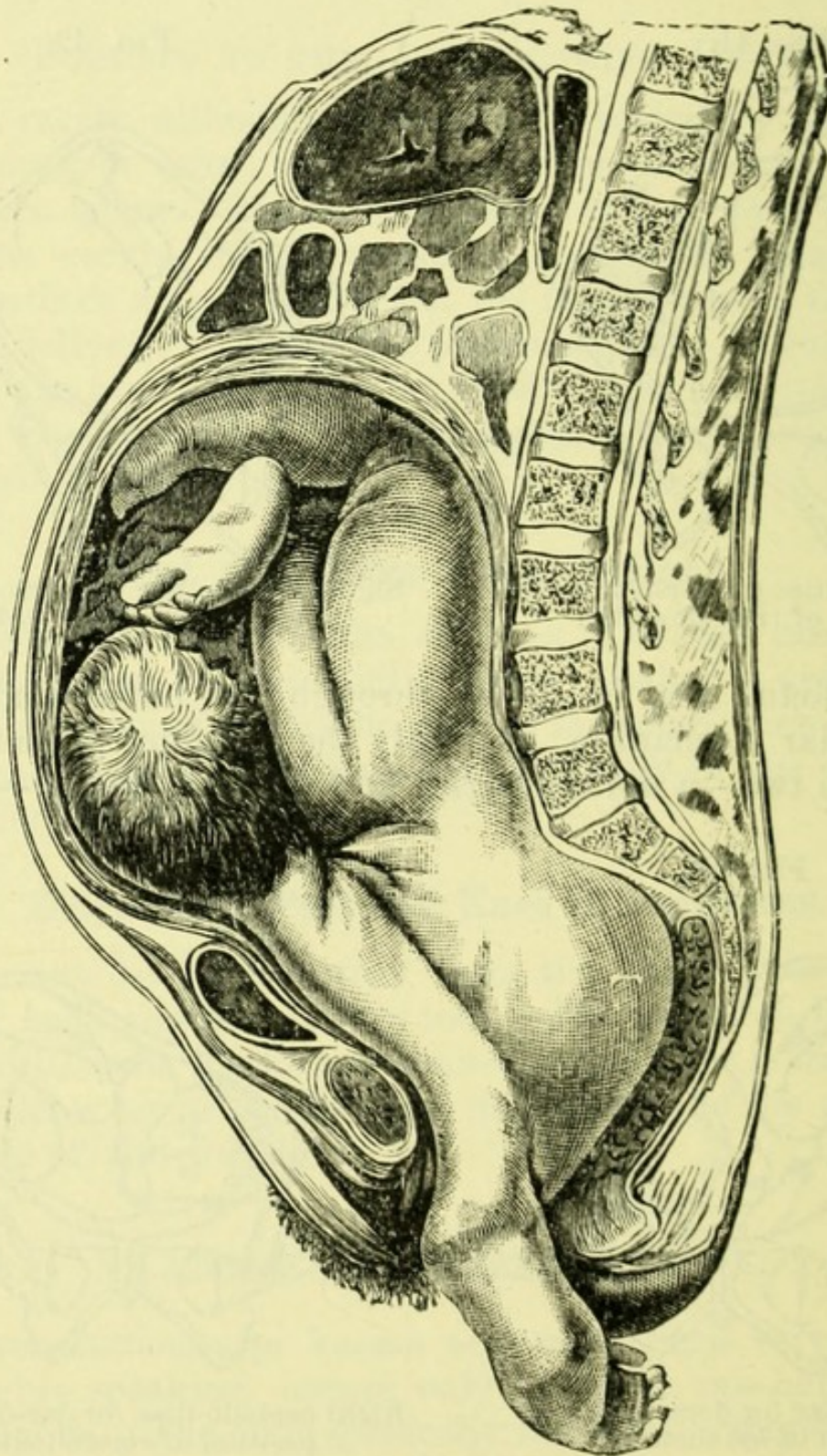
Right cephalo-iliac (or dorsoposterior)  
position of *right* shoulder.

head either to the right or the left. In natural delivery, early in labor the uterine contractions may press the head into the pelvis and displace the shoulder upward, a termination called *spontaneous*



*rectification.* At a later stage *spontaneous version* may take place. In this, as the result of strong uterine contractions and a firm,

FIG. 45.



Spontaneous evolution.

unyielding cervix and insufficient dilatation of the os, a longitudinal presentation is gradually substituted for a transverse. Or



*spontaneous evolution* may take place, the shoulder presenting, an arm escapes, and the chest, abdomen, breech, and legs are forced down past the head, which is delivered last (Fig. 45). In rare instances the foetal body is doubled up, the head and thorax are forced out together, followed by the breech and legs (*evolutio cum conduplicato corpore*).

### Diagnosis of Transverse Presentations.

The shape of the abdomen is considerably altered. By palpation the uterus is found to be distended more laterally than normal, and the foetal body lies in an oblique—rarely transverse—position, with the head in one or the other iliac fossa, while the breech is on the opposite side. The back is either anterior or the small parts are felt to the front. The foetal heart-sounds are heard below the umbilicus. By vaginal examination the small pelvis is found empty and, with the finger in the cervix, the bones of the shoulder, the humerus, clavicle, and spine of the scapula may be felt. The direction in which the axilla opens indicates an opposite position of the head.

### Prognosis.

This depends largely on the time at which the presentation is discovered. If labor is unassisted or the condition is recognized late, the prognosis for both mother and child may be grave. Maternal exhaustion, rupture of the uterus, the dangers of operative intervention, and septic sequelæ are to be feared; while the child may perish from pressure or destructive operation.

### Management of Transverse Presentations.

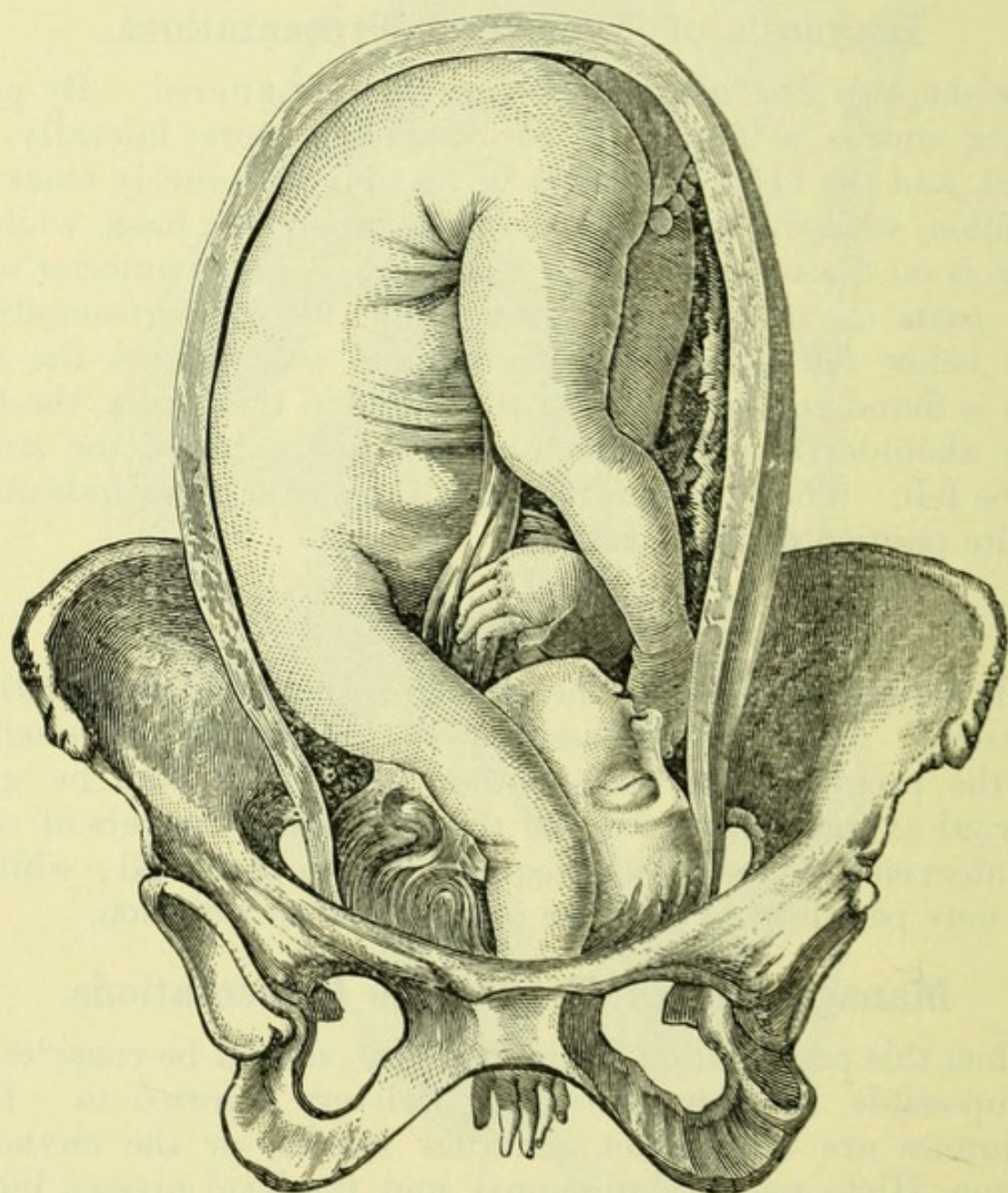
When this presentation is discovered it should be considered as an impossible labor and artificial delivery resorted to. If the membranes are still intact, external version or the method of Braxton Hicks may be attempted, and the head pressed into the pelvic brim. If this cannot be accomplished, as soon as the os is sufficiently dilated or easily dilatable, the patient should be anæsthetized and podalic version performed. If the uterus is firmly contracted about the child, or the presenting part is impacted in the pelvis, decapitation, evisceration or spondylotomy, according to the part most easy of access, must be done.



**PROLAPSED EXTREMITIES.**

The hand or arm, one or both, may prolapse beside, behind or in front of the head in cephalic presentations, and interfere with engagement at the brim (Fig. 46). If discovered before rupture

FIG. 46.



Hand prolapsed by side of head. The prolapsed cord is not represented.

of the membranes has taken place the woman may be placed on the side opposite to the prolapsed part. After rupture of the membranes and dilatation of the os the hand should be pushed up out of the way while the head is made to engage by suprapubic



pressure. If this does not succeed, version may be performed or the forceps applied, great care being taken not to include the hand or arm in the grasp of the instrument. When a foot presents with the head the same line of treatment is carried out.

In breech cases the prolapse of a hand is without significance. A tape may be tied loosely around the wrist to keep the arm straight during delivery. In transverse presentations the descent of a foot facilitates version. With prolapse of a hand the latter may be pushed up or, if this cannot be done, a tape is fastened to the wrist to hold the hand and arm out of the way during expulsion of the thorax.

### QUESTIONS.

- Describe the causes of persistent occipitoposterior positions.
- Describe the mechanism of labor in these cases.
- What is the frequency and cause of face presentations?
- Describe the mechanism of labor in mento-anterior positions.
- Describe the mechanism of labor in mentoposterior positions.
- How are the face presentations diagnosticated?
- Describe the management of labor in face presentations.
- What are brow presentations, and how are they caused?
- How is the diagnosis of brow presentations made?
- Describe the management of brow presentations.
- What do pelvic presentations include?
- What are the positions of the breech?
- How is a breech presentation diagnosticated?
- What is the prognosis for mother and child in these presentations?
- Describe the management of labor in breech presentations, L. S. A. position.
- Give the management of delivery in natural breech cases.
- How is a high arrest of the breech to be treated?
- How is impaction of the breech managed?
- What displacements of the arms may occur in breech presentations?
- How are displaced arms managed during delivery?
- How should the patient be placed for breech delivery?
- What is Deventer's method for delivery of the after-coming head?
- What is the Smellie grasp?
- What is the Prague grasp?
- What is the Mauriceau, or Smellie-Veit method?
- What is the Wiegand-Martin method?
- Describe the application of the forceps to the after-coming head.
- What is the mechanism of labor in foot and knee presentations?
- How are these presentations diagnosticated?
- What is transverse presentation?
- What is spontaneous rectification?
- What is spontaneous version?
- What is spontaneous evolution?
- How are transverse presentations diagnosticated?
- How are transverse presentations managed?
- What is meant by prolapsed extremities?
- How are prolapsed extremities managed?

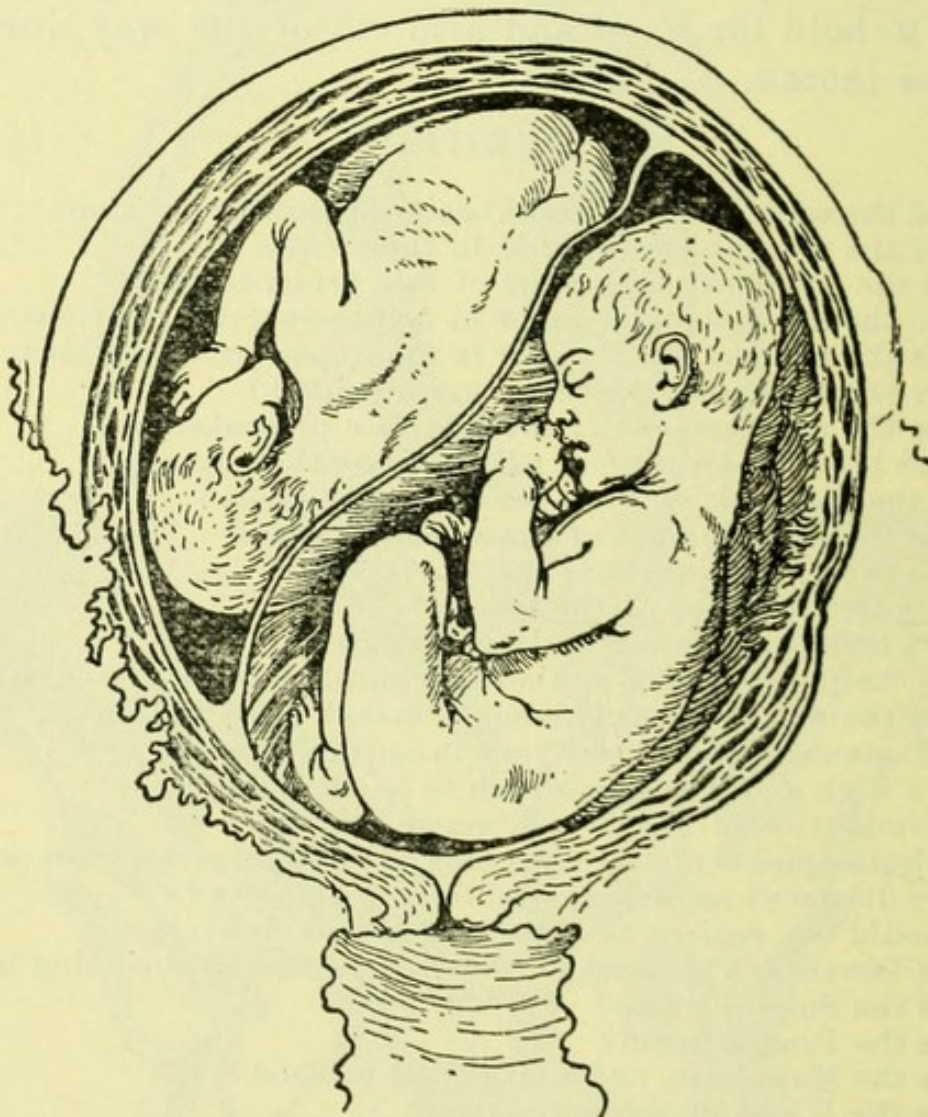


## CHAPTER XIII.

## PLURAL BIRTHS AND MONSTROSITIES.

A LARGE percentage of plural births (two-thirds) are premature on account of overdistention of the uterus, the weight of the two

FIG. 47.



Twins: breech and vertex presenting. (Ahlfeld.)

children, and the readiness in such cases with which labor may be excited. Of plural births twins are most frequent (Fig. 47).

**LABOR IN PLURAL BIRTHS.**

Labor is apt to be slow and protracted because the force of the uterine contractions—often weaker than in single births on account



of the thinning of the uterine walls—is exerted upon the bodies of both children instead of on the individual presenting. Both heads may present, or a head and a breech, or the second child may lie in a transverse position. Anomalies of presentations and complications are more liable to arise with the second child. As a rule, both placentæ are cast off after the birth of the second child, but exceptionally the first child may be followed by its own placenta, and rarely the second placenta is born before the second child. In the majority of cases labor with twins is easy and devoid of especial complications. The birth of the second child usually follows that of the first within an hour (84.6 per cent.—Winckel), but hours or days may elapse before the second child is expelled.

### **Prognosis in Plural Births.**

For the mother this is not as favorable as in single births because of increased liability to albuminuria, eclampsia, exhaustion, inertia uteri, postpartum hemorrhage, the dangers of operative intervention, and septic infection. The foetal mortality is increased by reason of prematurity and malpresentations and positions demanding artificial delivery.

### **Management of Plural Births.**

After the first child is born the cord must be tied in two places, to prevent hemorrhage in case of anastomoses of the vessels of the two cords or placentæ, and severed. Following expulsion of the first, the uterus contracts upon the second child, and there is an interval of rest varying from a few minutes to several hours or longer. During this interval the physician should assure himself as to the presentation and position of the second child. If the position is transverse this should be corrected by cephalic or podalic version. After waiting an hour with no indications of expulsion of the second child, the membranes may be ruptured and delivery effected by forceps or version. Usually the birth of the second child is much more rapid than that of the first because of the already dilated passages. Exhaustion of the mother, convulsions, hemorrhage, feeble foetal heart-beat, or any other condition seriously affecting mother or child should be met promptly by forceps to the head or version and extraction. During the course of twin delivery an attitude of watchfulness should be maintained on the

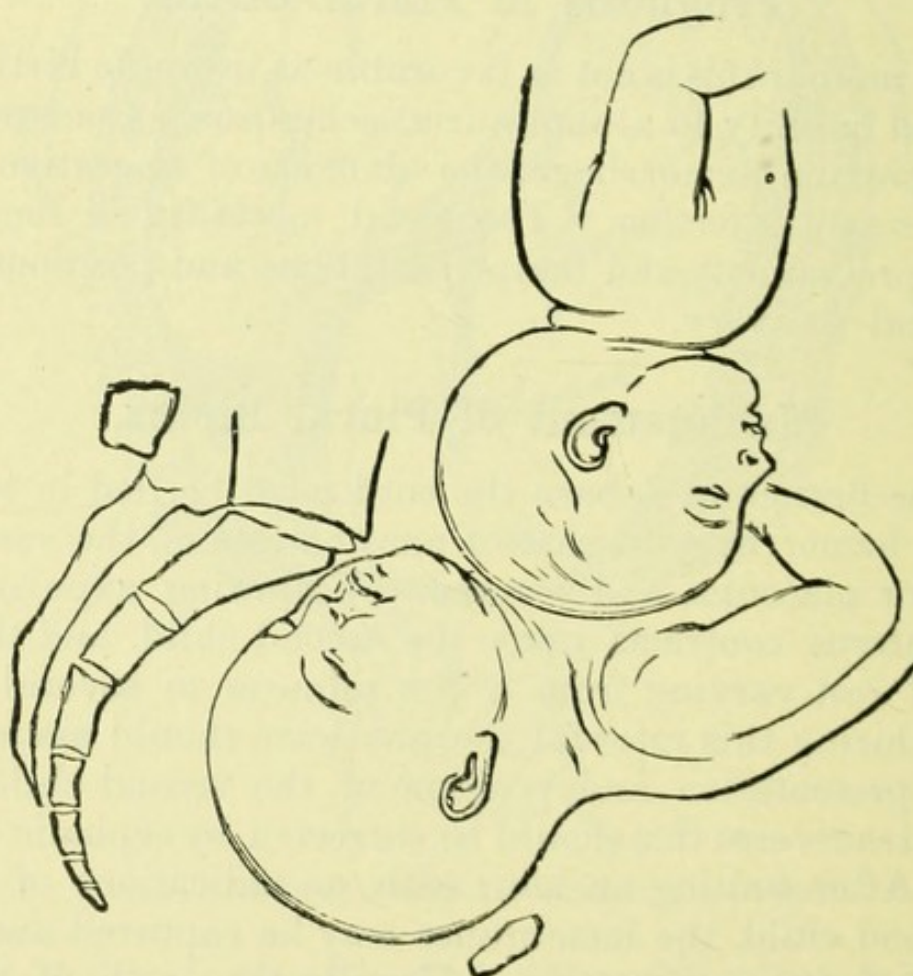


part of the physician. The uterus must be controlled by pressure from above following the birth of the first child until the second child and the placenta have been expelled. Premature separation of the placenta with hemorrhage, either frank or concealed, calls for immediate evacuation of the uterus.

### Complications of Plural Births.

When **two heads present**, the higher must be pushed back above the brim and the forceps applied to the lower head until it has well engaged at the brim, when repetition of the complication is impossible (Fig. 48). If both heads have already entered the

FIG. 48.



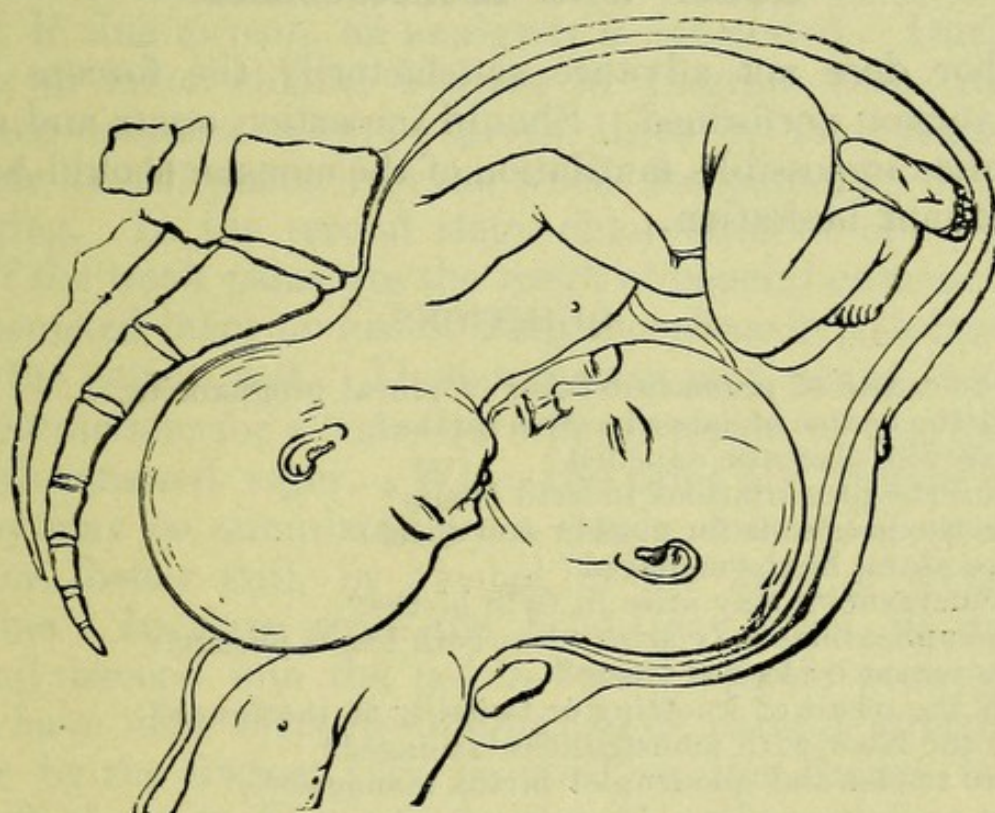
Locked twins, both heads presenting. (King.)

pelvis an attempt should be made to deliver the lower head by forceps. If this cannot be done, and the heads are impacted, as a last resort it may be necessary to decapitate the first child and deliver the other head by forceps. When a **breech and head present**,



the former should be pushed up, if possible, and the forceps then applied to the presenting head; or, if the breech comes first, it may be possible to push up the head or to change the condition by postural treatment—the knee-chest position. In **double-footling** cases the lowest extremities should be pulled down, while those of the upper child are pushed up until the breech of the first has fairly engaged at the pelvic brim. When **locking of the two presenting heads** takes place (**locked twins**) within the pelvis, one head may possibly be pushed up or forceps be applied to the second head

FIG. 49.



Locked twins—one breech, one head. (King.)

and delivery effected. If this fails, the head of the dead child (usually a breech presentation) must be perforated and the other child delivered with forceps (Fig. 49). Before resorting to operative measures in these cases the woman should be placed in the knee-chest position and the effects of gravity in breaking up the impaction tried. When both children are dead, delivery and extraction should be accomplished in the easiest and safest manner to the mother.

**Twisting, Interlacing, and Knotting of the Funes.**—When this occurs one or both children are likely to be dead from interference



with the circulation. If the condition has been diagnosticated in time labor should be terminated by forceps or version as rapidly as possible.

**Triplet and Quadruplet Births.**—These are managed the same as twin deliveries. On account of the smallness of the children labor generally presents little difficulty. The possibility of complications, especially hemorrhage, must always be borne in mind.

## MONSTROSITIES.

### Labor with Monstrosities.

If labor does not advance satisfactorily the forceps may be tried or version performed. Should impaction occur and delivery be otherwise impossible, mutilation of the monster should be undertaken without hesitation.

### QUESTIONS.

State the causes of premature labor in plural pregnancies.

What is the course of labor in twin births?

When are the placentæ expelled?

What are the presentations in twin labors?

What is the prognosis for mother and child?

How are plural births managed?

What emergencies may arise in twin births?

What complications may arise when both heads present?

What is meant by locked twins?

What is the result of knotting or twisting of the funes?

How is the labor with monstrosities managed?

How are triplet and quadruplet births managed?

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## CHAPTER XIV.

### COMPLICATIONS OF LABOR.

WHILE in normal labor there must be no disproportion between the passenger and the passages, and the propulsive force must be equal to the resistance, there are many deviations from this finely adjusted balance which result in too slow, too rapid, or impossible labor. Accidents may also occur due to anomalies of the mother or child, or to disease.



### INERTIA UTERI.

Feeble, inefficient pains may be the result of a great variety of causes. The fault may lie in a lack of general muscular development of the patient; an enfeebled physical state; an undeveloped condition of the uterine musculature; it may arise from faulty innervation of the uterus; an exaggerated susceptibility to suffering; from emotional causes; or from exhaustion, either general or local. Whatever the condition present, it demands the careful attention of the physician. If the inertia is the result of emotion, all disturbing influences, as far as possible, must be removed; if due to pain, an analgesic is demanded. During the first stage of labor chloral hydrate in 15-grain doses, repeated every fifteen minutes, may be given three or four times, or a hypodermic of morphine,  $\frac{1}{4}$  grain, when the pains are inefficient and nagging. In the second stage chloroform or ether is indicated. If the weak pains are the result of general exhaustion due to the protracted labor or loss of sleep, morphine hypodermatically will give the patient rest. These measures may retard or stop the uterine contractions for a time, but after a period of rest the pains return with renewed vigor. When the pains are lagging and far apart they may be stimulated by a single dose of 15 grains of quinine, or, better still, by alcohol in the form of whiskey or sherry wine. In these cases the head may often be made to engage and descend into the pelvis by suprapubic pressure. If the pains have little effect in dilating the os, careful stretching of the latter by the fingers may be tried, or the Barnes bag employed. If the os is dilated to the size of a silver dollar the forceps may be applied and gentle traction made during a pain, the *vis a fronte* giving rise to reflex stimulation of the cervix and hastening the expansion of the os. Inertia is oftenest present in primiparæ and the young.

### PRECIPITATE LABOR.

By this is understood an unusually rapid expulsion of the foetus and its appendages from the uterus and vagina. This generally takes place in the second stage of labor, oftenest in those who have previously borne children, and its percentage of frequency is about 1.2 (Bayer).



Precipitate labor may be due to excessively strong uterine contractions, an abnormally large pelvis, a small or macerated fœtus, relaxed or lacerated pelvic floor, or to the upright, sitting or squatting position. As a rule, more than one factor is responsible.

The dangers to the mother from the rapid extrusion of the child are lacerations of the soft parts, hemorrhage from a prematurely detached placenta, or to an adherent placenta with relaxed uterus, inversion of the uterus, and syncope or shock from the sudden emptying of the uterine contents. The fœtal mortality is nearly twice as great as in normal deliveries (4.9 to 2.5—Winckel), and is due to compression of the brain, pressure on the cord, rupture of the cord, injuries from falls, and asphyxia from dropping into closets and cesspools.

**Treatment.**—This consists in keeping the patient in the recumbent position on the side, especially if previous delivery has been precipitate, and in mitigating the uterine contractions by large doses of chloral hydrate (grs. xv–xx) or morphine (gr.  $\frac{1}{4}$ ) hypodermatically. The head and shoulders of the child must also be prevented from too rapid expulsion, either by holding the parts back with the hand or controlling them with the forceps. Following delivery the sequelæ must be carefully watched for.

### RIGIDITY OF THE BIRTH-CANAL.

This may be due to various conditions, a long narrow cervix, a strong resisting pelvic floor, cicatricial conditions of the cervix and vagina, and fibrous changes in the vagina. Hot water douches given every fifteen minutes or half hour may help to relax the parts, and the administration of chloral hydrate, either by mouth or rectum, or the hypodermatic injection of morphine will often help to overcome the difficulty.

The application of the forceps may be required. A tough, unruptured hymen, cicatricial contraction of the vagina or atresia, from syphilis, injury, etc., or congenital narrowing of the parts may require intervention. If the parts do not dilate before the advancing head, hydrostatic dilators may be tried, or single or multiple incision may become necessary, followed by the application of the forceps. Incised wounds should be sutured immediately after delivery, especially if there is much hemorrhage.



In rare instances where the vagina is absolutely undilatable Cesarean section must be performed.

### MEMBRANES OF ABNORMAL CONSISTENCY.

**Thin Membranes.**—These rupture prematurely, giving rise to dry labor, and are a frequent cause of prolonged delivery. **Thick, tough membranes** may also prevent the head from descending. The treatment of the first condition is by hot water douches and the application of the forceps when indicated. Tough membranes must be ruptured artificially as soon as the os is fully or partially dilated.

### SHORT FUNIS.

A short cord, either abnormally so or one produced by winding around the child's body or neck, may prevent the head from engaging or descending, and often gives rise to malpositions. The forceps should be applied as soon as the os is sufficiently dilated and the condition discovered.

### PROLAPSED FUNIS.

The funis descending along with or in front of the presenting part may be subjected to dangerous pressure between the latter and the pelvic wall, with resulting death of the foetus (Fig. 50).

The **causes** of funic prolapse are those which prevent complete occupation of the lower uterine segment and pelvis by the presenting part. Among these are abnormalities of the pelvis, foot, knee, breech, and transverse presentations, uterine and pelvic tumors, hydramnios, plural pregnancy, multiparity, and a low implantation of the placenta. When the cord prolapses with unruptured membranes the condition is called "*funic presentation*."

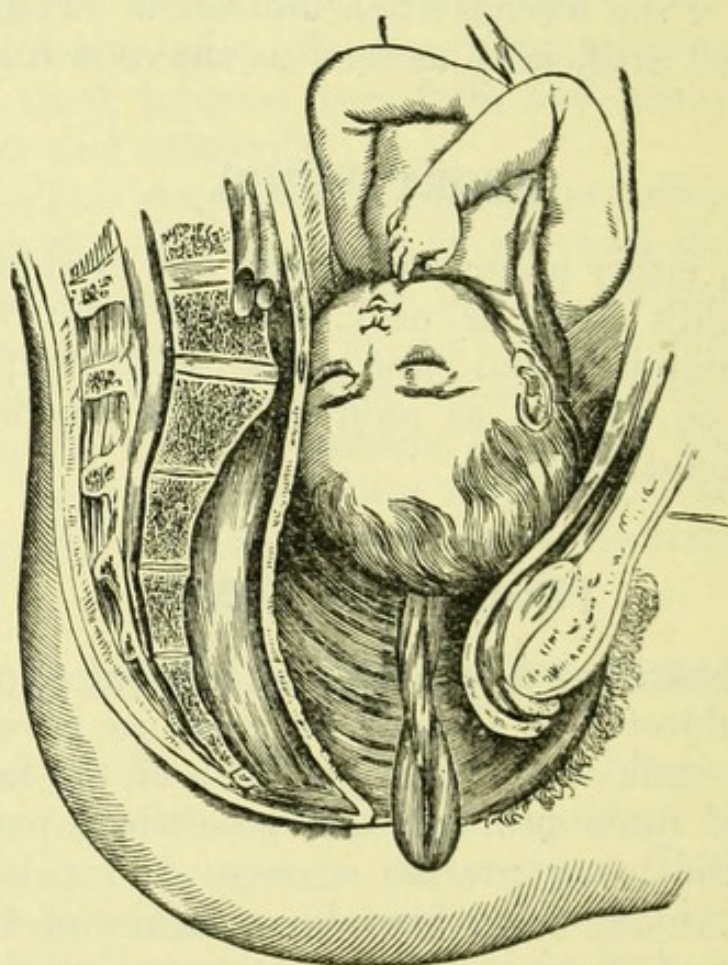
The **frequency** varies with different observers from one in sixty-five to one in five hundred labors. The predisposing moment is the sudden escape of the liquor amnii.

**Diagnosis.**—Before the membranes are ruptured this may be impossible. Sometimes with a very thin lower uterine segment the cord and the pulsations of its artery may be felt through the tis-



sues. The pulsations are not synchronous with the maternal heart-beat. If at this stage the frequency and strength of the foetal heart-sounds are diminished, as determined by auscultation, and no other cause can be found for the condition, prolapse of the funis should be thought of and investigation immediately made. After rupture of the membranes there should be no difficulty in distinguishing the presenting cord.

FIG. 50.



Prolapse of the umbilical cord.

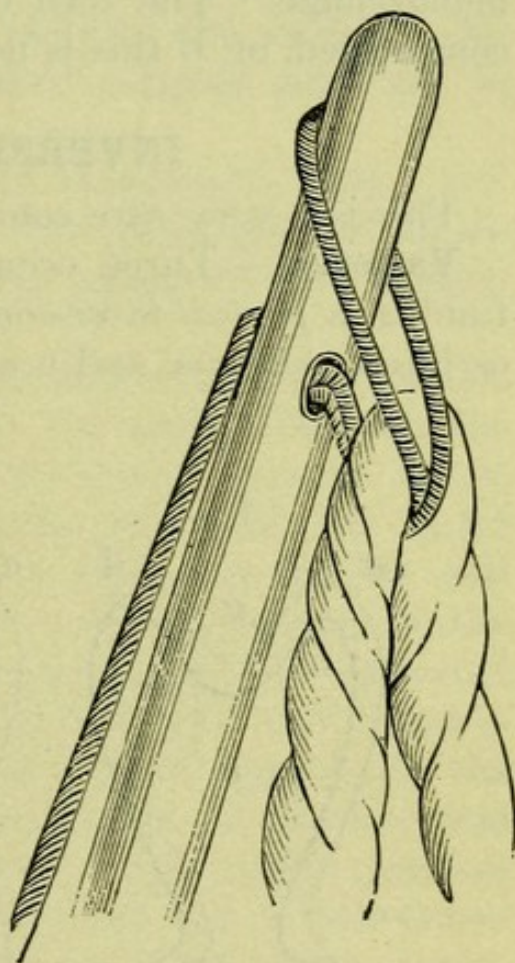
**Prognosis.**—Aside from the dangers inherent in manipulative interference, the prognosis for the mother is unaltered. According to Massman's statistics, in unassisted cephalic presentations the foetal mortality is 66 per cent., in pelvic presentations, 50 per cent.

**Treatment.**—Before rupture of the membranes the patient may be placed in the knee-chest position, or the Trendelenburg position,—over the back of a chair,—when the cord may slip back by gravity. The presenting part must then be crowded down into the



brim by suprapubic pressure until engagement has taken place, and a repetition of the accident prevented. After rupture of the membranes, with the woman in one of the positions named, the cord may be pushed back by the hand in the vagina and the presenting part crowded into the brim, or forceps may be used to engage the head. If this fails, in head presentations, version must be promptly performed, and as soon as the os is dilated the child extracted. For most of these manipulations the patient should be anæsthetized. Occasionally instrumental reposition of the cord is successful. For this a loop of string or tape is tied near the end of a large catheter, and the loop placed around the cord and over the tip of the catheter. The latter is then carried high up into the uterine cavity, the stylet withdrawn, and the catheter left to be expelled with the child (Fig. 51).

FIG. 51.

Braun's reposition of cord.  
(Witkowski.)

### RUPTURE OF THE CORD.

This may occur with delivery in the upright position, in precipitate labors, and from traction on the cord. There is rarely hemorrhage. If the rupture takes place near the umbilicus the vessels must be drawn out and ligated; if this cannot be done pins may be passed under the umbilicus and a ligature twisted around them.

### HEMORRHAGE.

Bleeding during labor, from premature separation of the placenta, and placenta prævia, have been mentioned. *Epistaxis*, *gastric* and *pulmonary* hemorrhage are rare complications of delivery. They should be treated as under other conditions, but may require a rapid termination of the labor,



## HÆMATOMA OF THE VAGINA AND VULVA.

Extravasation of blood usually takes place at the lower portion of the vagina or into the labia majora, and may occasionally be so extensive as to offer an obstacle to delivery.

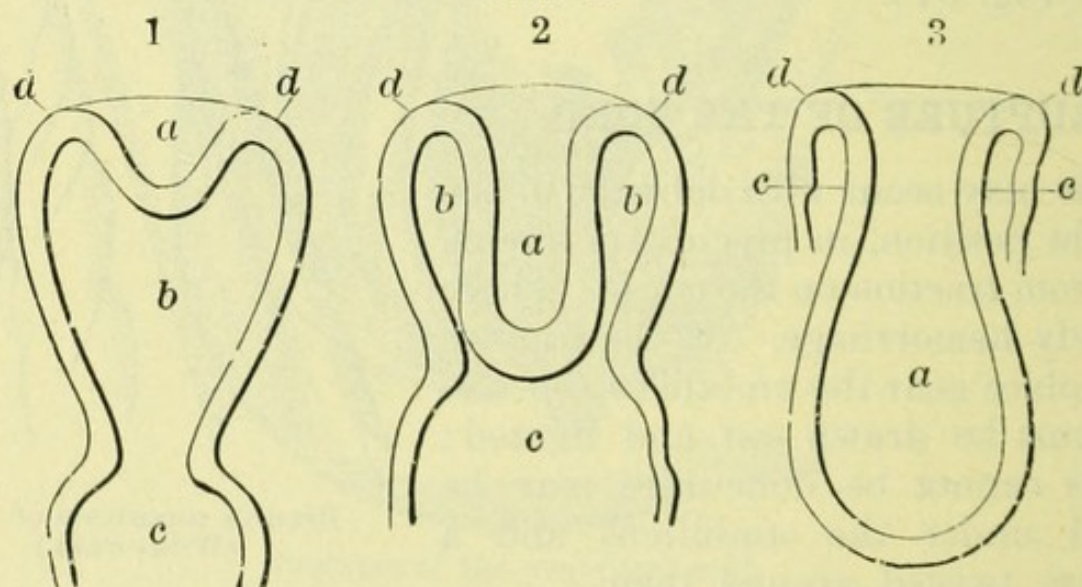
The **treatment** consists in incising the tumor, evacuating the clot, and if hemorrhage is profuse, in packing the cavity with iodoform gauze. Large varices of the vulva may sometimes rupture during the delivery of the child and give rise to alarming hemorrhage. The torn varix should be packed with gauze and compressed, or, if this is not sufficient, the vessels must be ligated.

## INVERSION OF THE UTERUS.

This is a very rare complication of labor.

**Varieties.**—Three occur: a *simple "cupping"* of the uterine fundus, a *partial inversion*, in which the fundus protrudes from the os like a polypus, and a *complete inversion*, in which the organ is

FIG. 52.



Three degrees of inversion: 1, depression; 2, introversion; 3, complete inversion (Crosse): *a*, fundus of uterus; *bb*, cavity of uteri receiving inverted fundus; *c*, vagina; *dd*, mouth of inverted portion.

turned inside out and hangs in the vagina or protrudes from the vulva (Fig. 52). Inversion takes place most frequently at the end of the second stage of labor.

The **causes** are manual pressure over the fundus, as in rough and violent efforts at placental expression, inertia uteri with adherent placenta, and traction on the cord.



The **symptoms** are those of profound shock and hemorrhage, associated with more or less pain and rectal and vesical tenesmus.

**Diagnosis.**—The conditions develop suddenly with the symptoms mentioned. These must be distinguished from those due to hemorrhage and ruptured uterus. *Abdominal examination* reveals the absence of the uterus in the hypogastrium, while *per vaginam* a mass is found filling the cervix or, perhaps, almost presenting at the vulva. A constricting ring of cervix remains above the inverted organ, and the finger or a sound may be passed upward for a short distance between this and the body in the vagina. No uterine cavity can be found. *An extruded polypus must not be confounded with inverted uterus.*

**Prognosis.**—The maternal mortality is exceedingly high. Of 54 cases reported by Winckel 12 died. The fatal issue is the result of shock, hemorrhage, septic infection, gangrene, and inflammation of the uterus.

**Treatment.**—This should be undertaken as soon as the condition is discovered. The hand is inserted into the vagina beneath the inverted organ and pressure made on the lower segment in the direction of the axis of the brim, in order to avoid the sacral promontory. If the wall can be started back the fundus will usually readily follow. It is undesirable to make pressure on the fundus itself, as nothing can be gained by so doing. The internal pressure must be continued for a considerable time and counter-pressure should be made from above on the side opposite to the operator's fingers, thus facilitating the dilatation of the cervical ring. If the inversion has existed for some hours elastic pressure should be tried, combined with taxis. A rubber bag is introduced into the vagina, filled with water and left for eight or ten hours. Taxis is then attempted and repeated at intervals, the rubber bag being replaced between the manipulations.

## PROLAPSE OF THE PARTURIENT UTERUS.

The prolapse of the uterus in these cases is never complete, as the body and fundus remain within the pelvic cavity and abdomen, the lower uterine segment is greatly stretched, and the cervix elongated and hypertrophied. During labor the prolapsed portion is often retracted.

The **treatment** consists in pushing the cervix up between pains,

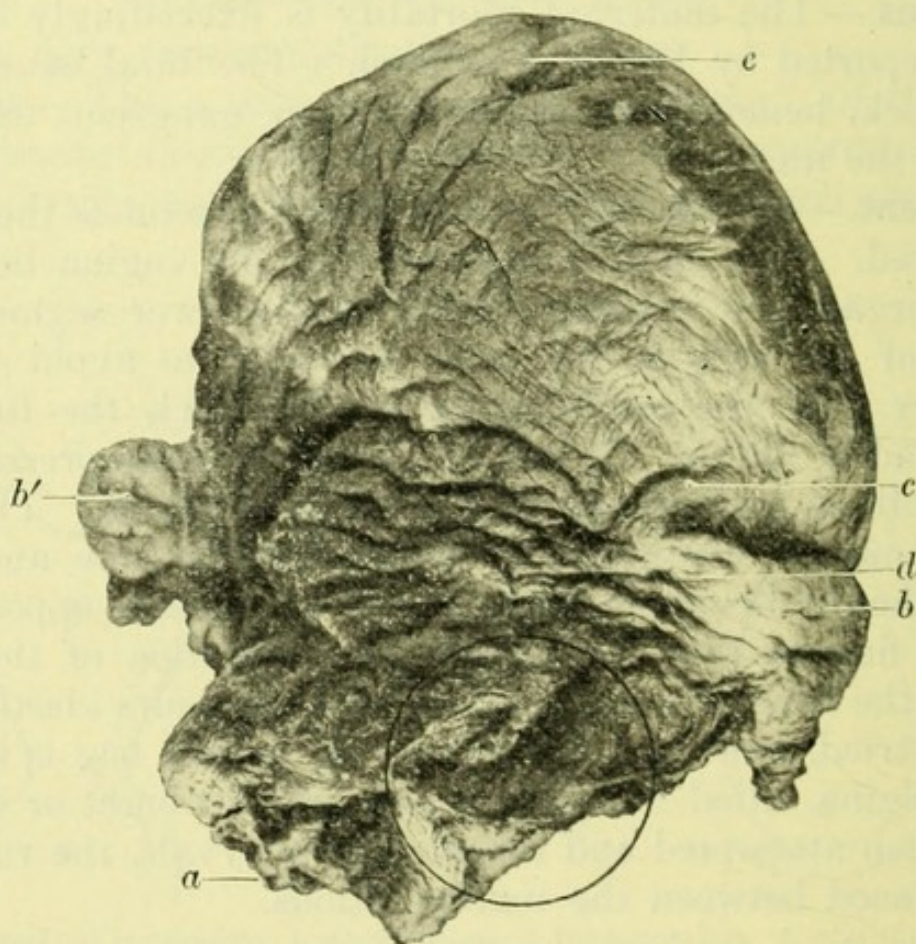


the application of the forceps, and multiple incisions of the cervix if demanded.

### RUPTURE OF THE UTERUS.

This is one of the most formidable and fatal of the complications of labor, and is, fortunately, very rare. The frequency varies in different localities, the extremes given being 1 in 462 labors (Koblanck) to 1 in 6000 labors (Lusk). It occurs with much greater frequency in multiparæ than in primiparæ (about 88 to 12 per cent.), and its predisposing cause is usually obstructed labor. Rupture may take place in any portion of the

FIG. 53.



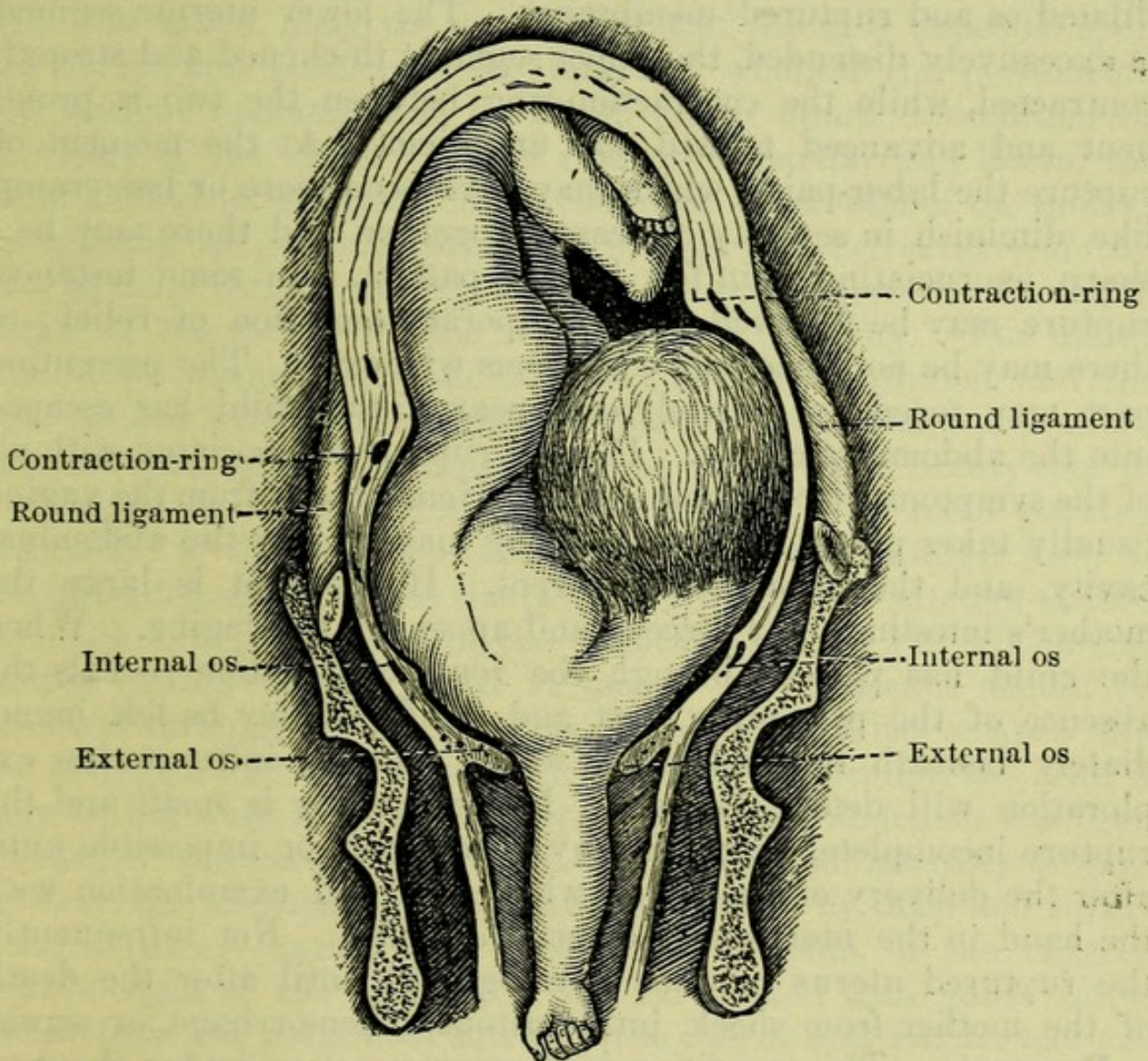
Completely ruptured parturient uterus. The circle is drawn about the laceration, which is situated just above the cervix in posterolateral wall; *a*, by the arrow points to the cervical canal; *b*, *b'*, ovaries; *c*, Fallopian tube; *d*, on the broad ligament; *e*, on the fundus uteri.

uterus, but is most often in the lower segment. The tear may be located anteriorly or posteriorly, but is generally lateral; it may be vertical, transverse or oblique; it may amount to only a small perforation—from pressure against a bony prominence—or it may be sufficiently large to permit the escape of the child into the



abdominal cavity. Rarely the upper portion of the body is separated from the lower. When the rent involves both the muscular layers of the uterus and the peritoneum it is said to be *complete* (Fig. 53); if the peritoneum escapes, it is *incomplete*. In one instance the muscle and peritoneum were torn, but the mucosa remained intact.

FIG. 54.



Shoulder presentation: threatened rupture of the stretched lower segment of the uterus and cervix.

**Causes.**—While rupture may take place during pregnancy from pressure necrosis, fatty degeneration of the wall, or other cause, it usually occurs during a prolonged second stage of labor where the lower uterine segment has become excessively stretched and thinned (Fig. 54). The rupture may occur spontaneously or be the result of violence. Of the latter, injuries, as blows or falls,



the unskilful use of instruments or the hand of the operator during version, may be the immediate agent. Of the former, pelvic deformities, uterine disease—as malignancy—ventral fixation, tumors—as fibroid in the uterine wall—the giving way of the scar of a former Cesarean section, transverse positions of the foetus, and hydrocephalus are the most frequent.

**Diagnosis.**—Rupture, as a rule, occurs in protracted labor, with dilated os and ruptured membranes. The lower uterine segment is excessively distended, the upper segment thickened and strongly contracted, while the contraction-ring between the two is prominent and advanced toward the umbilicus. At the moment of rupture the labor-pains, which may have been more or less cramp-like, diminish in severity or cease altogether, and there may be a sharp, excruciating pain felt by the patient. In some instances rupture may be followed by a temporary sensation of relief; or there may be no immediate symptoms whatever. The presenting part may recede or entirely disappear if the child has escaped into the abdominal cavity. Usually rupture is associated with all of the symptoms of profound shock. Hemorrhage from the vagina usually takes place, but the bleeding may be into the abdominal cavity, and therefore not apparent. If the rent is large the mother's intestines may descend and appear in the vagina. When the child has passed through the rent, examination reveals the absence of the presenting part and the foetus may be felt immediately beneath the abdominal wall. Further intra-uterine exploration will detect the rent. If the opening is small and the rupture incomplete, diagnosis may be difficult or impossible until after the delivery of the child, when a careful examination with the hand in the uterus will detect the defect. Not infrequently the ruptured uterus remains unrecognized until after the death of the mother from shock, intraperitoneal hemorrhage, or sepsis.

**Prognosis.**—This condition is very grave even under the best management, and in unrelieved cases it is usually fatal. Under modern technique and aseptic methods the maternal mortality is between 50 and 60 per cent. This results from sepsis, hemorrhage, and shock. Death may occur at once or be delayed for two or three days. When the child escapes into the peritoneal cavity it undergoes rapid putrefaction with gas formation, and septic peritonitis quickly supervenes. The foetal death-rate from asphyxia is over 90 per cent.



**Treatment.**—With strong uterine pains, extreme distention of the lower uterine segment, and the contraction-ring high and prominent, the possibility of uterine rupture should be anticipated and the child delivered in the quickest and safest manner for the mother. Version, the forceps, or craniotomy may be elected, according to the ease and safety with which either can be accomplished. The placenta should be removed at once. When rupture has taken place the management of the case depends upon the nature and position of the rent and whether the peritoneum has become contaminated by blood, liquor amnii, meconium, or the body of the child. If the rupture is partial and lateral the child should be delivered under complete anæsthesia of the mother as quickly as possible, either by version and extraction—if this can be done without adding to the existing injury—by the application of the forceps to the head, or by craniotomy. The uterus should be washed out with a mildly antiseptic solution and the rent packed with iodoform gauze to prevent hemorrhage and afford suitable drainage. The gauze may be removed in twenty-four to forty-eight hours, the uterus again douched, and fresh packing inserted. If the rent is at the fundus or in the anterior wall, or the child has escaped into the peritoneal cavity, no attempt should be made to deliver through the natural channel, but abdominal section should be performed at once. The placenta should be removed through the vagina if possible, but if it has escaped into the abdomen and cannot be readily extracted through the rent, it may be left until after cœliotomy. When the abdomen has been opened, if the rent is not large and is situated laterally or posteriorly, an attempt may be made to close it by deep and superficial sutures,—hardly ever possible on account of the ragged, friable edges of the wound; it may be packed with gauze introduced from the peritoneal side into the uterus and vagina and cut off flush with the uterine surface; a supravaginal amputation of the uterus below the seat of the injury may be made; or a pan-hysterectomy performed. After the removal of the organ the peritoneum should be carefully cleansed with gauze or sea-sponges of all blood and contaminating material, and the abdominal wound closed in the usual manner. When the hemorrhage into the peritoneum is large or septic infection is present, abdominal section is always indicated. Preceding or during the active treatment, saline



transfusion under the breasts should be made, and hypodermatics of cardiac tonics and alcoholic stimulants given.

### LACERATIONS OF THE CERVIX.

Some laceration of the cervix takes place in every labor, but serious lesions requiring immediate attention are the exception. Lacerations are usually bilateral, but may be unilateral or multiple, and may occur anteriorly or posteriorly. The usual causes are rigidity of the tissues, precipitate labor, the rapid forcible extraction of the head with forceps, or extraction following podalic version. In the majority of cases in an aseptically conducted labor and an undisturbed after-state of the parts, such lacerations heal satisfactorily of themselves, but occasionally the tear extends far up into the vaginal vault and through the circular artery of the cervix. The hemorrhage resulting may be so great as to endanger the patient's life. In rare instances the vaginal portion of the cervix is completely torn from the uterus.

**Treatment.**—If the proper instruments are at hand, the patient should be placed across the bed with the hips well to the edge, and the legs flexed and supported. A bullet forceps, or tenaculum, is then fastened into each lip of the ruptured cervix and the parts pulled down into view. A full-curve needle threaded with catgut or silkworm-gut is passed through the tissues of one lip at the highest angle of the wound, carried around the bleeding point, and brought out at a corresponding point in the other lip. The suture is then tied. Other interrupted sutures may be placed lower down in the cervix, if necessary, but in general the less the manipulation of the parts the better. An antiseptic douche should follow the introduction of the sutures, and a suppository of iodoform, or boric acid and aristol, should be passed into the vagina night and morning for a week. The immediate repair of a lacerated cervix, except for the control of hemorrhage, is undesirable. In the absence of instruments, with bleeding from the torn cervix, the lateral fornix may be tamponed with iodoform gauze, or any aseptic material saturated with vinegar.

### LACERATIONS OF THE VAGINA.

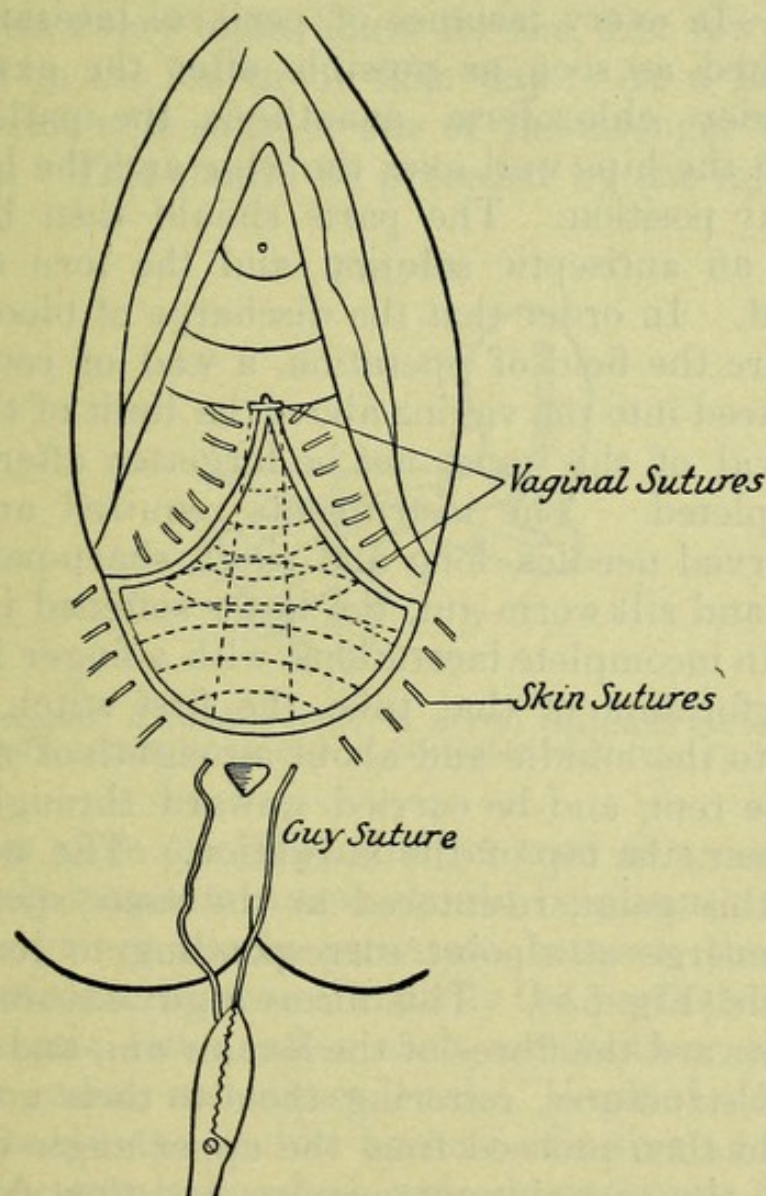
These are rarely of sufficient extent to require treatment. If serious they may be packed with gauze or sutured.



## LACERATIONS OF THE PERINEUM.

These are the most common accidents of labor, are generally due to mismanagement, but may occur under the most skilful treatment. The causes are abnormally strong pains with voluntary straining, narrowness and rigidity of the introitus, an unusually wide perineum, diseases of the vagina and vulva, deformities of

FIG. 55.



Laceration of the perineum (incomplete).

the pelvis, malpositions of the presenting part, and instrumental and manual delivery. Three degrees of laceration are described: those of the *first degree*, which extend not farther than the middle of the obstetric perineum; those of the *second degree*, which reach



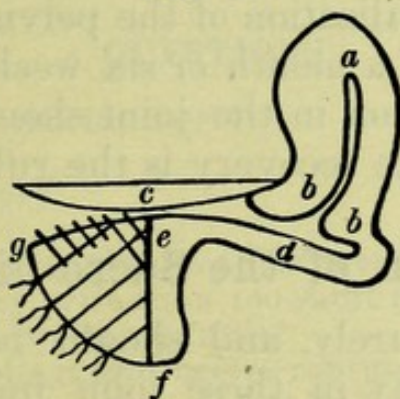
to the sphincter ani muscle ; and those of the *third degree*, or complete lacerations, which lay open the bowel. A rare form is central laceration, in which the median portion of the perineum gives way, leaving bridges of tissue below and above, between which the child may be expelled. The position of the perineal tear may be central or lateral, and include the skin alone or extend upward into the vagina. Lateral tears into one or both of the vaginal sulci are the most serious, as they involve the fibres of the levator ani muscle, the most essential portion of the pelvic floor.

**Treatment.**—In every instance of perineal laceration the parts should be united as soon as possible after the extrusion of the placenta. Under chloroform anæsthesia the patient is placed across-bed with the hips well over the edge and the legs supported in the lithotomy position. The parts should then be thoroughly douched with an antiseptic solution, and the torn surfaces completely exposed. In order that the discharge of blood from above may not obscure the field of operation, a wad of cotton or gauze may be introduced into the vagina above the limit of the laceration, but the removal of this must not be forgotten after the suturing has been completed. The instruments required are: a needle-holder, two curved needles, long and short, sharp-pointed scissors, sterile catgut, and silkworm-gut, the latter softened in hot antiseptic solution. In incomplete lacerations, with a finger in the rectum to prevent perforation of that tube, the first stitch should enter just posterior to the middle and about an eighth of an inch to the skin side of the rent, and be carried upward through the vaginal tissues to, or near, the top of the laceration. The needle is then withdrawn at this point, re-entered at the same spot, and passed downward to emerge at a point corresponding to its entrance on the opposite side (Fig. 55). This forms a guy-suture, which when tied pulls downward the fibres of the levator ani, and upward those of the perineal structures, restoring them to their normal contact. Suturing should then proceed from the upper angle of the vaginal wound down to the posterior commissure, and then from below upward through the skin to the same point. The vaginal sutures should be of catgut, those in the skin silkworm gut. The vaginal sutures should be tied first, then the skin, and last of all the guy-suture. The wound is then to be dusted with some antiseptic powder, as equal parts of aristol and boric acid, camphophenique, or borochloretoe, and the dressings applied (Figs. 55 and 56).



In complete lacerations the rent in the rectum is first closed from above downward by interrupted catgut sutures introduced and tied from within the bowel. When the sphincter is reached great care must be taken to bring the torn ends of the muscle into apposition and to secure them in this position. If retracted, they must be pulled out with a tenaculum or forceps. The remainder of the operation for closing the laceration is the same as that for incomplete ruptures. In the after-treatment the knees should be loosely tied, the parts dusted twice a day with an antiseptic powder, the urine drawn every eight hours for the first few days, and the bowels moved on the fourth or fifth day. As a laxative, citrate of magnesia, Rochelle salts, or one of the stronger mineral waters may be given. This should be preceded by the injection into the

FIG. 56.



Perineal body restored: *a*, fundus uteri; *b*, portio vaginalis cervicis uteri; *c* and *d* respectively, parietes anterior et posterior vaginæ; *e f g*, perineum.

bowel of warm olive oil (ʒiij), and as soon as a movement is imminent a simple soapsuds enema should be given. Care must be taken lest the syringe nozzle penetrate between the stitches. As soon as the patient urinates voluntarily the parts should be sprayed with an antiseptic lotion after each micturition, carefully dried with cotton or gauze, and repowdered. Vaginal douches are undesirable. Should the lochia become offensive and a rise in the patient's temperature take place, a single antiseptic douche may be given and repeated as required. The patient should remain in bed for at least two weeks; the silkworm sutures may be removed on the eighth or tenth day. Spasm and irritation of the sphincter ani is apt to follow these operations. It can be avoided by dilating the muscle prior to operation, when the tear is not complete.



### DAMAGE TO THE PELVIC JOINTS AND BONES.

Separation of the symphysis pubis is usually due to disease of the joint itself or to the forcible extraction of the head with forceps. The patient may experience a sharp pain and a feeling of something giving way as the parts separate, and occasionally a snapping sound is heard. There may be, however, no intimation of the accident until later in convalescence, when the mobility of the joint is discovered by the patient in attempting to turn in bed. Suppuration of the joint not infrequently follows the separation.

The **diagnosis** can be made by holding the joint between the finger and thumb while the patient draws first one leg and then the other up and down. Sometimes two fingers can be placed between the ends of the separated bones.

**Treatment.**—Immobilization of the pelvis by a wide, firm bandage and rest in bed for a month or six weeks is ordinarily all that is required. Suppuration in the joint should be promptly incised and drained. Complete recovery is the rule.

### Separation of the Sacro-iliac Joints.

This occurs more rarely, and should be treated in the same manner. The mortality in these joint injuries has been 30 per cent. (Hirst).

### Fracture of the Coccyx.

This is not an uncommon accident of labor, especially in women after the age of thirty-five, when the bones may have become ankylosed. Usually no treatment is required.

### TUMORS OF THE PELVIS, UTERUS, OVARY, VAGINA, AND RECTUM.

Solid or cystic tumors of large size and so situated as to give rise to dystocia should be removed by coeliotomy before the advent of labor. *During labor*, cysts may be punctured and the fluid drawn off, but as leakage, followed by septic peritonitis, is liable to occur, preparations must be made for coeliotomy should untoward symptoms develop. Pedunculated subserous growths may sometimes be pushed up above the presenting part and the child ex-



tracted with forceps; pedunculated submucous growths projecting into the vagina should be removed. Hemorrhage may be checked by packing with gauze or by sutures. Whenever much pressure on a tumor has taken place inflammation and gangrene are liable to supervene. In the presence of large solid growths, as fibroids of the uterine wall, Cesarean section with removal of the entire uterus may be required.

Various other conditions, such as hernias, floating kidney, and foetal malformations, may give rise to difficult or impossible labor.

### SUDDEN DEATH.

This occurring during labor, or immediately following, may be due to shock, heart failure, hemorrhage, syncope, embolism and thrombosis of the pulmonary arteries, and rupture of the cord.

### QUESTIONS.

What are the causes of inertia uteri?

What is the treatment?

What is precipitate labor?

How is it managed?

To what complications may thin or thick membranes give rise?

What complications may arise from too short a cord?

What are the causes of prolapsed funis?

How is this condition diagnosed before rupture of the membranes?

What is the prognosis for mother and child?

What is the treatment of prolapsed funis?

To what is rupture of the umbilical cord due?

What hemorrhages during labor may give rise to complications?

What is hæmatoma, and where does it take place?

What is the treatment of this condition?

What is inversion of the uterus, and how many varieties are there?

What is the cause of this accident?

How is the diagnosis made?

What is the prognosis for the mother?

What is the treatment?

Describe prolapse of the parturient womb?

What are the causes of rupture of the uterus?

Where is the tear most likely to occur?

What is the classification of ruptured uterus?

What are the symptoms, and how is the diagnosis made?

What is the prognosis for mother and child?

What is the treatment of ruptured uterus, (a) maternal, (b) foetal?

How is the placenta to be managed?

What are the causes of laceration of the cervix?

What serious condition may occur as the result of deep rupture of the cervix?

How are deep lacerations to be treated?



How are lacerations of the vagina treated?

To what conditions is laceration of the perineum due?

What are the varieties of perineal laceration?

What is the treatment of incomplete perineal laceration?

Describe the steps in the operation for complete perineal laceration.

Mention the causes and symptoms of rupture of the pelvic joints.

How is this accident treated?

What tumors may complicate labor, and what is to be done in the presence of these new growths?

## CHAPTER XV.

### DEFORMITIES OF THE PELVIS.

**Significance.**—Some familiarity with the abnormal as compared with the normal pelvis is of paramount importance for the physician in order that he may understand the difficulties or impossibilities of labor, the dangers to be anticipated for mother or child in the presence of abnormalities, and the time when and the manner in which assistance should be rendered. Whenever the pelvis varies from the normal type to such a degree as to render labor difficult or dangerous it is said to be deformed, but anomalies may exist and be overlooked because, under certain conditions, labor is not obstructed to any serious degree. When a malformation is marked it may produce deviations of the uterus during pregnancy as well as malpresentations and malpositions of the child.

The **causes** of pelvic deformities in general are lack or arrest of development, diseases of the bony structures, and, secondarily, fractures and dislocations.

**Frequency.**—Statistics differ widely as to the frequency of pelvic deformities. In this country contracted pelvises exist in about 7 per cent., or about once in every fourteenth case, in white women, and in 19.83 per cent.; or once in every fifth case, in black women (Williams).

**Varieties.**—The most frequent forms of deformed pelvises are: (1) The *generally contracted pelvis*; (2) the *flat pelvis*; (3) the *fœtal, undeveloped, or funnel-shaped pelvis*; (4) *Deformities due to diseases of the spinal vertebræ*. Some idea as to the cause and nature of the abnormal pelvis may be obtained from the history of the patient,—a feeble, sickly childhood may indicate an undeveloped or flattened pelvis; if the patient has had *rickets*, one of



the numerous forms of abnormal pelvis resulting from this bone-disease may be present; if she has previously borne a child without difficulty, *osteomalacia* may have developed since; or there may be a history of *tuberculosis*, *hip-disease*, or *injury*, all of which should assist the physician in his further examination. The only positive proof of pelvic deformity, however, is obtained by direct palpation and measurement of the pelvis itself. The general directions for pelvimetry have been given.

### GENERALLY CONTRACTED OR JUSTOMINOR PELVIS.

A common variety oftenest seen in small or short women, and due to arrest of development. The shape of the pelvis is normal, but it is smaller, and all of the measurements are lessened.

**Varieties.**—There are *three*: *juvenile*, bones small and light; *masculine*, bones thick and heavy; *dwarf*, bones small and retain their infantile cartilaginous union (rare). In labor the head is strongly flexed; labor is retarded, but if the child is small may progress with the regular mechanism.

**Treatment.**—When the brim-conjugate is not less than  $3\frac{1}{4}$  inches, the forceps may be applied—axis-traction best—in Walcher's position. With a diameter of 3 to  $3\frac{1}{4}$  inches, symphysiotomy, especially in young subjects, followed by the forceps. If the anteroposterior is less than 3 inches, Cesarean section is indicated. Version should not be attempted on account of possible extension of the head and displacement of the arms. The child suffers from long-continued pressure on the head, and the maternal soft parts are liable to serious injury from pressure and laceration. Rupture of the pelvic joints may occur.

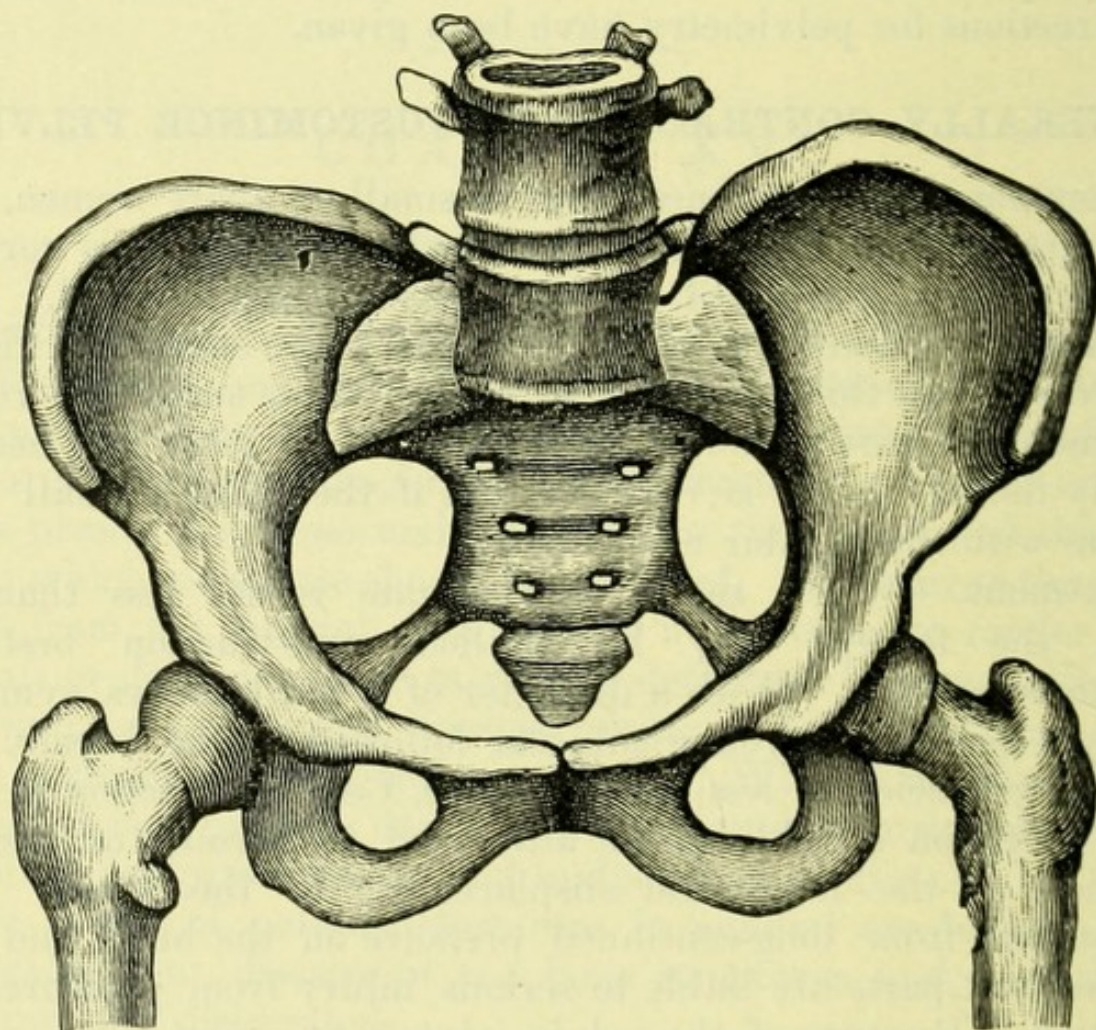
### SIMPLE FLAT PELVIS.

*Flat is the most common form of contracted pelvis.* The sacrum is small and displaced downward and forward between the two ilia, but without forward rotation. Conjugate diminished throughout the pelvic cavity, rarely below three inches. A double promontory may be present resulting from non-bony union between first and second sacral vertebræ. *In measuring, the promontory nearest the symphysis is to be taken.* The transverse diameter may be normal, a little longer or a trifle less. The causes are ascribed to hard work in childhood, arrested rickets, heredity,



and early walking or standing on feet. Dilatation of the os is slow and labor is retarded, but in three-fourths of cases the pains are sufficient to overcome the resistance of the pelvic brim (Litzmann). Failure of the head to enter the brim may give rise to a sagging forward of the abdomen, especially in multiparæ (Fig. 57.)

FIG. 57.



Simple flat pelvis. (After Kleinwächter.)

Malpositions of the fœtus are not infrequent, and prolapse of the funis and extremities may take place. The membranes are likely to rupture early.

**Treatment.**—If the conjugate is over  $3\frac{1}{4}$  inches the forceps may be applied.

#### GENERALLY CONTRACTED FLAT PELVIS.

Both the conjugate and transverse are diminished, but the conjugate is proportionally shorter. Three-fourths of an inch should

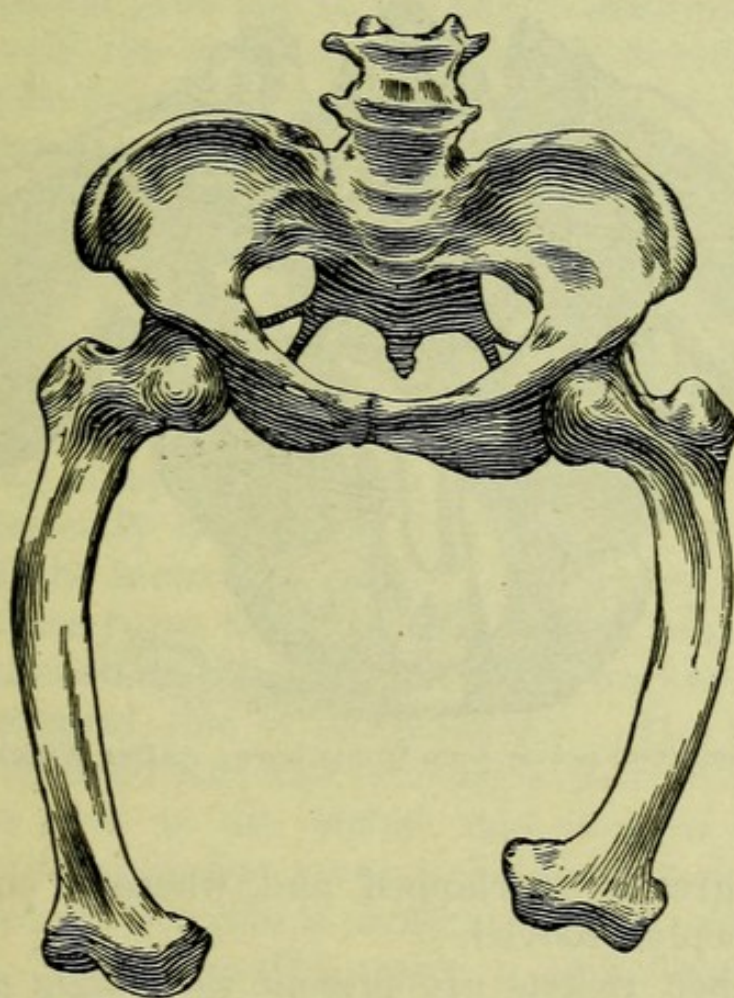


be subtracted from the diagonal conjugate on account of the increased angle between promontory and symphysis. A depression of those bones of the child's head which come in contact with the sacral promontory takes place.

### FLAT RACHITIC PELVIS.

Pelvis generally smaller than normal, shallow, contracted at brim, widened at outlet. Bones may be small, light and brittle, or thick and compact. The crests of ilia are straightened, the

FIG. 58.



Flat rachitic pelvis. (Mutter Museum, College of Physicians, Philadelphia.)

fossæ flattened, and the spinous processes thrust outward so that that distance between may equal the intercrystal. The sacrum is flattened or convex, widened, and the promontory projects toward the symphysis. The symphysis is deeper and approaches nearer the promontory. The pubic arch is wide. The pelvic brim is

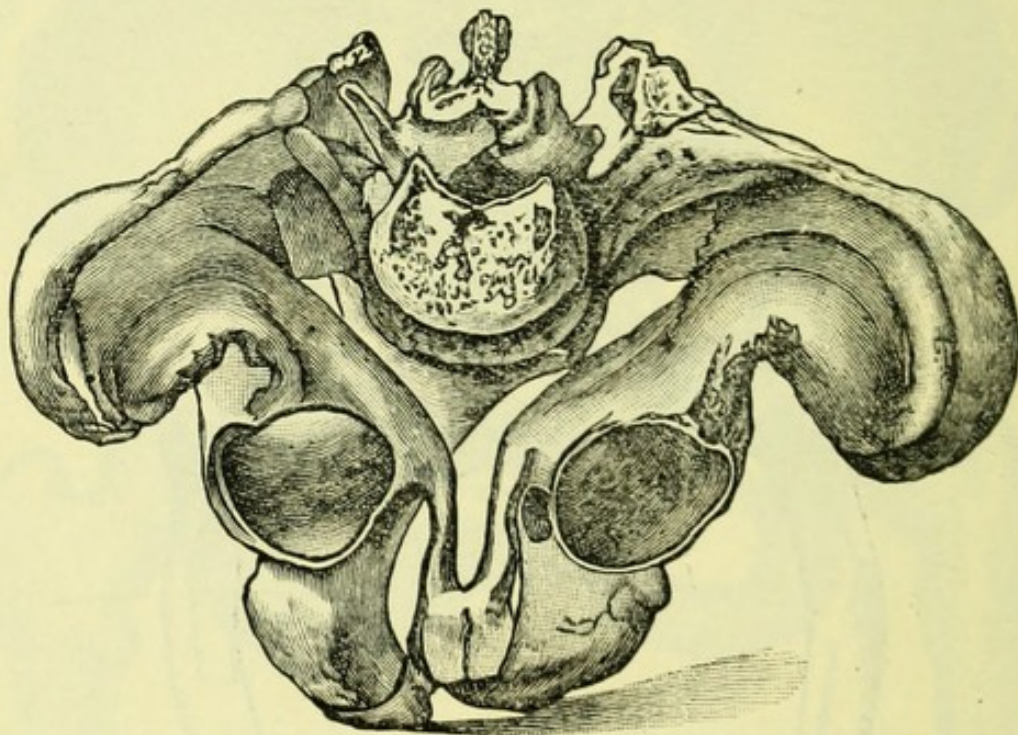


kidney-shaped instead of cordate, the conjugata vera is shortened, the transverse increased, and the cavity is wider than normal.

**Varieties.**—The *generally contracted, flat rachitic pelvis* from undeveloped bones, (Fig. 58); *figure-of-eight pelvis*, when symphysis is drawn inward; *rachitic infantile*; *rachitic pseudomalacosteon*, from forcing inward of the acetabula.

The **diagnosis** is made from the history of case, general appearance of the patient, other signs of rickets, and pelvic measurements. The child may be dead from long-continued pressure, the

FIG. 59.



Malacosteon pelvis, seen from above. (After Winckel.)

cranial bones greatly overlapped, and, where in contact with the promontory, deeply grooved.

**Causes.**—When rickets are present the weight of the body in the sitting posture forces the promontory downward; early walking forces the acetabula inward, and muscular and ligamentous traction assist in producing the deformity.

**Treatment.**—If it is possible for the head to enter the pelvis, axis-traction forceps in Walcher's position; when contraction is too great, symphysiotomy and forceps. In other cases, embryulcia or Cesarean section. Premature labor is advocated.



**MALACOSTEON PELVIS.**

The whole pelvis is greatly distorted. The iliac wings are bent or compressed together; the pubic bones approximate, giving rise to a "beak-shape" of the anterior part of the brim. The ischial tuberosities are close together and may be bent; the lower portion of the sacrum and coccyx curve upward into the pelvic canal like a hook, thus producing a strong contraction of the outlet (Fig. 59).

**Etiology.**—Osteomalacia is rare in this country, usually develops during pregnancy or lactation, and is characterized by a general softening of the pelvic bones from loss of earthy constituents. The weight of the trunk above and the opposing pressure of the femurs below the acetabula give rise to the pelvic deformity.

**Treatment.**—If the bones are sufficiently flexible the head of the child may be forced through and born. Otherwise Cesarean section is indicated, with hysterectomy and removal of the ovaries. The latter may modify or cure the disease.

**OBLIQUELY CONTRACTED OR NAEGELE PELVIS.**

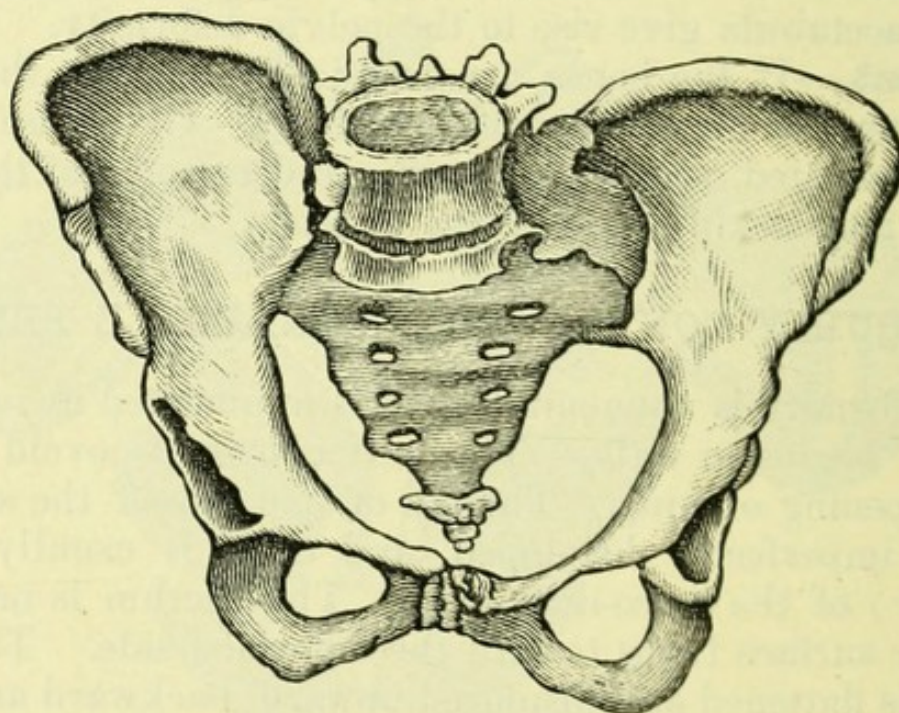
This deformity is congenital, and is augmented as soon as the individual begins to walk. The pelvic brim is ovoid in shape, with the opening oblique. The ala of one side of the sacrum are absent or imperfectly developed, and there is usually ankylosis (secondary) of the sacro-iliac joint. The sacrum is narrow, and its anterior surface turns toward the deformed side. The innominate bone is flattened and displaced upward, backward and inward, and the ileopectineal line is straightened. The tuber ischii is higher on the diseased side and inclines farther inward, while the ischial spine is close to the sacrum and projects into the pelvic canal. The symphysis lies more to the healthy side, so that the oblique diameter of this side is shortened, while that of the other is lengthened. The subpubic angle is asymmetric, irregularly contracted, and faces the diseased side. The opposite side of the pelvis is practically normal.

**Diagnosis.**—This is often difficult. The rachitic pelvis and deformities from bone-disease must be excluded. One iliac crest is higher than the other. Palpation shows the ileopectineal line of the diseased side straightened with the whole wall of this side approaching more to the median line. The distance between the



spinous process of the last lumbar vertebra and the posterior superior spine of the ilium is generally greatly diminished. *Naegele gives the following measurements:* (1) From the tuber ischii of one side to the posterior superior spinous process of the ilium on the other side; (2) from the anterior superior spinous process of one side to the posterior superior spinous process of the other; (3) from the spinous process of the last lumbar vertebra to the anterior superior spinous processes of the ilium on both sides; (4) from one trochanter major to the opposite posterior superior iliac spine; (5) from the under surfaces of the symphysis to the posterior supe-

FIG. 60.



Obliquely contracted pelvis. (After Hecker.)

rior iliac spinous process. In the normal pelvis these measurements are equal; in the deformed pelvis all but the last measurement are shorter on the affected side (Fig. 60).

The **prognosis** in cephalic presentations is always unfavorable; in other presentations it is distinctly bad for both mother and child. With a moderate grade of deformity labor may not be retarded. The head enters extremely flexed, with its long diameter in the longest oblique of the pelvis. Rotation is likely to be imperfect.

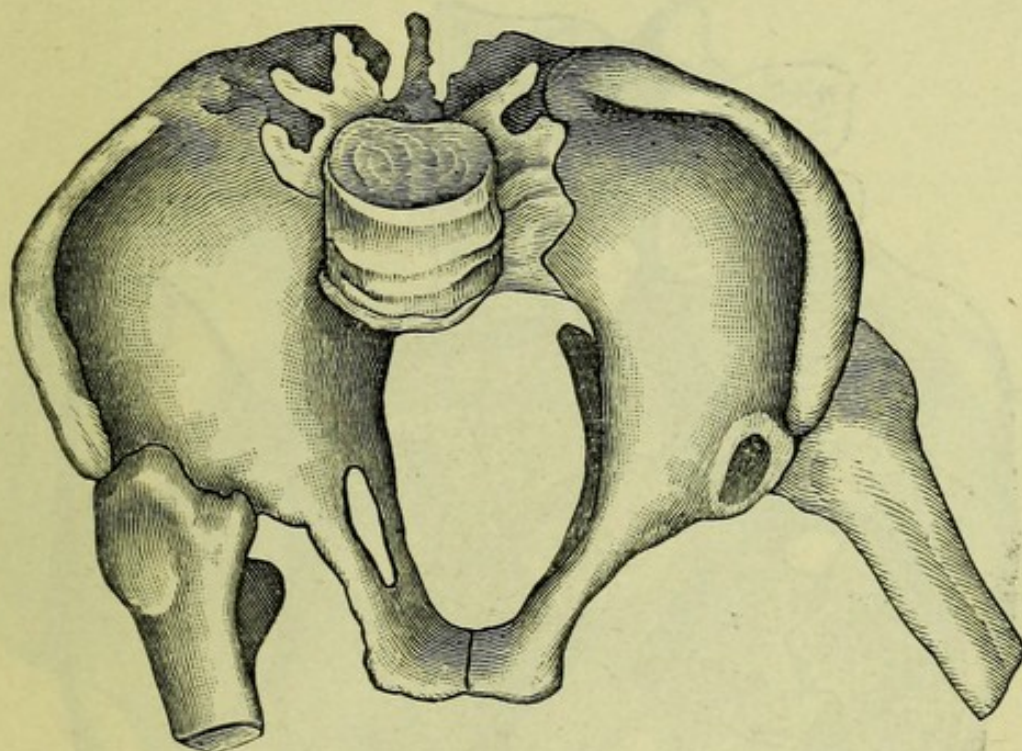
**Treatment.**—The induction of premature labor, craniotomy, or Cesarean section, according to the degree of contraction. Version, the forceps, and symphysiotomy are contraindicated.



**TRANSVERSELY CONTRACTED OR ROBERT PELVIS.**

This is a double obliquely contracted pelvis, the conditions existing on one side in a Naegele pelvis being here found on both. The sacrum is narrow and straightened, and the innominate bones are brought close together. The sacro-iliac joints are generally ankylosed (secondarily). The etiological factors are the same as in the Naegele. Labor is impossible.

FIG. 61.



Transversely contracted pelvis. (After E. Martin.)

**Treatment.**—If the condition is recognized early enough abortion may be induced, otherwise Cesarean section.

**SPONDYLOLISTHETIC PELVIS.**

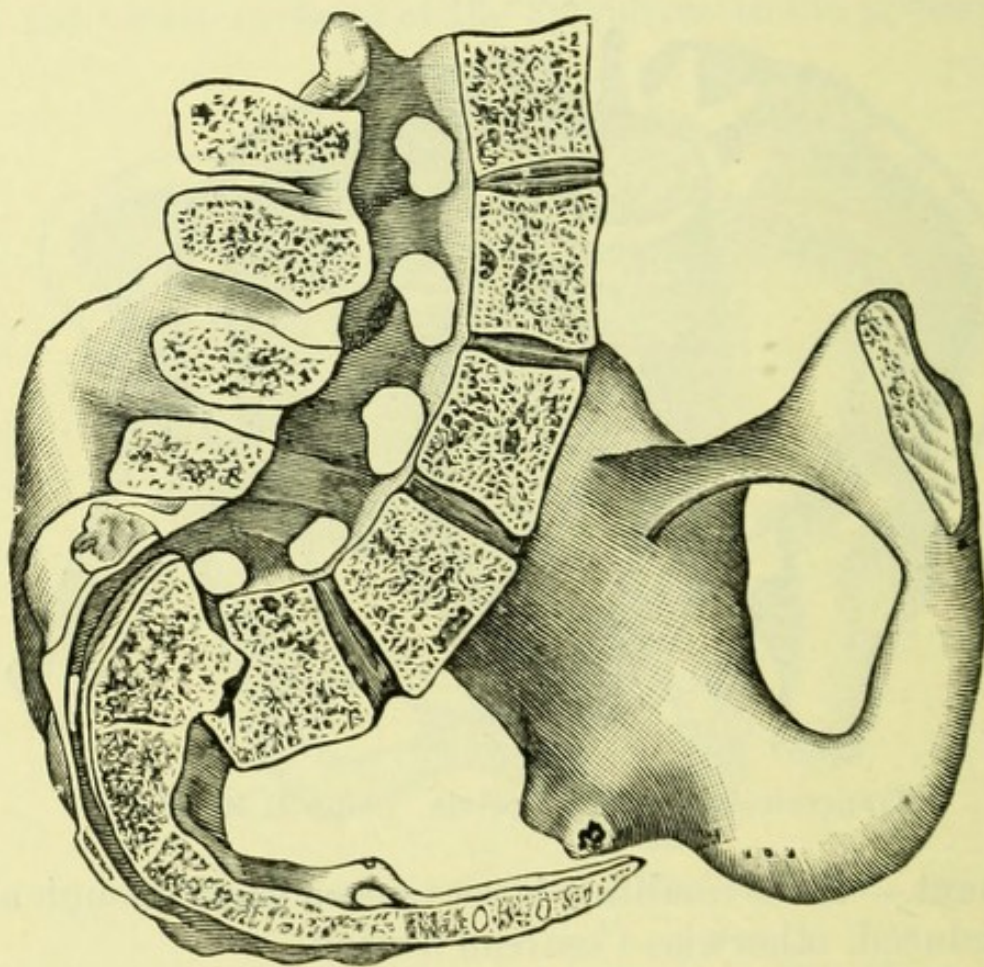
In this pelvis the fifth lumbar vertebra is displaced downward and inward over the sacral promontory, thus diminishing the antero-posterior of the brim. The sacrum is crowded backward and downward; the lower portion projecting forward and inward, so that the conjugate of the outlet is diminished. Lumbar curvature (lordosis) is marked. The cause of the deformity is not clear; it has been attributed to injury, disease, and faulty development.

**Diagnosis.**—From history, appearance of patient, and examina-



tion. The stature is diminished ; the abdomen shortened and pendulous, the ribs approach the ilia ; the symphysis is raised and the inclination of the pelvis practically lost. The iliac crests are very prominent posteriorly, and the external conjugate is diminished. In walking the woman squares the shoulders to maintain equilibrium, and the footsteps fall in a straight line. By internal examination the projecting lumbar vertebræ are distinguished, and in

FIG. 62.



Spondylolisthetic pelvis. (After E. Martin.)

front the aorta and its bifurcation into the common iliacs may be felt pulsating. The diagonal conjugate is taken from the lumbar vertebra nearest the symphysis.

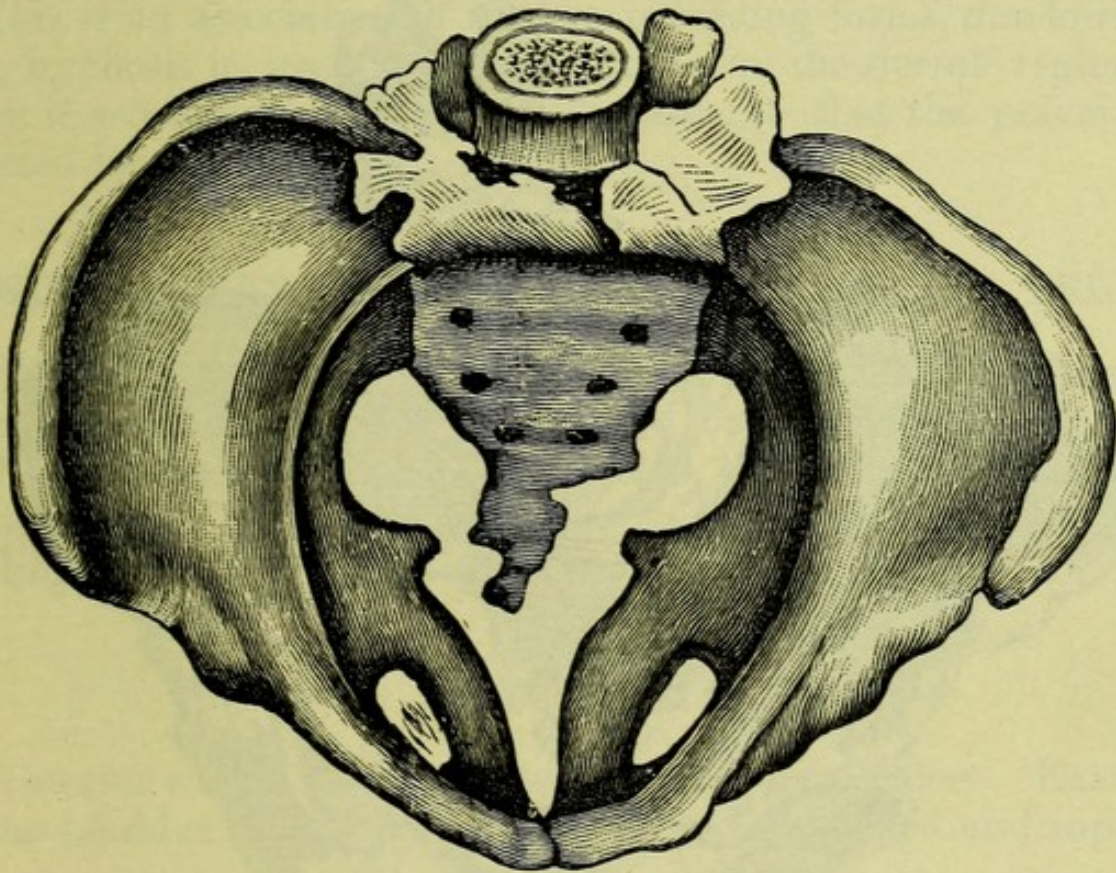
**Treatment.**—Practically the same as in flat pelvis. A conjugate of over  $3\frac{5}{8}$  inches may terminate naturally or require forceps or version. At  $2\frac{3}{4}$  inches, the induction of premature labor between the 32d and 36th week, or symphysiotomy is indicated ; a smaller diameter than this calls for Cesarean section.



**KYPHOTIC PELVIS.**

The pelvic deformity depends upon degree and position of spinal "hump." This condition is due to caries of lumbosacral or lumbodorsal vertebræ. The brim is oval with its long diameter anteroposterior. The sacrum is forced backward, and is narrower, straighter, and longer than normal. The coccyx turns forward, narrowing the conjugate of the outlet. The innominates are flattened and their lower portions (ilium and ischium) are drawn in-

FIG. 63.



Kyphotic pelvis. (After Kleinwächter.)

ward; the posterior superior spinous processes are thus brought close together, while the anterior superior spinous processes are carried farther apart. The transverse diameter of the outlet is accordingly shortened. The pelvic inclination is lessened.

**Diagnosis.**—The "humpback" is evident. Further from history, examination, and obstruction at the outlet. Transverse positions of the child are not uncommon; the occiput may rotate posteriorly.

**Treatment.**—With moderate contraction the labor may be

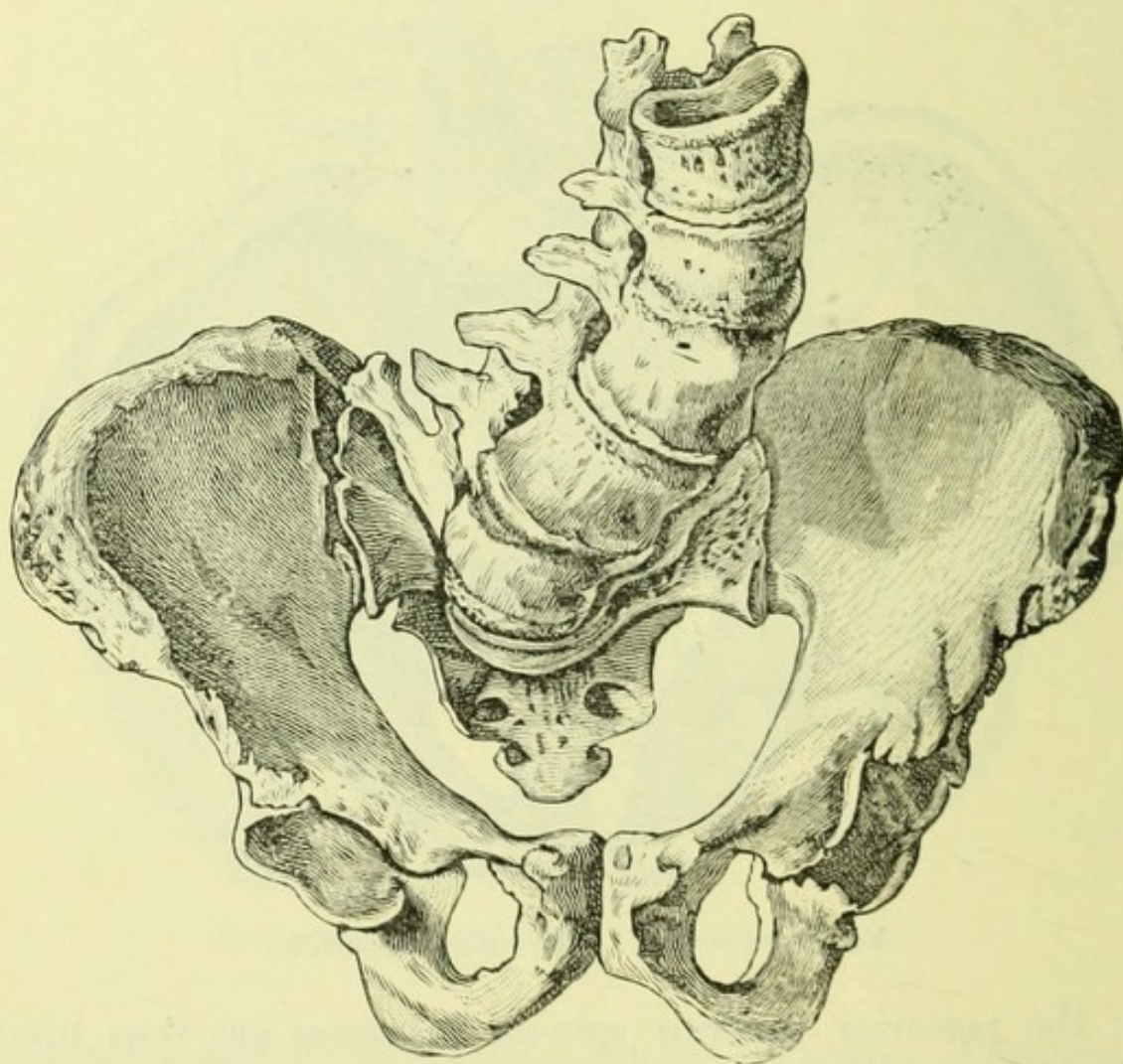


natural or somewhat retarded. If the conjugate is below  $3\frac{1}{4}$  inches the forceps, symphysiotomy, craniotomy, or Cesarean operation are indicated, according to the degree of deformity.

### SCOLIOTIC PELVIS.

There is marked asymmetry of the pelvis, the degree of deformity depending upon the extent and position of the lateral cur-

FIG. 64.



Kyphoscoliotic-rachitic pelvis. (After Ahlfeld.)

vature. It is usually associated with rachitic complications. The side of the pelvis toward which the curvature extends receives the greater weight of the body and the counterpressure of the femur pushes the innominate bone upward, backward, and inward, giving rise to some degree of oblique contraction. The acetabu-



lum is displaced upward and forward, the diameter between the promontory and the iliopectineal eminence (sacroctyloid) being much shorter than on the opposite side. The symphysis is pushed toward the healthy side. In slight deformities the mechanism of labor is similar to that in rachitic pelves; in extreme deformity the head is prevented from entering the superior strait.

**Treatment.**—Where the contraction is great Cesarean section is indicated.

### KYPHOSCOLIOTIC PELVIS.

This is an association of the two preceding forms, due to rickets. The kyphosis is usually situated high in the dorsal region and there is a compensating lumbar lordosis, so that the pelvis is not affected by the kyphosis.

### UNIVERSALLY ENLARGED OR JUSTOMAJOR PELVIS.

The pelvis has a normal appearance, but all the diameters are increased. Labor is apt to be rapid or precipitate, with abnormalities of mechanism. There is a disposition to postpartum hemorrhage. No particular treatment is necessary beyond retarding the exit of the child.

### SPLIT PELVIS.

Anterior wall of pelvis absent,—a congenital defect. Exstrophy of the bladder associated. Labor is uncomplicated and rapid.

### PELVIC DEFORMITY FROM HIP-DISEASE (COXITIS).

Pelvis obliquely contracted, resembling that of Naegele. The conjugate is greatly shortened.

### DEFORMITY FROM PELVIC-WALL TUMORS.

Cartilaginous, bony, osteosarcomatous, and other tumors develop from the pelvic bones, but, as a rule, are small and do not obstruct labor. May give rise to injuries of foetal head or ma-



ternal soft structures from pressure. If large and projecting into the pelvic canal labor may be impossible. The Cesarean operation is indicated in such instances.

### FRACTURES OF THE PELVIS.

Rare. Excessive callus or ossification of joint near injury may encroach upon the birth-canal or result in distortion of bones.

Dislocations of one femur or both, either congenital or developed early in life, may give rise to some degree of deformity. When the dislocation is unilateral the contraction is likely to be oblique.

### QUESTIONS.

- What are the most common forms of deformed pelvis?
- What is the justominor pelvis?
- What are the varieties of this deformity?
- What is the management of delivery in this deformity?
- What is the simple flat pelvis?
- What is the management of delivery in this deformity?
- What is the flat rachitic pelvis?
- What is the management of delivery?
- What is the malacosteon pelvis?
- What is the management of labor?
- What is the Naegele pelvis?
- How is the diagnosis of this pelvis made?
- What is the management of labor in obliquely contracted pelvis?
- What is the Robert pelvis?
- What is the management of labor in transversely contracted pelvis?
- What is the spondylolisthetic pelvis?
- How is labor managed in this pelvis?
- What is the kyphotic pelvis?
- How is labor managed in this deformity?
- What is the scoliotic pelvis?
- How is such a labor managed?
- Describe the kyphoscoliotic pelvis, and the management of labor?
- Describe the justomajor pelvis.
- What is split pelvis?
- What pelvic deformities may result from hip-disease?
- How do pelvic tumors interfere with delivery?
- How is dystochia caused by fracture of the pelvis?
- What effect upon the pelvis has dislocation of the femurs?



## CHAPTER XVI.

## OBSTETRIC SURGERY.

**MECHANICAL DILATATION OF THE OS AND CERVICAL CANAL.**

ARTIFICIAL dilatation of the cervix becomes necessary in various conditions which demand more or less rapid emptying of the uterus, or where the cervix fails to sufficiently dilate during labor. The **indications** in general are the induction of abortion or premature labor; eclampsia; rigidity or partial stenosis of the cervical canal, as in elderly primiparæ, from disease, as chronic catarrh, granular vaginitis (gonorrhœal), hypertrophy of the cervix, or from previous plastic operations on the vaginal portion; visceral diseases, as cardiac, pulmonary, and renal diseases; death of the foetus; marked pelvic deformity.

**The Methods of Dilating the Cervix and Os.**

These are: (a) *manual*; (b) *vaginal tamponade*; (c) *hydrostatic*; (d) *instrumental*; (e) *multiple incisions*. Whichever method shall be employed depends upon the urgency of the conditions present. In all these operations the strictest aseptic methods must be observed as regards patient, physician, and instruments to be employed.

**Manual Dilatation.**

The patient is placed in the lithotomy position, the knees supported, and an anæsthetic—or not—given. If the os alone, or with it a short remaining portion of the cervix, is to be dilated, the internal os having disappeared, the forefinger of one hand is inserted into the os, then the thumb, followed by the second, third, and little fingers in succession, the fingers being separated as the tissues yield and stretch until, finally, the whole hand can be introduced (*Harris's method*). The manipulation must be carried out slowly and carefully in order to prevent laceration of the tissues. When the os is too small to admit the finger, a Goodell's dilator may be used to render the parts sufficiently patulous. If



the internal os is already taken up, the forefinger of one hand may be inserted through the external os followed by the forefinger of the other hand, and traction made in different directions until the part is sufficiently dilated (*Edgar's method*).

### Vaginal Tamponade.

For this Braun's colpeurynter or gauze may be used. The colpeurynter is a rubber bag which is introduced into the vagina and distended with water in the same manner as a Barnes bag. The pressure of the bag tends to soften the cervix and to set up uterine contractions, thus bringing about dilatation. It may be left in place, if necessary, for twenty-four hours. When gauze is used (iodoform), if the cervical canal is at all open it may be packed by means of a uterine dressing forceps and the vagina then filled with the same material. The gauze may be left in place for eight or twelve hours. If on removing sufficient dilatation is not effected, the vagina should be irrigated with an antiseptic solution, dried with cotton, and fresh packing inserted. Should the cervix be tightly closed, it may be opened sufficiently for the introduction of the gauze by means of a steel dilator.

### Hydrostatic Dilatation.

The largest sized Barnes' bag that can be introduced is disinfected, lubricated, folded, and in the grasp of a forceps passed into the cervical canal until the middle portion of the bag is at the internal os. The rubber tube is then attached to a syringe and sterile water gently pumped into the bag until it is felt tightly grasped by the os. After a short interval more water is forced into the bag, the tube is then compressed by a catch forceps, and the bag left in place for a quarter of an hour to an hour. The water is then allowed to escape and larger bags successively introduced and distended in the same manner until dilatation is sufficiently advanced to permit of the necessary manipulations. As the rubber of these bags is very liable to deteriorate, they should be tested before using.

Dr. J. D. Voorhees, of New York, has recently brought out a modification of the original Champetier-de-Ribes bag, conical in form, so that it imitates the action of the bag of waters better than the fiddle-form Barnes' bag. The Voorhees bag is made of stout



rubber lined with canvas and strong enough to permit of traction on the tube, which will stimulate the uterus to contract. The conical form aids in rapid dilatation. They come in four sizes.

### **Instrumental Dilatation.**

When the cervix is long and firm and it is imperative that the uterus be emptied without delay, Goodell's instrument or Hegar's dilators may be employed. For this an anæsthetic is usually desirable. The operation may or may not be conducted through a wide speculum, the uterus being steadied by a tenaculum forceps fastened to its anterior lip. The time required is from ten to twenty minutes, according to the conditions present. In using Hegar's dilators, beginning with the smallest, the different sizes up to the largest are successively introduced into the cervix until the neck is thoroughly distended. Instrumental dilatation is the quickest and safest method of opening up the cervical canal, but care must be taken that rupture of the tissues does not occur.

### **Multiple Incisions.**

When the case is urgent, and other means are not sufficiently rapid, or are ineffectual in dilating the external os, a blunt-pointed bistoury or the blade of a scissors may be carried into the os under guidance of the fingers, and the cervix divided in two or more places from os to vaginal junction. Hemorrhage from the cuts may be very profuse, and, following delivery, they should be sutured.

### **RETAINED AND ADHERENT PLACENTA.**

Sometimes the uterine contractions fail to expel the placenta into the vagina, and it remains detained in the lower uterine segment. In such a case it may be displaced by Credé's method, or, if this fails, a finger introduced into the uterus may be hooked over one edge of the after-birth, or it may be buttonholed and delivered.

When the placenta is adherent to the uterine wall and repeated attempts at expression fail to cause its expulsion, it must be removed manually. The hand in the vagina follows the cord up into the uterus until the edge of the placenta is reached, when the fingers are carefully insinuated between the after-birth and the



uterine wall and the former gradually dissected off. The placenta is then grasped in the hand, squeezed small, and removed. In rare instances the placental adhesions are so strong that it can be removed only piecemeal. During these manipulations counter-pressure must be made over the uterine fundus.

### INDUCTION OF ABORTION AND PREMATURE LABOR.

When for any reason the health or life of the patient become jeopardized by the continuance of pregnancy, or in the later months the life of the child is in any way endangered, the uterus must be emptied. As this procedure involves more than the mere dangers to the mother, presenting a moral as well as a legal aspect, it should not be undertaken lightly, and never without the consent of the patient's family and the concurrence of a consultant. By *abortion* is meant the termination of pregnancy during the early months before the child has become viable, that is, prior to the 28th week. By *premature labor* is understood the interruption of pregnancy between the 28th week and the natural termination of gestation.

**Indications.**—Death of the foetus; hyperemesis; pronounced cardiac, pulmonary, and renal disease; chorea and mental disease aggravated by the gestation; persistent retroflexion of the uterus (incarceration); new growths of the uterus or parturient tract which do not admit of removal; intra-uterine diseases, as hydramnios and hydatidiform mole; pernicious anæmia and leukæmia; placenta prævia; concealed hemorrhage, and extreme pelvic deformity.

### Methods of Induction of Abortion.

The vagina must be rendered as sterile as possible by antiseptic douches and scrubbing with a cotton sponge and soft soap. Under an anæsthetic the patient is placed in the lithotomy position and the legs supported. A speculum is introduced,—that of Graves gives a satisfactory working space,—and the anterior lip of the uterus fixed by a tenaculum forceps,—Cullen's instrument is the best for this purpose.

### The Ovum Forceps.

The cervix is then dilated with Goodell's instrument or Hegar's dilators to at least  $1\frac{1}{4}$  inches, an ovum forceps is introduced, and



as much of the ovum as possible removed at successive grasps. The interior of the uterus must then be gone over carefully with a sharp curette and all remaining portions of the ovum and decidua brought away. The uterine cavity is then douched with an antiseptic solution, preferably lysol or carbolic acid, through an intra-uterine douche nozzle, the vagina dried with cotton, and then lightly packed with iodoform gauze. The *after-treatment* consists in keeping the patient in bed for a couple of weeks. The vaginal gauze must be removed in twenty-four hours, after which an antiseptic douche should be given twice daily for a few days. The diet should be at first fluid. To promote uterine contraction and involution the following may be given :

R	Extr. ergot fl.,	
	Extr. hydrastis fl.,	āā ʒss ;
	Tr. cinnamomi,	gtt. xv. ;
	Syrup simpl.,	ʒj ;
	Aquæ,	q. s. ad ʒiij.

M. and Sig.—A teaspoonful in water three or four times a day.

If haste in evacuating the uterus is unnecessary, instead of the above method the cervix and vagina may be tamponed with gauze as already described. The subsequent steps for emptying the uterus are the same.

**Electricity.**—The application of the electrical current in the production of abortion during the early weeks of pregnancy has given good results. After disinfection of the vagina, a short intra-uterine electrode is inserted into the cervical canal, and the other pole, a small abdominal plate, is placed over the hypogastrium. A fairly strong current is then passed through the uterus for fifteen or twenty minutes. The applications should be made daily, a larger intra-uterine electrode being employed at each sitting. Usually after a few applications the uterus will throw off the ovum in its entirety. The *after-treatment* of the patient is the same as when other methods are employed. Galvanism or faradism may be used in the same manner.

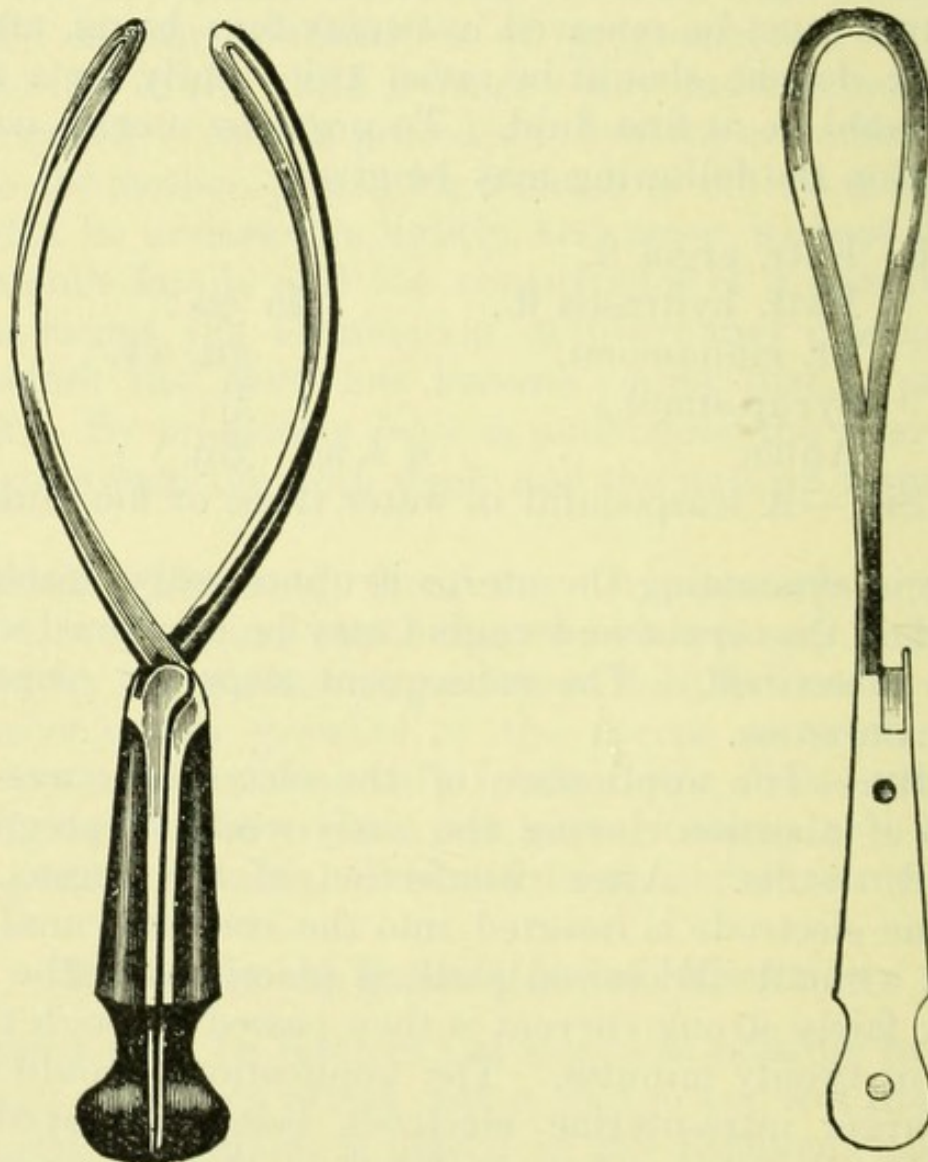
### INDUCTION OF PREMATURE LABOR.

The cervix may be dilated by the steel branched dilators, Hegar's stems, manually, or by bags. During the later months



of pregnancy a modification of Krause's method is to be recommended. The cervix is first dilated with the steel instrument, the membranes are then detached from the lower uterine zone by the finger or a sound (Jewett), great care being taken not to rupture the sac, and a large bougie which has been thoroughly ster-

FIG. 65.



Short forceps (Denman's).

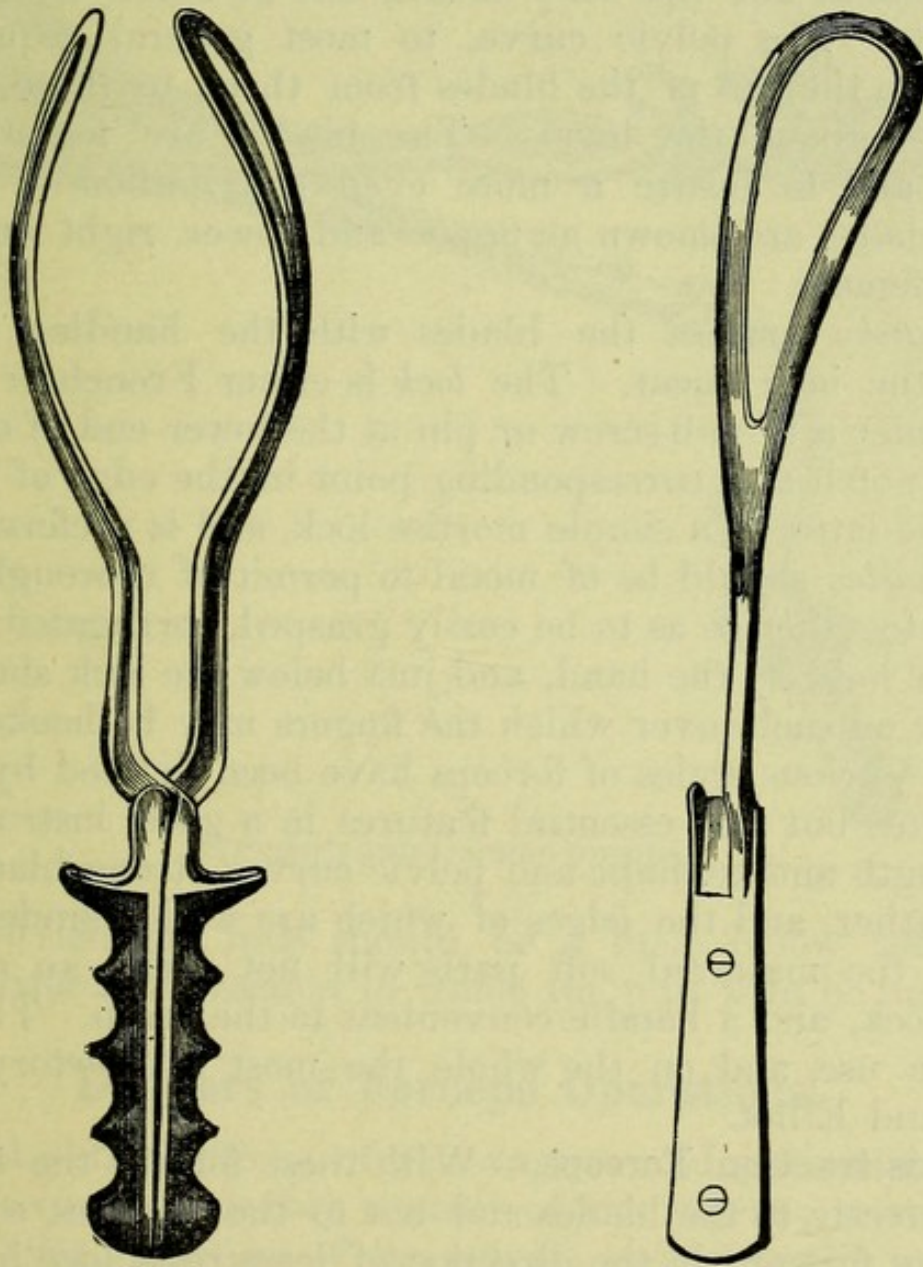
ilized is introduced between the membranes and the uterine wall. The vagina is then packed with gauze. Uterine contractions are usually set up within a few hours and the labor terminated within thirty-six hours. Sometimes the insertion of a second or even a third bougie becomes necessary before labor-pains are inaugurated.



**THE FORCEPS.**

Forceps are metal hands for grasping the foetal head, and are intended by traction in front to assist the natural forces behind in the expulsion of the presenting part, usually the head. Two kinds of forceps are in use—the short and the long.

FIG. 66.



Simpson's long forceps.

**The Short Forceps.**—These have a cephalic, but no pelvic curve, and are therefore straight (Fig. 65). They are intended for use when the head is low down in the cavity or at the pelvic



outlet. As the long forceps is equally efficient under these conditions the shorter instrument has fallen into disuse.

**The Long Forceps.**—These should be about fourteen inches in length (Fig. 66). Each half consists of a handle, a shank, a lock, and a blade. The blades have two curves, a cephalic curve conforming to the shape of the child's head, and a pelvic curve adapted to the axis of the pelvis. The distance between the blades at the middle of the cephalic curve should be about three inches, while at the tips they should not be much less than one inch apart. The pelvic curve, to meet general requirements, should raise the tips of the blades from three to three and one-half inches above the level. The blades are fenestrated for lightness, and to insure a more even distribution of pressure. The two blades are known as upper and lower, right and left, or male and female.

The *shanks* connect the blades with the handles and give length to the instrument. The *lock* is either French or English. In the former a thumb-screw or pin at the lower end of one shank fits into a notch at a corresponding point in the edge of the other shank; the latter is a simple mortise lock, and is preferable.

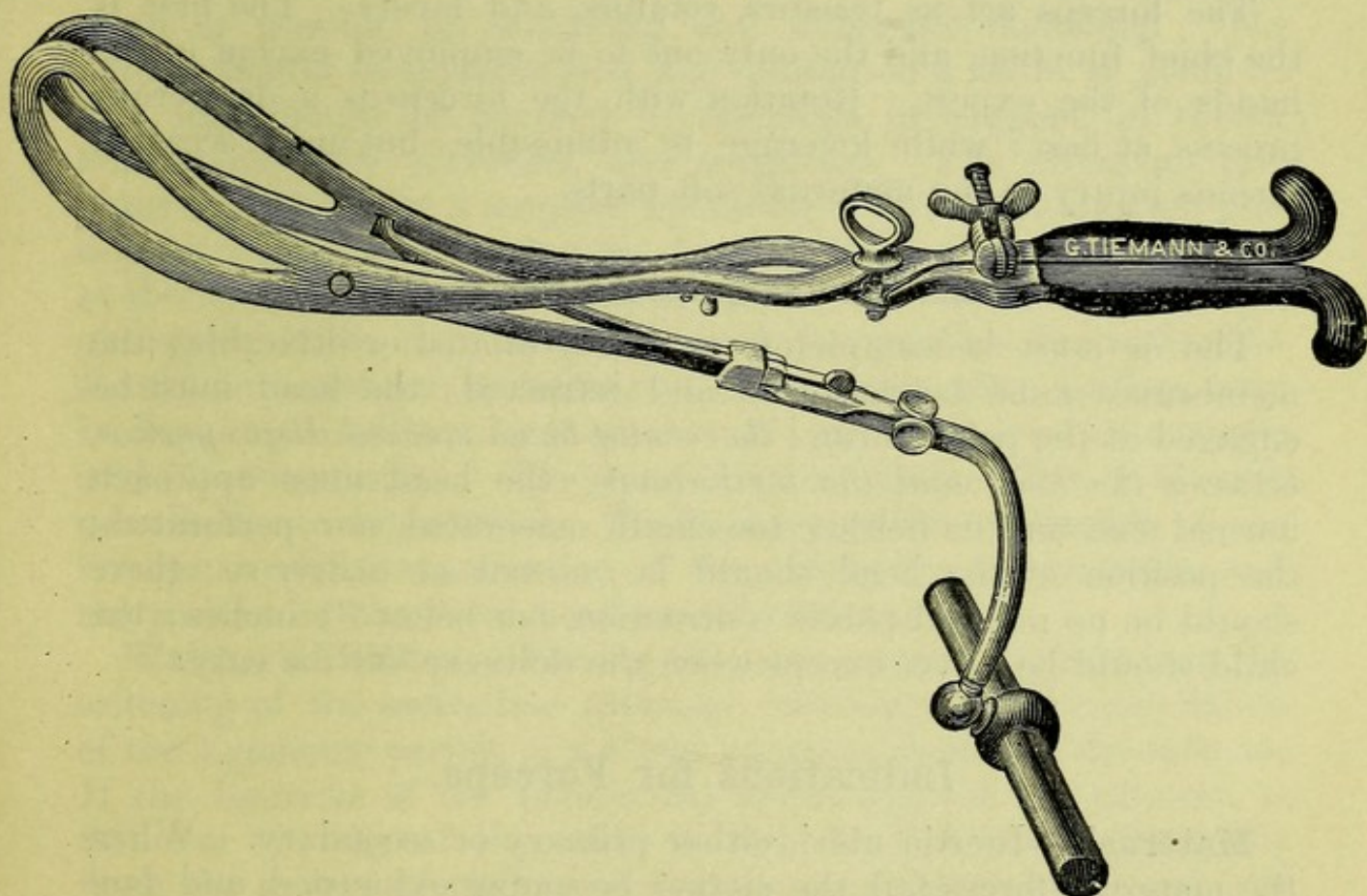
The *handles* should be of metal to permit of thorough sterilizing, come together so as to be easily grasped, corrugated to permit of a firmer hold by the hand, and just below the lock should have a shoulder on each, over which the fingers may be hooked during traction. Various styles of forceps have been devised by different obstetricians, but the essential features in a good instrument are proper length and cephalic and pelvic curves, strong blades which do not feather, and the edges of which are well rounded, so that cutting of the maternal soft parts will not occur, an easily adjustable lock, and a handle convenient to the grasp. The forceps in common use, and on the whole the most satisfactory, are the Simpson and Elliot.

**The Axis-traction Forceps.**—With these forceps the traction is applied directly to the blades and not to the handles, so that the head moves forward in the direction of least resistance in the axis of the parturient canal. The instrument upon which all others are modeled is that of Tarnier (Fig. 67). This consists of two blades as in the ordinary forceps, with a French lock, behind which is a fixation-screw, by means of which the compression by the blades is regulated. At the heel of each blade a movable



traction rod is attached which, when not in use, is held in place along the shank by a small pin on the under surface of the latter. When the forceps have been applied to the head the rods are released and their free ends locked to a cross-bar or traction handle.

FIG. 67.



Tarnier's axis-traction forceps.

During traction the rods should be a little below the shanks, which indicate the direction in which the pull is to be made.

### Dangers of Forceps Operations.

**Maternal.**—Lacerations of the vagina and perineum; lacerations of the cervix, possibly rupture of the uterus; separation of the pubic joint; fracture of the pelvis; shock; septic infection.

**Fœtal.**—Compression of the brain, possibly resulting in later life in mental defect; fractures of the cranial bones; facial paralysis; intracranial hemorrhage; bruises and lacerations of the face and scalp; death from pressure on the large vessels of the neck. In the biparietal and occipitofrontal diameters considerable compres-



sion of the head may be sustained without doing harm, but in the other diameters undue pressure is liable to result in serious injury or even death.

### Function of the Forceps.

The forceps act as tractors, rotators, and levers. The first is the chief function, and the only one to be employed except in the hands of the expert. Rotation with the forceps is a dangerous process at best; while leverage is admissible, but may occasion serious injury to the maternal soft parts.

### Conditions Necessary to the Use of Forceps.

The os must be completely or nearly dilated or dilatable; the membranes must be ruptured and retracted; the head must be engaged at the pelvic brim; *there must be no marked disproportion between the head and the birth-canal*; the head must approach normal size, and be neither too small, macerated, nor perforated; the position of the head should be normal or nearly so; there should be no marked pelvic contraction, not below  $3\frac{1}{2}$  inches; the child should be alive, except when the delivery will be easy.

### Indications for Forceps.

**Maternal.**—Inertia uteri, either primary or secondary. When the maternal forces fail, the mother becoming exhausted, and dangerous symptoms threaten, the forceps should be applied before the condition has advanced too far. In the second stage of labor, in eclampsia; in acute and chronic visceral diseases, as in adynamic conditions, pneumonia, pulmonary and cardiac disorders, in which exertion on the part of the mother might prove dangerous or fatal; in moderate pelvic contraction, in which the maternal forces are not able to overcome the resistance; when the head of the child remains stationary for an hour, neither advancing nor receding with the pains; in intra-uterine hemorrhage from premature detachment of the placenta; in placenta prævia; in some malpositions of the head, as occipitoposterior and mento-anterior; in impacted breech.

**Fœtal.**—When the heart-beat increases to 160 or more or sinks to 100, indicative of asphyxia; in prolapse of the funis; in premature separation of the placenta; when meconium is discharged.



## Preparation for Forceps Operations.

The patient's bowels and bladder must be evacuated. In healthy, clean individuals antiseptic treatment of the birth-canal is unnecessary. If doubt exists as to local asepsis, the abdomen and thighs, the vulva and vagina, must be rendered as surgically clean as possible by scrubbing and antiseptic douching. The patient should be anæsthetized and placed on a table, if possible. The legs should be covered by stockings or wrapped in sheets, flexed over the abdomen, and supported. The physician prepares himself as for a surgical operation in the usual manner, putting on a gown, or covering his clothes with a clean sheet fastened at the neck and waist. The instruments to be used,—the forceps, episiotomy knife, and those required for possible lacerations,—should be sterilized by boiling. The forceps, after boiling, may be kept sterilized in a large pitcher of 1 per cent. lysol or carbolic acid (1 : 80) solution. The usual preparations for labor, as already described, are understood. Preliminary to the application of the forceps a careful examination of the patient should be made, and the position of the foetal head exactly determined.

**Walcher's Position.**—During the later months of pregnancy the softening of the sacro-iliac articular cartilages and the relaxation of the ligaments permit of a slight nutatory motion of the sacrum. If the buttocks of the patient are raised and the legs allowed to fall over the edge of the table or bed, the feet not touching the floor, the weight of the legs draws the promontory backward and the anteroposterior of the brim is increased from  $\frac{1}{5}$  to  $\frac{3}{5}$  of an inch, while at the same time the conjugate of the outlet is correspondingly shortened by the forward movement of the tip of the sacrum. After the head has passed the brim, by again placing the patient in the lithotomy position, the promontory is brought forward and the anteroposterior of the outlet increased. In moderate contraction of the brim, especially with the use of the axis-traction forceps, an otherwise difficult and prolonged labor may often be terminated with comparative ease.

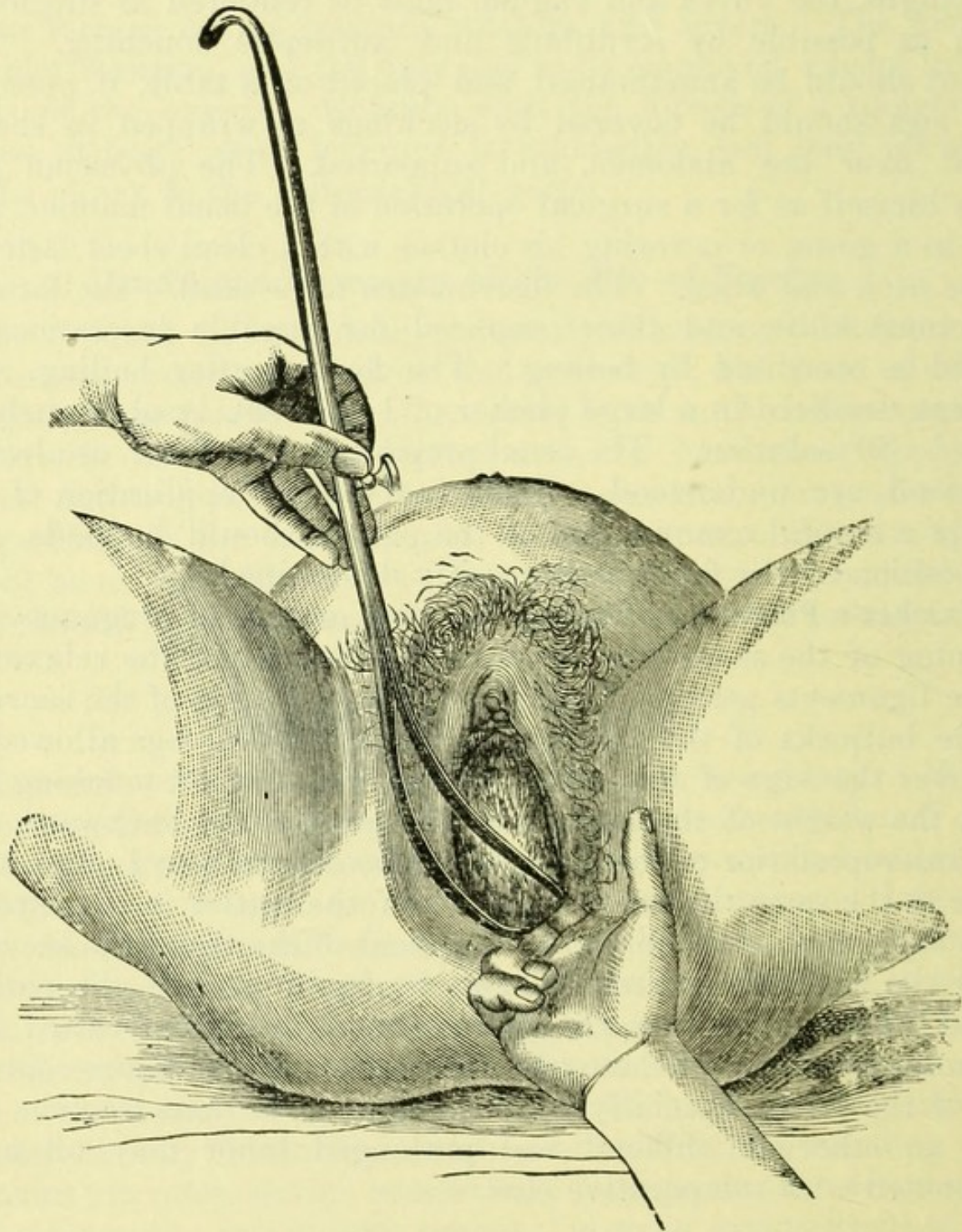
## Method of Forceps Application.

With the woman in position and the other preparations made, the forceps are removed from the pitcher and held locked in front of the operator with the tips of the blades pointing upward. The



lower blade, that with the mortise in Simpson's forceps, the handle of which is in the operator's left hand, is then detached, and the other (upper or right) blade laid aside. *There are two methods of*

FIG. 68.

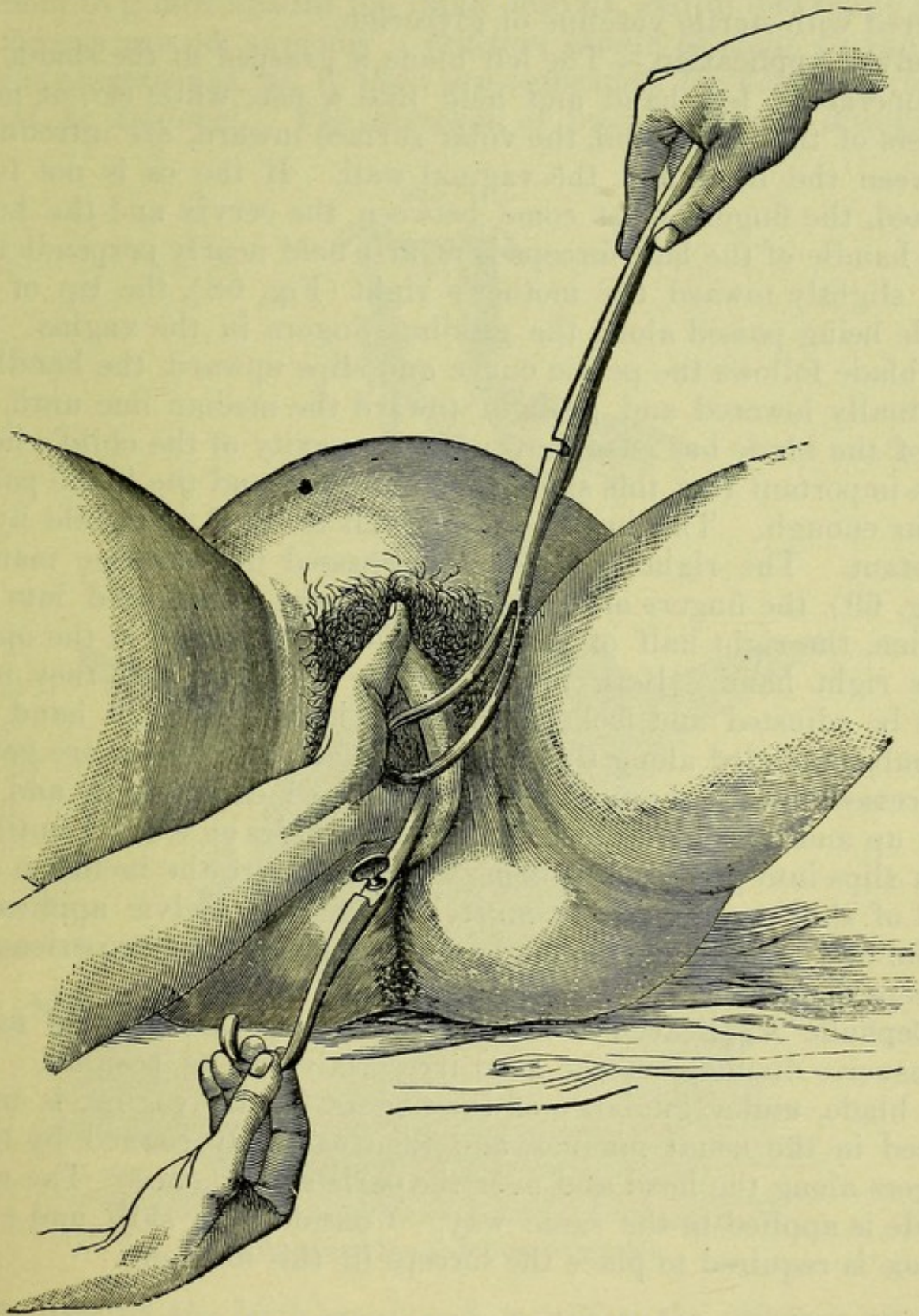


Method of introducing first blade.

*applying the forceps, called the "cephalic application" and the "pelvic application." In the first the blades are introduced so that one lies on each side of the head over the parietal eminence; in*



FIG. 69.



Method of introducing second blade.

the second they are introduced at the sides of the pelvis without reference to the position of the head. The application consists of (a) *the introduction*; (b) *the locking*; (c) *traction or delivery of the head*.



Before application the outer surfaces of the blades should be covered with sterile vaseline or glycerine.

**Pelvic Application.**—The left blade is grasped at the shank by the operator's left hand and held like a pen, while two or more fingers of the right hand, the volar surface inward, are introduced between the head and the vaginal wall. If the os is not fully dilated, the fingers must come between the cervix and the head. The handle of the half forceps is at first held nearly perpendicular and slightly toward the mother's right (Fig. 68), the tip of the blade being passed along the guiding fingers in the vagina. As the blade follows the pelvic curve and slips upward, the handle is gradually lowered and brought toward the median line until the tip of the blade has passed over the convexity of the child's head. It is important that this should be observed and the blade passed in far enough. The handle is then left to itself or is held by an assistant. The right blade is then passed in the same manner (Fig. 69), the fingers of the left hand being introduced into the vagina, the right half of the instrument being held in the operator's right hand. Both blades having been applied, they must now be adjusted and locked. With a handle in each hand, the thumbs extended along their upper surface, the blades are gently depressed toward the perineum, and moved carefully in and out and up and down so as to bring the two blades on a level until the lock slips into position. During this manœuvre the inclusion of a fold of skin or vulva hairs must be avoided. Pelvic application is the best method for those who have not had large experience in forceps operations.

**Cephalic Application.**—In this the forceps are applied to the transverse diameter of the head irrespective of its position. The left blade, under guidance of the fingers in the vagina, is introduced in the usual manner, and then carefully coaxed by these fingers along the head and over the parietal eminence. The right blade is applied in the same way. Considerable skill and experience is required to place the forceps in this manner.

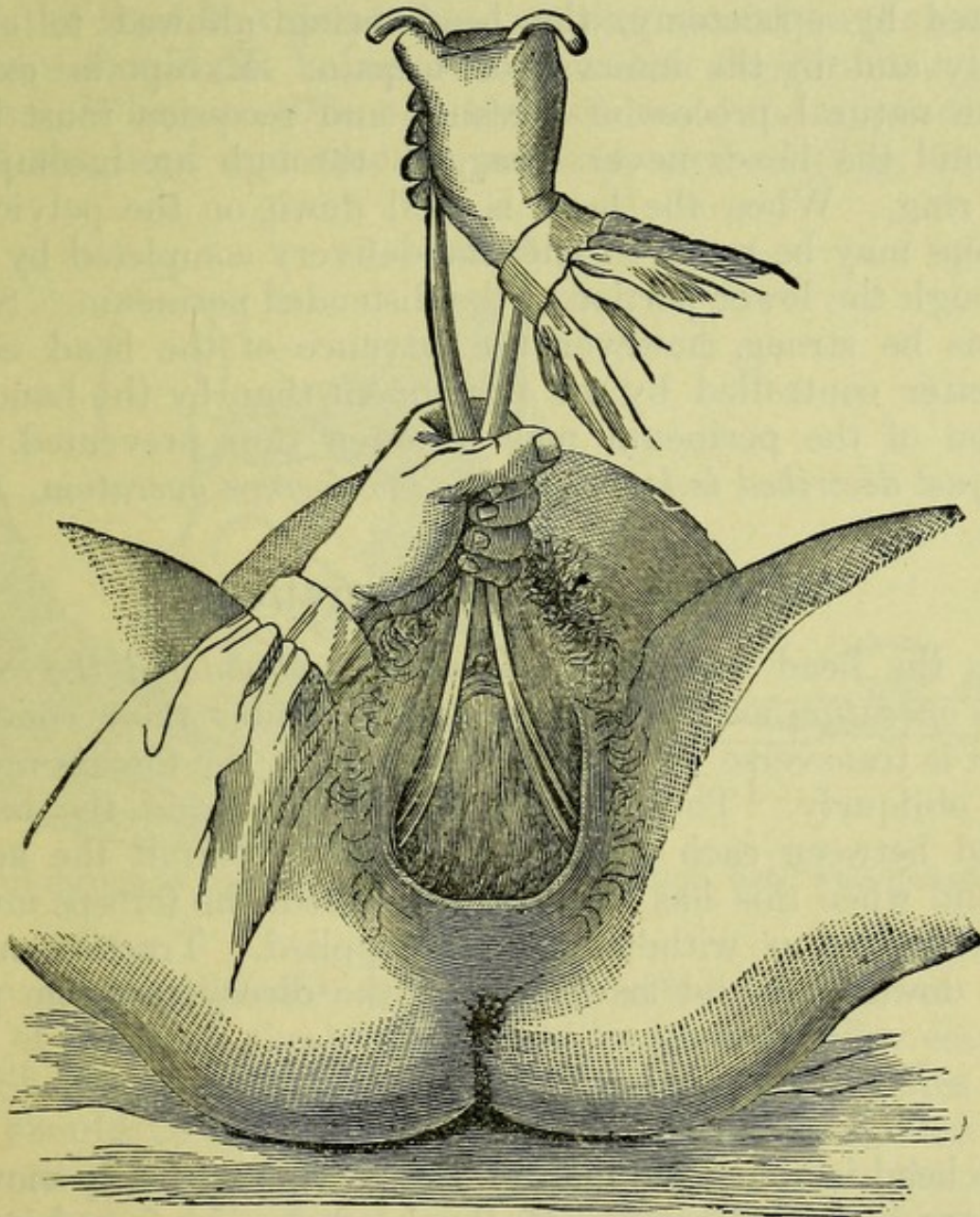
### Low Forceps Operation.

**Traction.**—The handles of the forceps are grasped by the right hand of the operator and the index and second fingers hooked over the projecting shoulders. Two fingers of the free hand are then



placed against the child's head to see that it follows during each traction, to guard against too rapid descent, and to determine that the forceps are not slipping. *Traction should be made during the uterine contractions, or, if these are suspended, the natural process should be imitated. The direction of traction should always be*

FIG. 70.



Lifting handles to follow extension.

*in the axis of the birth-canal, and, to relieve the pressure on the child's head, must be intermittent, not more than a minute being allowed for each pull. The force applied should come entirely from the arms and shoulders; it is unnecessary to add the weight of the body, or to brace the feet against the side of the bed.*



When the head is low in the pelvis and the occiput rotated to the arch, the direction of traction is at first straight ahead, and then, as extension occurs, the handles of the forceps must be carried gradually upward until, as the face escapes over the perineum, they are almost parallel with the mother's abdomen (Fig. 70). As the perineum distends it must be carefully guarded by the operator's free hand, hot cloths applied, and threatened rupture anticipated by episiotomy, the head being allowed to emerge gradually and in the interval of a pain. Except in extreme cases the natural process of advance and recession must be followed, and the head never dragged through an incompletely dilated ring. When the head is well down on the pelvic floor the forceps may be removed and the delivery completed by pressure through the lower portion of the distended perineum. Should the pains be strong, however, the advance of the head can be much better controlled by the instrument than by the hand, and laceration of the perineum may be often thus prevented. *The method just described is known as the low forceps operation.*

### **Medium Forceps Operation.**

When the head has *passed the brim and entered the cavity* a *medium operation* may be necessary. If under these conditions the head is transverse or oblique in position, the forceps must be applied obliquely. They should be unlocked and the handles separated between each traction in order to permit the head to rotate, and when this has been accomplished, the forceps must be either readjusted or withdrawn and reapplied. Traction must at first be downward and backward in the direction of the pelvic axis.

### **High Forceps Operation.**

If the head is above the inlet of the pelvis and freely movable, forceps are contraindicated. If the head can be forced into the superior strait by suprapubic pressure the forceps may be applied, although this is generally very difficult, and always more serious for both mother and child than the low operation. The ordinary forceps are ill adapted for this purpose, but may be used; the axis-traction instrument is much to be preferred. The blades should be applied to the sides of the child's head when possible,

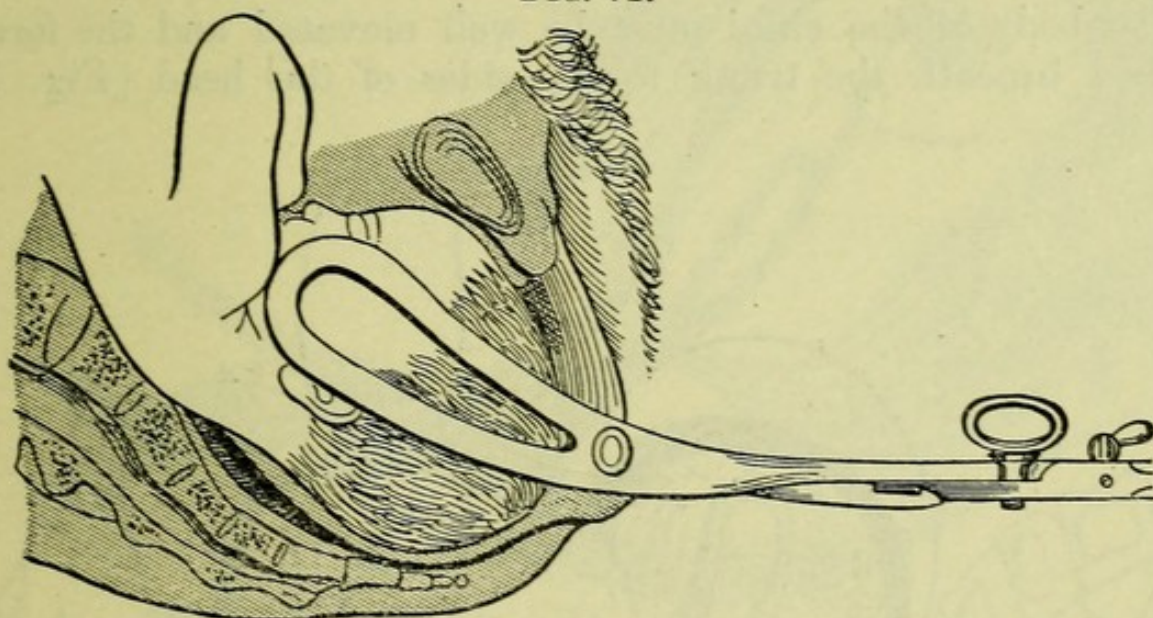


but application to the sides of the pelvis is generally easier, the forceps lying, as a rule, in the oblique diameter of the head. Traction should be downward and strongly backward, and the forceps should be shifted as the head descends.

### Forceps in Occipitoposterior Positions.

With the head in this position waiting should be the rule, and the forceps should not be resorted to unless dangerous symptoms threaten. When possible the blades should be applied to the sides of the head and traction made downward (Fig. 71). As

FIG. 71.



Relation of forceps to head in occipitoposterior position, head well flexed. (Faraboeuf and Varnier.)

anterior rotation of the occiput will often take place during descent of the head, the blades should be loosened after each traction. Should the occiput continue posterior the handles of the forceps should be gradually raised, to increase the flexion of the head, until the vertex emerges from the vulva, when the handles are depressed and the face brought from under the pubic arch by extension.

### Forceps in Face Presentations.

If the face is above the brim the forceps should not be used, but an attempt should be made by external manipulation to change the presentation. The forceps may be applied to the face when

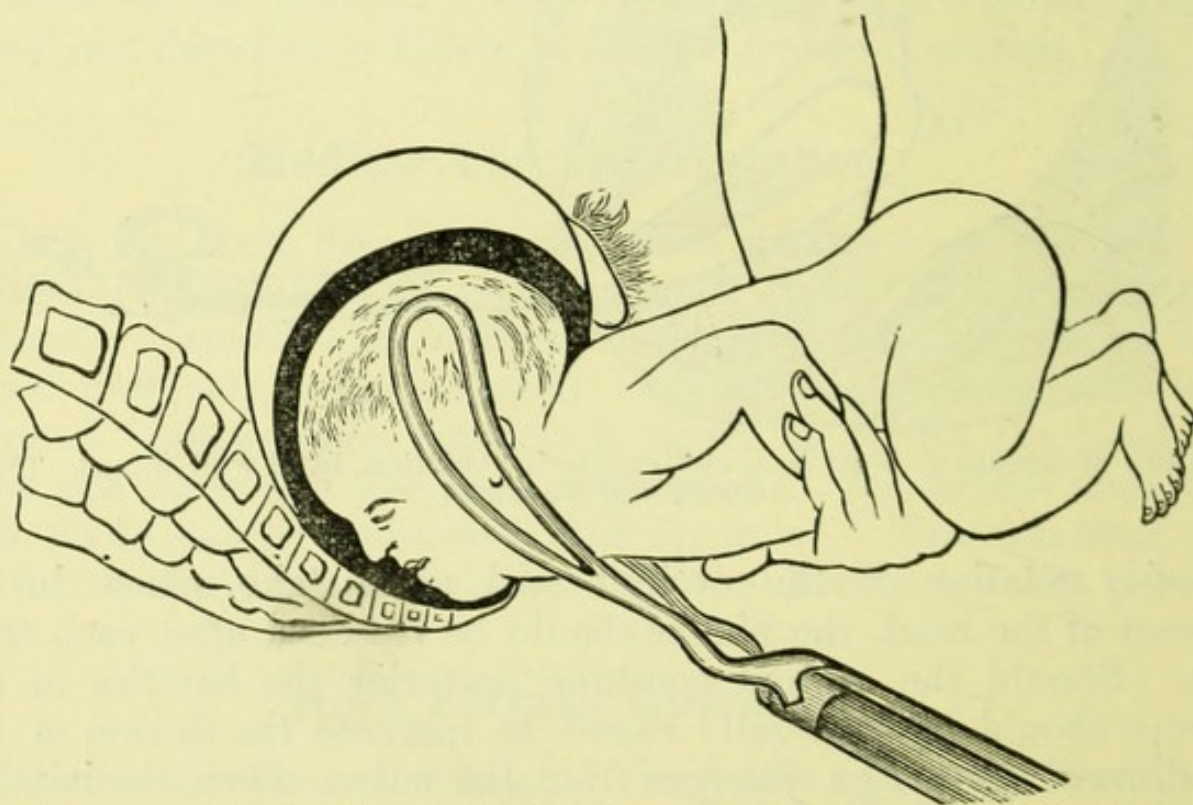


the chin points either anteriorly or to one or the other side of the pelvis, but never if the chin is posterior, for delivery of a living child in this position, with the head and pelvis of the natural proportions, is impossible. Craniotomy or Cesarean section is indicated. If the chin is anterior and the face low the blades are applied to the sides of the head and delivery effected by the usual mechanism of mento-anterior cases. If the face is transverse the forceps should be applied obliquely, with the concavity of the blades toward the chin. Rotation of the chin to the front must be accomplished before traction is made.

### Forceps to the After-coming Head.

The body of the child must be well elevated and the forceps applied beneath the trunk to the sides of the head (Fig. 72).

FIG. 72.



Forceps applied to after-coming head when occiput has rotated to pubes.

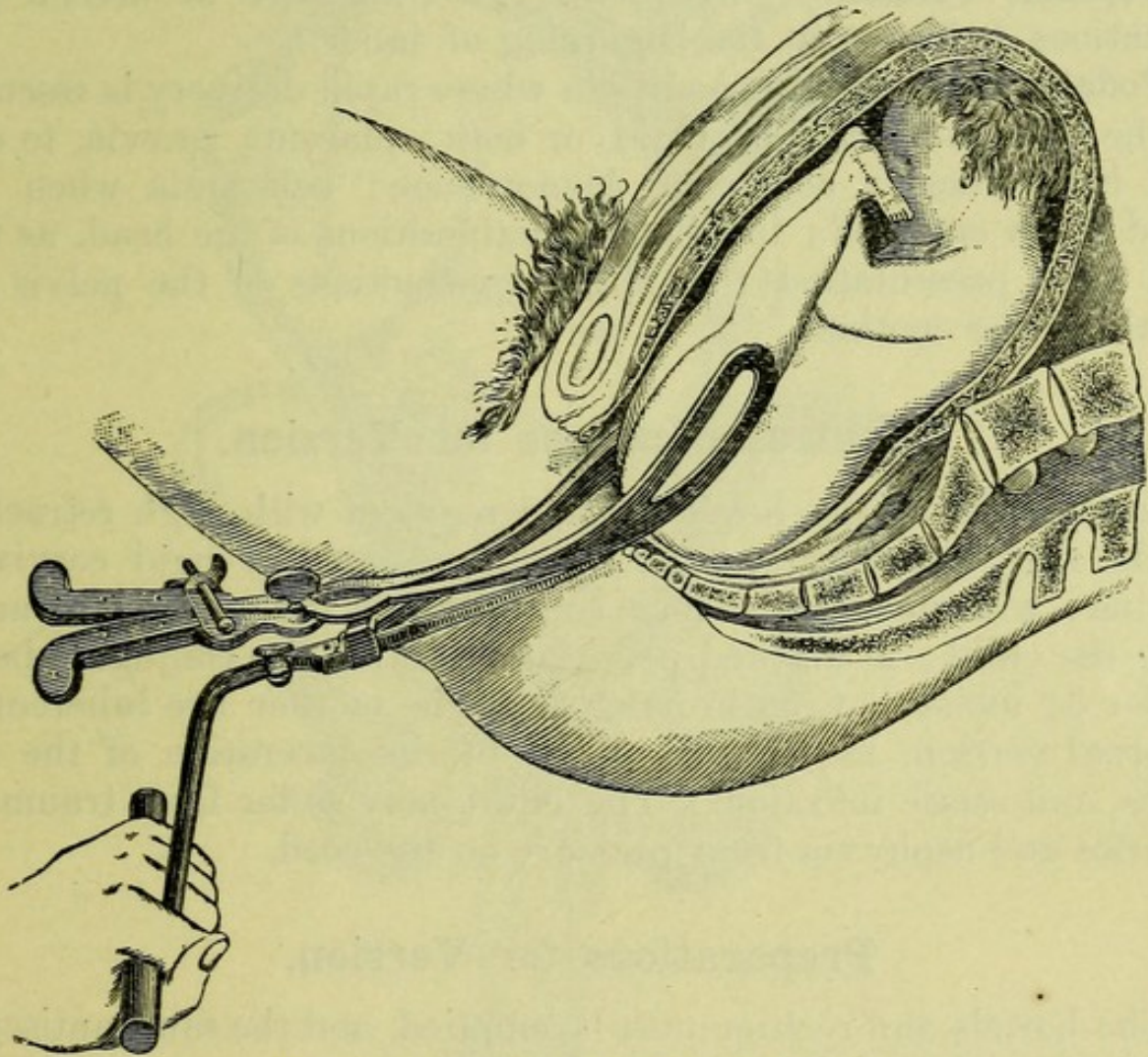
Traction should be backward and downward and then gradually upward. With the head high, forceps are contraindicated. The various methods described for the delivery of head-last cases are generally sufficient, so that the forceps are rarely called into requisition.



### Forceps to the Breech.

When the breech becomes impacted, and other methods fail or are impracticable, the forceps may be tried. With the breech in the transverse position the blades are applied to the lateral surfaces of the thighs (Fig. 73); with complete rotation, one blade should lie over the sacrum and the other over the thigh. A lim-

FIG. 73.



Tarnier's forceps applied to the breech.

ited pull is desirable. The axis-traction instrument is best adapted for breech cases.

### VERSION.

Version, or turning, consists in substituting one foetal pole for another or in exchanging an unfavorable portion of the body for the part originally presenting, as transverse or shoulder presentation to breech or head.



**Varieties.**—There are two : *cephalic*, or the substitution of the head for some other part ; and *podalic*, in which the feet are brought down into the birth-canal. These changes in foetal presentation are accomplished by either external or internal manipulations, or by a combination of the two.

### Indications for Version.

**Cephalic Version.**—Infrequent. In transverse or breech presentations before or at the beginning of labor.

**Podalic Version.**—In conditions where rapid delivery is essential in the interest of mother, child, or both ; placenta prævia, to control hemorrhage ; accidental hemorrhage ; eclampsia when the head is not engaged ; irreducible malpositions of the head, as face and brow presentations ; in slight contractions of the pelvis ; in death of the mother.

### Contraindications for Version.

In thinning of the lower uterine segment with high retraction of the ring, lest rupture occur ; with undilated or rigid cervix or vagina ; with membranes long ruptured and the uterus contracted over the child ; in marked pelvic deformities, the conjugate being under  $3\frac{1}{8}$  inches. Certain dangers to the mother are inherent to internal version, as rupture of the uterus, laceration of the soft parts, and septic infection. The child may suffer from traumatic injuries and asphyxia from pressure on the cord.

### Preparations for Version.

The bowels and rectum must be emptied, and the same antiseptic precautions observed as in all operative cases.

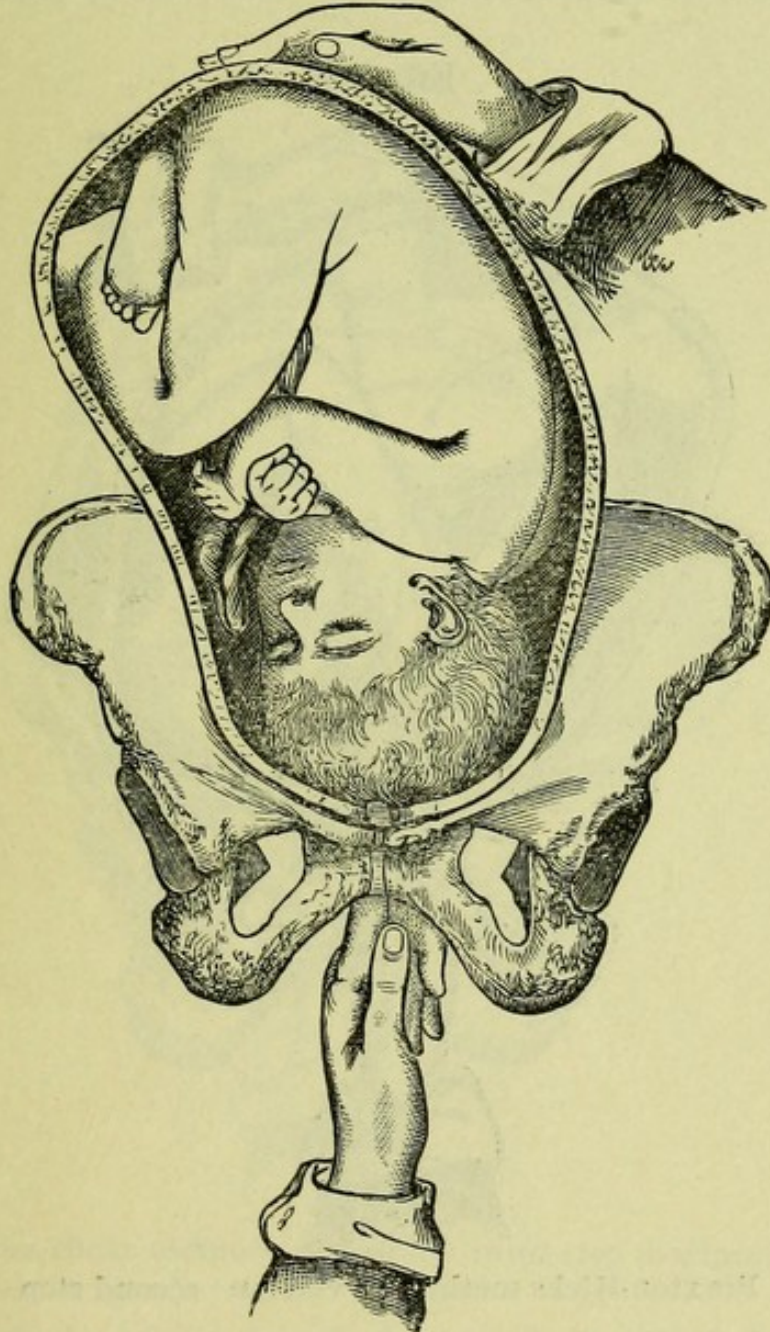
### External Version.

This should be undertaken before the beginning of labor, with unruptured membranes and a not too thick abdominal wall. The patient is placed on her back with legs flexed and knees separated. With a stroking movement the presenting part is pressed to one side and then upward, while with the other hand the upper pole of the child is forced to the opposite side and downward. This must



be done carefully and gradually during the intervals between contractions, and the change in position gained must be maintained during each pain by steady pressure over the parts. When the position has been rectified, the presenting part should be forced into

FIG. 74.



Braxton-Hicks method of version: first step.

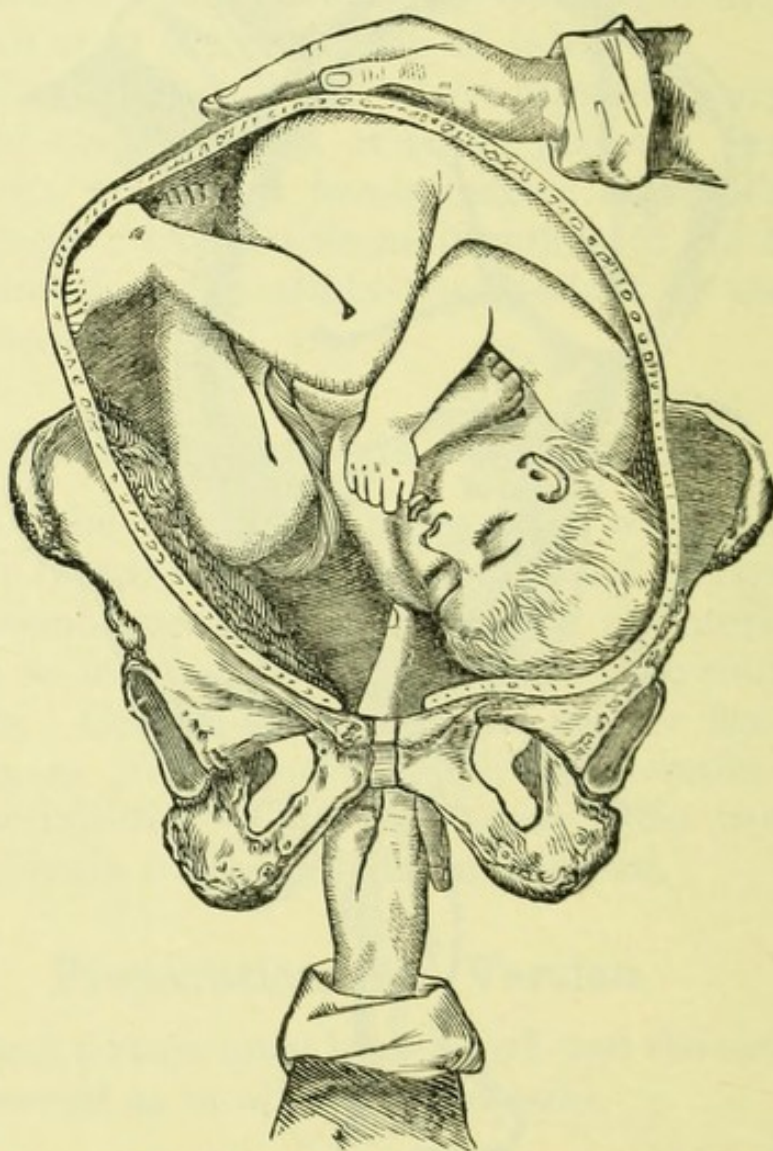
the brim by suprapubic pressure, and a pad applied on each side of the uterus and secured by a bandage. Sometimes it is desirable to rupture the membranes to secure the presenting part in position and prevent return to the former condition.



**Combined or Bipolar Version (Braxton-Hicks Method).**

The patient is anæsthetized and placed in the lithotomy position. One hand is introduced into the vagina and two fingers into the cervical canal. If the shoulder presents, and it is desired to bring down the head, the internal fingers push the shoulder upward in the direction of the extremities, while at the same time the external

FIG. 75.



Braxton-Hicks method of version : second step.

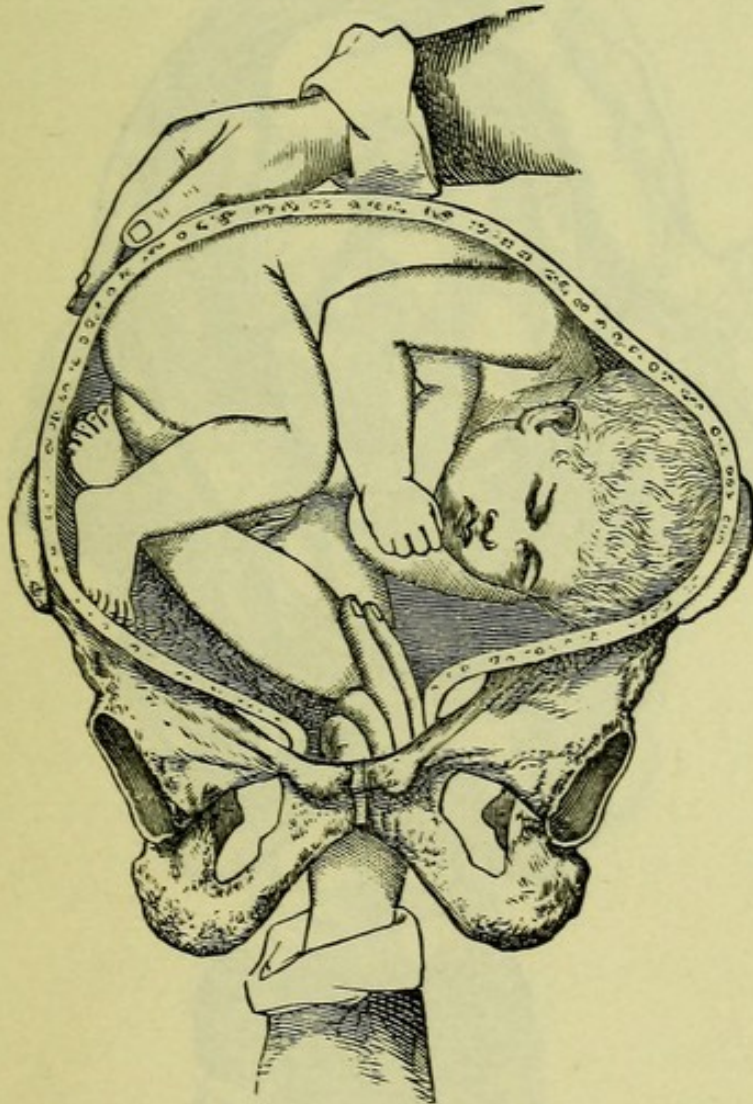
hand presses the head down to the os. If it is desired to bring down the feet, the internal fingers press the presenting part upward in the direction toward which the occiput points, while the free hand on the abdomen presses the breech downward in the direction of the feet (Figs. 74-76). In this way the parts are gradually "edged along" until a knee is within reach, when the membranes



must be ruptured, the knee seized, and the leg drawn down to the vulva, thus engaging the breech.

**Podalic Version.**—The position of the small parts of the lower extremity must first be determined by external palpation. The hand of the operator, the palmar surface of which looks to the child's abdomen, is the one used in the internal manipulations.

FIG. 76.



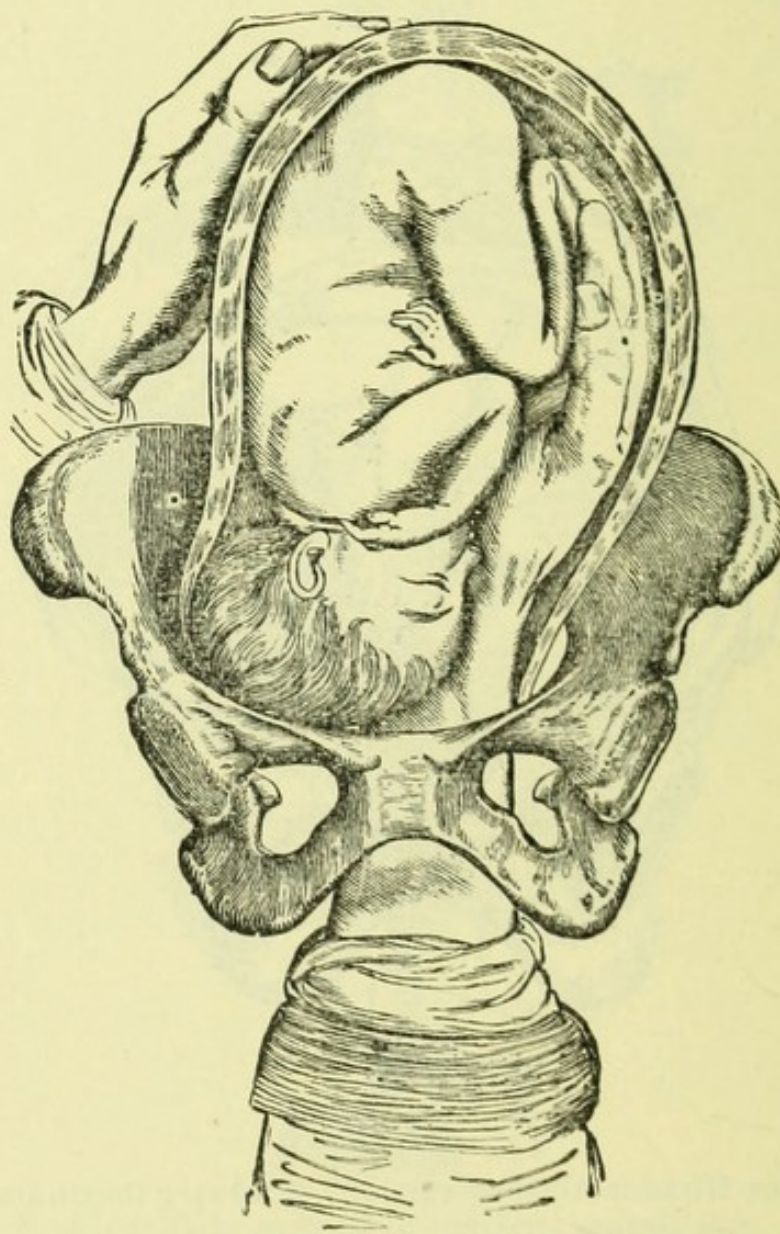
Braxton-Hicks method of version : third step (beginning).

Thus feet to left the right hand, feet to right the left hand. The os must be completely dilated, or nearly so, and dilatable. The operator's hand is introduced into the vagina and the cervix, the membranes, if intact, ruptured, and the hand gently and quickly carried upward into the uterine cavity until the feet are felt (Fig. 77). One foot, the *anterior*, if possible, is then seized between the two first fingers and thumb and the leg gradually pulled



down until the knee appears at the vulva (Fig. 78). As the leg is drawn downward, upward pressure of the child's shoulders and head toward the fundus by the free hand on the abdomen will greatly facilitate the evolution of the body. When the labor must be terminated at once, it is best to bring down both feet and

FIG. 77.



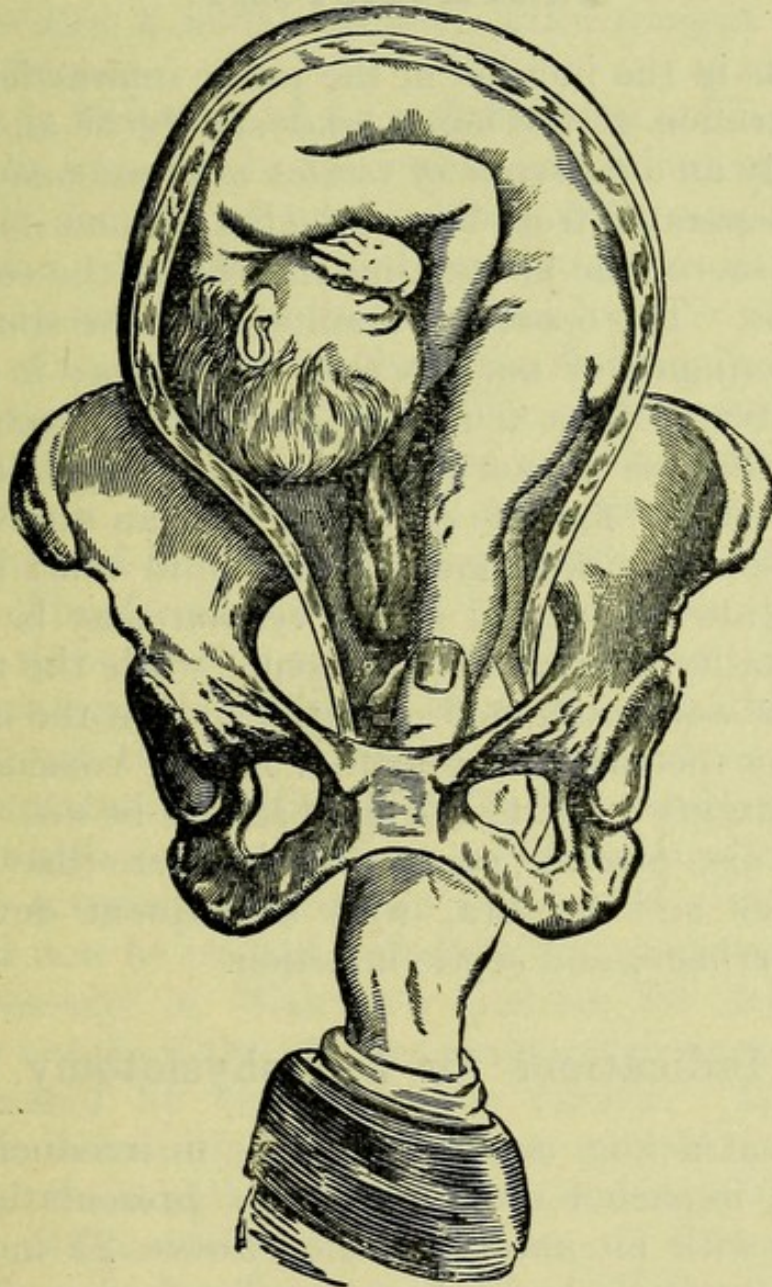
Internal podalic version : grasping the foot.

then extract the trunk and head, as has been already described under breech delivery. *If there is no haste, after the knee has been drawn to the vulva it is best to leave the completion of delivery to the natural forces. The exposed limb must be constantly covered with hot towels.* In shoulder presentations the feet are



found lower down than when the head presents. If an arm is prolapsed a long tape or strip of bandage may be fastened about the wrist and the arm loosely held during the process of turning. A malposition of this member is thus prevented. If

FIG. 78.

Podalic version: turning the child.<sup>1</sup>

the knee or leg is more accessible than the foot it should be seized, and no time lost in seeking for the latter. When the leg is brought down and the presenting shoulder or head fails to recede,

<sup>1</sup> This figure is faulty in representing *both* feet within the operator's hand. In the best modern practice he seizes only *one* foot, except for rapid extraction.



the leg may be held with the hand or a tape tied around the ankle, while the other hand in the vagina pushes the resisting part upward and out of the way. The knee-elbow position may also be tried in rectifying this complication.

### SYMPHYSIOTOMY.

This consists in the incision of the pubic interarticular cartilage to obtain separation of the bones, and should be an elective operation, generally an *alternative of version or craniotomy*. The pubic bones can be separated from  $2\frac{1}{2}$  to 3 inches without doing particular damage to the sacro-iliac joints, thus increasing the conjugate diameter  $\frac{1}{4}$  to  $\frac{1}{2}$  inch. The operation is suitable in the simple flat pelvis with a true conjugate of not less than  $2\frac{3}{4}$  inches; in the generally contracted pelvis with a true conjugate of  $3\frac{1}{5}$  inches, when the head of the child is of normal size and a slight increase in the conjugate will suffice for safe delivery. As an alternative of version the question of risk to mother and child must be considered. With a conjugate of over  $2\frac{3}{4}$  inches version may be possible, but the foetal mortality is great (33 per cent.), while the maternal danger is slight in well conducted operations. On the other hand, in symphysiotomy the risk to the mother is very considerable (about 12 per cent. fatality), but to the child should be *nil*. The dangers to the mother are, possible rupture to the sacro-iliac joint; injury of the bladder and urethra, with subsequent development of fistulæ; hemorrhage, and septic infection.

### Indications for Symphysiotomy.

In pelvic contraction, as noted above; in irreducible face presentations; in impacted occipitoposterior presentations. In contracted pelves with an anteroposterior above  $2\frac{3}{4}$  inches, delivery in Walcher's position by version or the forceps should be attempted tentatively.

### Essential Conditions for Symphysiotomy.

A living child; both mother and child in good condition, not exhausted by prolonged labor; a dilated or readily dilatable cervix.



## Method of Performing Symphysiotomy.

While several operations have been advocated, that known as the suprapubic method is selected for description as possessing simplicity and comparative ease of execution.

The **necessary instruments** are a scalpel, a strong probe-pointed bistoury or Galbiati knife, a flat director, several hemostats, needle-holder and needles, a metal catheter, silkworm-gut and chroma-cised catgut sutures.

**The Patient is Prepared as for a Cœliotomy.**—The bowels and bladder must be evacuated; the pubic and labial regions shaved and thoroughly disinfected by scrubbing with soap and then bi-chloride solution (1 : 2000); and an antiseptic vaginal douche given. The incision, two or three inches long, is made from the upper margin of the symphysis along the median line of the abdomen, through skin, fascia, and fat. The recti muscles are separated by the fingers and scalpel handle, and the retropubic tissues carefully detached. The catheter is now passed by an assistant, and the urethra and bladder neck depressed and carried slightly to the right. The forefinger of the left hand or the director is carried down through the opening to the lower margin of the symphyseal cartilage, the knife is inserted along this guide, and the symphysis cut through from below upward and within outward. It is important that the subpubic ligament be also severed. Hemorrhage, which may be profuse, may be controlled by twisting or ligating the arteries and packing the wound with gauze. The incision should now be packed with iodoform gauze and the patient placed, if necessary, in Walcher's position for delivery. This may be left to nature if the uterine contractions are strong, but is usually terminated by version or the forceps. If the head is freely movable above the brim turning may be performed; if engaged, or in the middle strait, the axis-traction forceps should be employed. Malpositions of the head should be corrected as far as possible before the forceps are applied. During traction strong pressure on the trochanters must be made by the assistants to prevent too great separation of the pubic bones and rupture of the sacro-iliac joints. The placenta may be expressed in the usual manner. After the third stage of labor is completed the suprapubic wound must be cleansed and the bones brought together by inward rotation of the patient's thighs. Care must



be taken that the bladder or urethra is not caught between the bones. The legs of the patient should now be straightened out and the abdominal wound closed. It is unnecessary to suture the bones, but it may be desirable to unite the prepubic fibrous tissue by one or more sutures of silkworm-gut or chromacised catgut. The skin-wound is closed by interrupted silkworm-gut sutures. Any antiseptic powder may be dusted over the wound. The dressings are then applied and held in place by a three-inch-wide strip of adhesive plaster, which also assists in keeping the bones in apposition. Immobilization of the pelvis is secured by a broad, strong inelastic binder which must be tightly pinned. The patient should lie on a firm, hard bed and retain the recumbent position for at least three weeks. After the first week she may lie on her side, but the legs should be kept straight, with the knees tied loosely together. The bandage should be worn for several weeks after the woman leaves her bed.

### CESAREAN SECTION.

By this operation the child is delivered through an abdominal and uterine incision.

#### The Indications for the Operation.

These are absolute and relative.

**Absolute**, when the child, whether living or dead, can be delivered in no other way, as in a flat pelvis with a true conjugate of  $2\frac{1}{2}$  inches with a living child, or two inches or less with a dead child; in marked degrees of osteomalacia, kyphosis, spondylolithesis, Naegele pelvis; tumors blocking the birth-canal; cancer of the cervix and rectum and atresia of the vagina.

**Relative**, when delivery can be effected in some other way, but with equal or increased risk to the mother and with death or exceeding danger to the child, as in flat pelvis with a conjugate of  $2\frac{3}{4}$  inches. When possible the operation should be elective and undertaken near the middle of the last month of pregnancy.

#### Preparations for Operation.

With an elective operation, the woman should receive preliminary treatment. She should be kept in bed for the preceding two



or three days, on light diet, and the bowels should be freely opened and the urine examined. The night before operation the median line of the abdomen and the pubes should be shaved and thoroughly scrubbed with soap and water, followed by bichloride (1 : 2000). A gauze pad wrung out in bichloride solution should then be placed over the abdomen and held by a binder. She should also receive two compound cathartic pills or a half ounce of Epsom or Rochelle salts. In the morning she should have an enema of soap and water and an antiseptic douche. When on the table the gauze pad is removed and the abdomen again scrubbed with soap and water, followed by bichloride, dried with a sterile towel, and then covered by ether.

The **instruments required** are a scalpel, twelve artery forceps, six long compression forceps, a right and left ligature carrier, a stout vulcellum forceps, a needle-holder, six large and six small needles, a steel dilator, silkworm-gut and heavy silk and catgut sutures. The instruments and ligatures should be thoroughly sterilized. The operator and assistants prepare as for an ordinary abdominal section. Before the operation has begun, the abdomen—having been prepared—is covered with dry sterile towels, over which towels, wrung out of warm bichloride solution, are placed. The incision, in the median line, should be from four to six inches long, and extend upward from just above the pubes. When the peritoneum is reached it is picked up by two catch forceps and nicked between, the opening being enlarged with the scissors. The uterus is then lifted out of the wound and warm, moist, sterile towels packed behind it into the abdominal cavity. *An assistant now grasps the uterus with both hands around the lower uterine segment and makes steady pressure to control the hemorrhage.* The incision in the uterus should be about four inches long and in the upper or middle third, and should include all of the muscles down to the ovular membranes. It is of no consequence whether the placenta is cut through or not. As soon as the uterus is opened the operator introduces his hand, ruptures the membranes, seizes the child by the most available part, and extracts. The cord is clamped by two artery forceps and cut between, and the child turned over to an assistant or nurse. The operator then again inserts his hand into the uterus, grasps the placenta, squeezes it, and gradually peels it, together with the membranes, from the uterine wall. *A hypodermic of ergot aseptic*



*should be given the patient at this time to promote uterine contraction.* If the cervical canal is not sufficiently open to afford good drainage it should be dilated with the steel instrument and a long strip of iodoform gauze introduced through it into the vagina from above. The wound in the uterus must now be closed by deep and superficial sutures. The deep sutures (silk or chromacised catgut) are entered about an eighth of an inch from the edge of the wound, and pass through the muscular layers to the mucosa, where the needle is brought out and again entered on the opposite side, to emerge at a point corresponding to its entrance. These sutures should be about an inch apart and, when all are placed, may be tied with two or three knots and cut short. Intermediate sutures may be placed between the deep sutures if necessary. The deep sutures and the wound are now to be covered in by a fold of peritoneum which is brought together by a running suture, or interrupted sutures, of silk or catgut. When the uterine wound has been closed the assistant holding the uterus may relax his grasp. Undue bleeding or oozing may be checked by holding a sponge or gauze wet in hot water against the spot. The uterus is now returned to the abdominal cavity, the towels removed, and the peritoneal toilette made. Great care should be taken during this important step in the technique. *Last of all, the omentum is brought down and carefully spread over the anterior surface of the uterus, covering over the line of incision.* The abdominal cut may be united by through and through sutures or by three layers, catgut being used for the peritoneum, muscle and fascia, and silk-worm for the skin. Antiseptic powder is dusted over the wound, the dressings applied and held in place by wide strips of adhesive plaster, which should half encircle the patient, and a binder put on. If during, or immediately after, the operation the patient shows signs of shock, a pint of normal saline solution containing an ounce of whiskey may be injected into the rectum, and a similar amount transfused under each breast. In the after-treatment the patient should receive nothing by mouth for the first twenty-four hours. She should then be given two ounces of liquid nourishment every two hours for the first five or six days, and afterward soft diet until she is able to resume her ordinary fare. The urine must be drawn for the first few days. The bowels should be moved on the third day, or sooner if vomiting continues and symptoms of peritonitis arise. She may begin to sit up at the



close of the third week. *The binder should be worn for a year following operation.* After a few hours of rest, should no untoward symptoms develop, the child may be put to breast at the usual times.

### **CELIOHYSTERECTOMY (PORRO'S OPERATION).**

This consists in the removal of the uterus after the delivery of the child. The steps of the operation are the same as just described until after the extraction of the foetus. The broad ligaments are then tied off or clamped, the uterine arteries being subsequently ligated, severed, the cervix cut through, and the uterus removed. If the cervical canal is not already dilated this should be done, and the cavity swabbed out with pure carbolic acid followed by alcohol. The stump is then carefully covered by peritoneum, which is sewed over with catgut, and the broad ligaments are brought together and sewed with the same material. The peritoneal toilette and the closure of the abdominal wound is made in the manner already described.

### **EMBRYULCIA (EMBRYOTOMY).**

These terms designate operations by which the foetus is mutilated in order to render delivery possible. As a rule, they should be performed only on the dead child, excepting, always, in the case of monstrosities.

### **CRANIOTOMY.**

Perforation of the child's head with the removal of the brain. Instruments: Braun's perforator or Naegele's scissors, Braun's cranioclast, bone forceps, a sound, and a syringe. The woman's vulva and vagina, the operator's and assistant's hands, and the instruments must be rendered sterile. The patient, anæsthetized, is placed across the bed or table in the lithotomy position. Suprapubic pressure is made by an assistant to steady the head. The operator then introduces his left hand into the vagina and locates the point to be perforated, usually the parietal bone, rarely a suture or fontanelle. With this hand the end of the trephine is pressed against the head and guarded from slipping and injuring the maternal soft parts, while the operator's other hand grasps the instrument farther down the shaft and steadies it while an assistant



turns the handle. When the skull has been pierced the instrument is removed, the sound entered through the opening and the brain thoroughly broken up. The syringe nozzle is then introduced and the brain washed out. The solid blade of the cranioclast is introduced into the skull and the fenestrated blade applied outside, the handles locked, the screw tightened, and traction made in the axis of the pelvis as in forceps operations. When the scissors are used the point is placed against the skull and a boring motion made until perforation is accomplished. The blades are then opened in different directions and the opening enlarged, and the brain broken up and washed out. In craniotomy of the after-coming head the perforation should be made at the base of the skull or through the mouth, the child's body being lowered or raised according to the position of the part perforated.

### CEPHALOTRIPSY.

In this operation the skull is crushed by heavy forceps. The instrument is applied to the head in the same manner as ordinary forceps, the blades locked, and the compression screw turned until the head is crushed and lessened in size. Unless the Tarnier basiotribe is used (Fig. 79), perforation and evacuation of the brain-matter must precede the crushing process.

### DECAPITATION.

The separation of the child's head from the body is rarely called for, but in some impacted transverse presentations with threatened rupture of the uterus, in locked twins, and in monsters, it may sometimes be indicted. The best instrument for the purpose is Braun's decapitation hook.

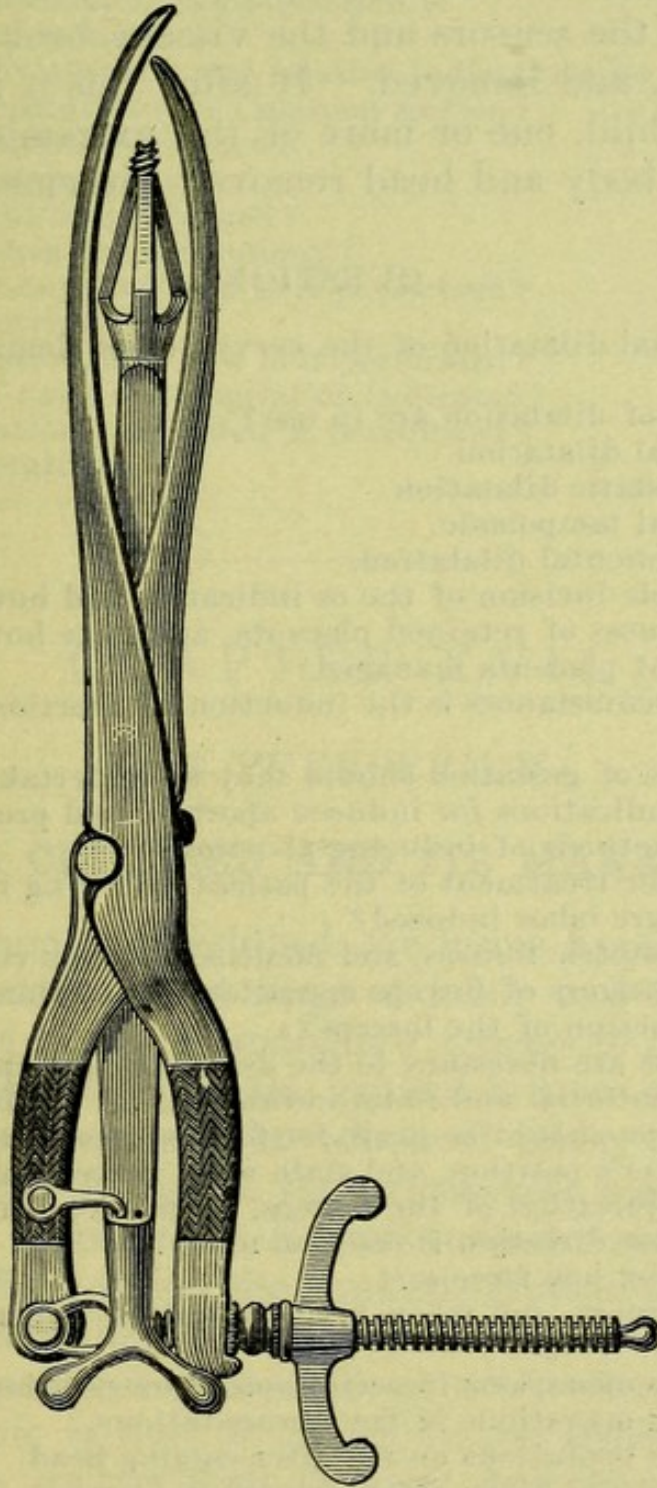
### Method of Operating.

The operator introduces the hand which is nearest the child's head into the vagina and up to the child's neck. The hook is then passed flat along the hand until the neck is reached, when it is turned and firmly settled over the part. The handle of the hook is then turned, traction being made at the same time, until the neck is severed. During the twisting the fingers of the vaginal hand should guard the tip of the hook, so that in case of slipping



the maternal soft parts may not be injured. The head may be extracted by the fingers holding to the inferior maxilla, by bone

FIG. 79.



Tarnier's basiotribe.

forceps, or the obstetric forceps may be applied. In maldevelopment, perforation of the decapitated head may be necessary before delivery can be accomplished.



## EVISCERATION.

When the neck cannot be reached for decapitation, in order to effect delivery the abdomen or thorax may have to be opened and the viscera removed. The most accessible portion of the body is perforated with the scissors and the viscera broken up by the fingers or a sound, and removed. If after this it is still impossible to extract the child, one or more of the extremities must be amputated, or the body and head removed piecemeal, until delivery is possible.

## QUESTIONS.

When is artificial dilatation of the cervix or os demanded, and what are the indications?

What methods of dilatation are in use?

Describe manual dilatation.

Describe hydrostatic dilatation.

Describe vaginal tamponade.

Describe instrumental dilatation.

When is multiple incision of the os indicated, and how is it done?

Describe the causes of retained placenta, and state how it is managed.

How is adherent placenta managed?

Under what circumstances is the induction of abortion or premature labor permissible?

At what periods of gestation should they be undertaken?

What are the indications for induced abortion and premature labor?

What are the methods of inducing abortion?

What is the after-treatment of the patient following induced abortion?

How is premature labor induced?

Describe the obstetric forceps, and mention those in common use.

What are the dangers of forceps operations for mother and child?

What is the function of the forceps?

What conditions are necessary to the use of the forceps?

What are the maternal and foetal indications for the forceps?

What preparation should be made for forceps operations?

Describe Walcher's position, and state what it accomplishes.

Describe the application of the forceps, (*a*) pelvic, (*b*) cephalic.

How and in what direction is traction made?

What is meant by low forceps?

What is high forceps, and when is the operation indicated and contraindicated?

Describe forceps operations in occipitoposterior positions.

Describe forceps operations in face presentations.

Describe forceps operations on the after-coming head.

Describe forceps operations on the breech.

What is version, and what are its varieties?

What are the contraindications for version?

What preparations should be made for version?

What is external version, and how is it performed?

What are the indications for podalic version?

What is combined or bipolar version?

How is podalic version performed?



- What is symphysiotomy?  
How far can the pubic bones be separated without dangerous consequences?  
Under what conditions is symphysiotomy suitable?  
What are the indications for the operation?  
What are the essential conditions for symphysiotomy?  
Describe the operation of symphysiotomy.  
What is Cesarean section?  
What is meant by absolute and relative indications for this operation?  
Describe the preparations for Cesarean section?  
How is the operation performed?  
What is celiohysterectomy?  
How is the operation performed?  
What is embryulcia or embryotomy?  
What is craniotomy, and how is it performed?  
Describe cephalotripsy.  
What is decapitation, and how is it performed?  
In what class of cases is decapitation indicated?  
What is evisceration, and when is it required?  
Describe the operation.
- 

## CHAPTER XVII.

### THE PUERPERIUM.

#### NORMAL CHILDBED AND ITS MANAGEMENT.

THE puerperium and childbed are terms applied to the period included between the third stage of labor and the return of the organs concerned in the reproductive process to their normal condition. Following delivery the patient is more or less exhausted by the sufferings and muscular efforts of labor, but, satisfied that the dreaded climax is passed, she experiences a sensation of relief, relaxation, and repose, and, if undisturbed, usually sinks into a gentle slumber from which she awakes refreshed and strengthened. In many cases immediately following the expulsion of the placenta the patient experiences a sensation of cold, often amounting to a slight *chill*. This is due, as a rule, to the exposure of the body during delivery, contact with the wet bed linen, as well as to nervous excitement, and is of no moment, passing away as soon as the patient is well covered and a hot drink has been taken. During the first few days the *temperature* of the puerpera is frequently somewhat raised, varying within normal limits to 100° or 100.5° F. It is usually higher in primiparæ than in multiparæ,



depending somewhat upon the severity and length of the preceding labor, and is readily influenced by emotional and other conditions. The *pulse* immediately following labor becomes soft, especially in multiparæ, and more or less accelerated, but soon declines in rapidity, often sinking to 60 beats or less per minute. This slowing of the pulse-rate may continue during the first nine to fourteen days postpartum, and is then succeeded by a gradual return to the normal. It is a favorable sign, but the cause of the bradycardia has not been satisfactorily determined. The pulse is easily influenced by slight temporary conditions, as diet, a full bladder and rectum, and nervous disturbances. A rapid pulse following delivery may denote hemorrhage, serious nervous disorder or septic infection. The pulse is, in reality, of much greater value in determining the condition of the patient than is the temperature. The *lung capacity* postpartum is somewhat increased, and respiration is fuller and freer. During the first week the *activity of the skin* is increased, and the body is moist and often covered by a sensible perspiration. Actual sweating is most marked during sleep and in the feeble. It is often increased by too warm bed coverings and an overheated room. The *urine* is clear, pale, and at first of low specific gravity (1010). The urea may be slightly diminished, but is later somewhat increased; the chlorides do not vary greatly from the normal, but may be increased according to the food ingested. The phosphates and sulphates are increased. Sugar, peptone, and albumen may be present. The former is due to absorption of milk-sugar from the mammary gland and to nervous influences; the latter is abnormal. Peptone is found more constantly, and is probably in relation with the involution changes taking place in the uterus. *Ischuria* is of frequent occurrence, and the bladder may become enormously distended. This may be due to lessened intra-abdominal pressure, to relaxation of the abdominal walls, to contusion of the urethra from pressure of the child's head during delivery, or the soreness and tumefaction of the parts may cause the patient to refrain from increasing her sufferings by voluntarily emptying the bladder. In many cases the retention is due to the inability of the patient to void the urine in the dorso-recumbent position. For the first few days following delivery the *appetite* is usually diminished, the tongue slightly furred, and *thirst* increased. The *bowels* are usually sluggish, partly on account of the limited diet, but also



from lessened intra-abdominal pressure, decreased peristalsis of the descending colon and rectum, and increased draft on the fluid of the blood by skin, kidneys, breasts, and uterus.

### INVOLUTION OF THE UTERUS.

Following the expulsion of the placenta the contracted uterus may be felt as a firm, hard body, somewhat flattened in its supero-inferior diameter like a turnip, with the fundus about midway between the pubis and the umbilicus. In about six hours the fundus has risen to the level of the umbilicus, but from this time on it gradually sinks, until by the ninth or twelfth day it is again behind the symphysis. In the majority of cases the position of the organ is anterior, but occasionally it is displaced backward. At term the uterus weighs about two pounds, by the second or third day following delivery it is reduced to about  $1\frac{1}{2}$  pounds, by the fourteenth day it weighs in the vicinity of eleven ounces, and by the end of the second month it has returned to nearly its normal size. The rate of involution varies somewhat with different individuals, it is more rapid in women who suckle their young, and is retarded after twin pregnancy and when the loss of blood during labor has been large. The retrogressive changes in the uterus are due to the processes taking place in its constituent elements; the *musculature* undergoing a fatty degeneration and a paratrophic change which results in the destruction and disappearance of some of its fibres, with a diminution in the size of others. The connective tissue undergoes a similar process of involution. The *mucosa*, the lower leaf of the decidua which remains behind in the uterus after the expulsion of the membranes, undergoes atrophy and fatty degeneration and passes off in the lochia, the uterine walls being gradually recovered by an upgrowth and proliferation of the glandular epithelium, so that by the fourth week postpartum they have become entirely resurfaced. The *cervix* at first hangs loose and flabby in the vagina, but by the end of twelve hours has begun to retract, and at the close of the second week has about regained its former size and shape. Somewhat similar changes as those going on in the uterus take place in the *tubes* and *ovaries*. The overstretched *vagina* and *vulva* gradually regain their tone and return to their normal size and shape, but the folds in the former are never fully reformed, and



both the apertures remain permanently wider. The *uterine ligaments* are slower in returning to their normal condition, and several months may elapse before this is accomplished. The *abdominal walls* following delivery are soft and flaccid, but the skin soon regains a part of its elasticity, especially in primiparæ; the tonicity of the muscles returns within a few hours. Permanent scars in the skin (*lineæ albicantes*) remain in about 10 per cent. of cases, and where the abdominal distention has been great *diastasis of the recti muscles* may be permanent.

### THE LOCHIA.

As the result of the involution changes going on in the pelvic organs, especially in the uterus, there occurs a discharge from the genitals—the lochia. During the first week it is composed almost entirely of blood and disintegrated epithelial cells (*lochia rubra* or *cruenta*); for the following week or ten days it is lighter in color and the amount of blood is greatly diminished (*lochia serosa*); and from this time on to the cessation of the flow it assumes a leucorrhœal or pus-like character (*lochia alba*), and contains fatty and disintegrated epithelium, cholesterine, detritus, and pus, the latter derived from the granulating cracks and excoriations of the parturient tract. After the first day or two the lochia contains a variety of microorganisms, some of which may be pathogenic. The chemical constituents of the lochia are, albuminate of soda, mucine, saponified fat, chlorides, phosphates, and lime salts. When decomposed the odor is penetrating, due probably to butyric acid. The total amount of lochia lost during the first eight days has been estimated by Gassner to be about 3½ pounds. The flow may cease entirely any time between the second and the sixth week. It is likely to be increased by the addition of a little fresh blood, from muscular exertion, at about the time when the patient begins to get about.

### THE MAMMARY GLANDS AND LACTATION.

At the beginning of pregnancy certain changes in the mammary glands take place associated with the formation of an opaque, watery fluid called colostrum, which contains irregular bodies filled with oil globules—the colostrum corpuscles. This fluid has



a laxative effect upon the child, and is its only nourishment for the first forty-eight hours or longer after delivery, the function of *lactation* being established from the second to the fifth day post-partum. At the beginning of secretion the mammary glands enlarge, the skin over them is stretched, smooth, and occasionally reddened, and the engorged superficial vessels become visible through the tense and shining integument. The lobes of the gland have an irregular knotted feel. A certain amount of soreness is usually present, and at times this may amount to actual pain if the breasts are not emptied. The pain is localized or radiates toward the axilla—the glands of which may also participate in the swelling—and thence down the arm. These phenomena usually subside in a few hours and the milk-flow becomes established. *Human milk* is a thin, bluish-white, opaque fluid, of alkaline reaction and a specific gravity of 1029 to 1032. Microscopically it consists almost entirely of milk globules containing fat. Chemically it is made up of water and solids—fat, milk-sugar, proteids, and salts. The percentage of its constituents may vary considerably in different women, in the same woman at different times, and in the two breasts of the same woman, as seen from the following table:

Fat . . . . .	2.02– 5.16	per cent.
Milk-sugar . . . . .	5.68– 7.30	“
Proteids . . . . .	1.08– 4.17	“
Ash . . . . .	0.12– 0.21	“
Water . . . . .	84.70–89.68	“ (Rotch.)

The amount of milk secreted in twenty-four hours varies greatly; after the second week it approximates one to four pints per day, varying in different women, in the same woman, and even in the two breasts. *Psychic* and *nervous* conditions may so vary the quality of the milk as to render it unwholesome. During *menstruation* the amount secreted is somewhat diminished and the quality is also changed. Generally the digestion of the infant is very little if at all affected, but in some instances gastro-intestinal disturbances may arise. Certain *drugs* administered to the mother may pass into the milk and affect the child. Among these are hydrochloric, citric, and acetic acids, opium and morphine, quinine, iodoform, iodine, the mercurials, arsenic, and chloral.

Lactation continues for from nine to twelve months, but may



be prolonged beyond this period. The changes in the constituents of the milk, however, render it less and less suitable as a food for the child after the eighth or ninth month. Nursing exerts a distinct action upon the generative organs, as a rule hastening the process of involution.

### THE MANAGEMENT OF THE PUERPERIUM.

The duties of the accoucheur are by no means at an end with the expulsion of the placenta ; he must possess a knowledge of all the details of the lying-in period, and direct the management of both mother and child during the entire course of the puerperium. However experienced and trustworthy the nurse may be, nothing should be left to her discretion ; the physician alone is responsible for the welfare of the two patients as long as they remain under his care. The puerperal woman, on account of the peculiar physiological changes going on within her organism, is especially susceptible to morbid processes, the most important of which is *septic infection*. This disorder is due to the invasion of micro-organisms which in almost every instance gain entrance into the body through the genital canal. In dealing with the puerperal woman, therefore, the strictest cleanliness must be observed, and everything coming in contact with the parturient tract—hands, instruments, and material—must be strictly aseptic. The first duty of the physician following the third stage of labor is to see that the uterus is well contracted and retracted, and control of the organ should be maintained for at least one hour following delivery. By so doing excessive blood-loss and postpartum hemorrhage may be averted. A drachm of fluid extract of ergot should be administered at this time to promote uterine contraction. As soon as this has been established all evidences of the recent labor should be removed from the lying-in room, and the patient made comfortable. The patient's nates and thighs, which have become soiled during the labor, should be bathed with warm water and soap, and the external genitals sprayed off with an antiseptic solution (lysol, 1 per cent. ; carbolic acid, 1 : 80), then dried with sterile gauze or cotton, the occlusive dressing applied over the vulva, and the temporary bed removed. The patient may then have a cup of tea, hot milk or broth, and be left to rest, but during the first sleep the uterus must be carefully watched



lest it relax and serious, if not fatal, hemorrhage occur. As a rule, in a normal puerpera the dressings need not be changed oftener than six times during the twenty-four hours for the first few days. The local toilette should be made two or three times a day. As soon as convenient after the first toilette, the physician sterilizes his hands and, with the patient on her left side, introduces one finger into the rectum and the thumb into the vagina, to ascertain the condition of the perineum. A very considerable laceration may not be evident to inspection alone, and the routine examination of the perineum will be necessary to guard against oversight. Douching of the vagina is not permissible except under special conditions. A suppository containing iodoform (gr. v) or boric acid (gr. v) and aristol (gr. iij) may be inserted into the vagina night and morning with benefit.

The **binder** should be considered indispensable. It may be made of unbleached muslin, and should be wide enough to extend from pubis to ensiform cartilage, and long enough to go around the patient's body and slightly lap. In pinning, the binder should be tightest in the middle; it should not be so tight as to press upon the uterus and crowd it backward or to either side. The binder has little or no effect in restoring "form," but acts as a splint to the relaxed abdominal muscles and exerts a decided influence in promoting the involution of these parts.

**Rest.**—Perfect physiological rest of body and mind are essential to the well-being of the lying-in woman. With the exception of the nurse, the physician, and one or two members of her immediate family, she should see no one for the first week or fortnight. Visitors from outside should be absolutely interdicted. All noise and disturbance in or about the lying-in room should be prohibited, and the patient should be protected from annoyance of every kind. For the first few days she should lie on her back and for the few hours immediately following delivery the head should be without the support of a pillow. *Sleep* is important, and wakefulness should be overcome by mild hypnotics. The question of sitting up must be decided by the individual case, but in any instance until the uterus is well involuted and has resumed its position behind the pubis the erect position is undesirable. Among the upper classes, where involution of the local organs is apt to be slow, three weeks in bed is a good rule, the patient remaining in her room until the end of the fourth week. With healthy women of the laboring



class, in whom muscular development has not been sacrificed to brain culture and social excesses, the uterus and adnexa resume their normal proportions much more rapidly, but even in such cases two weeks in bed are desirable.

### After-pains.

Following delivery, especially in multiparæ or where the uterus has been excessively distended (twin pregnancy, hydramnios), painful contractions occurring at irregular intervals for two or three days may give rise to much distress. These are usually due to lack of firm contraction of the uterus and the formation of blood clots in its interior. When the contractions are not severe a few drops of spirits of camphor on a lump of sugar will often give relief. When severe, drugs to promote uterine contraction, expel the clots, and thus remove the cause should be given.

R    Extr. ergotæ fl.,                     $\bar{3}j$  ;  
       Extr. hydrastis fl.,                 $\bar{3}ss$  ;  
       Tr. opii camphoratae, q. s. ad  $\bar{3}iij$ .  
 M. and Sig.—Teaspoonful every three hours.

Morphine in combination with chloral hydrate may also be given, or Dovers' powder (gr. v) ; phenacetin (gr. v) with sod. bicarb. (grs. iij) ; antipyrin (grs. v) will be found useful. If the pains are of a neuralgic type, the following may be given :

R    Phenacetin,                        gr. v ;  
       Quiniæ sulph.,                    gr. iv ;  
       Sod. bicarb.,                      gr. iij.—M.

### The Bladder.

When voluntary micturition is impossible the bladder should be emptied by catheter once in eight or twelve hours, or oftener if required. A No. 7 soft-rubber catheter is best for this purpose. After using, it should be sterilized in boiling water, and then kept in a bichloride solution (1 : 2000). Before it is used again it must be washed off in sterile water to remove the antiseptic, and lubricated with sterile oil. In passing the catheter the parts must be



exposed, the labia separated by the finger and thumb of one hand, and the meatus and surrounding parts bathed clean with an antiseptic solution. The introduction of decomposing lochial discharge into the bladder is prolific of cystitis, often of a serious character.

### The Bowels.

On account of the inactivity of the bowels, from causes already mentioned, laxatives are generally necessary. They should be moved on the second or third day, and if the conditions are not urgent a soap-and-water enema containing a drachm of spirits of turpentine and a half ounce of glycerine will be sufficient. Later the compound rhubarb pill (No. II.); one or two drachms of licorice powder in water; Barker's postpartum pill (No. II.); or some of the cascara preparations, may be used. When the breasts are much distended and painful, and constitutional disturbances from beginning milk-secretion arise, saline laxatives for two or three days are indicated, and citrate of magnesia, Rochelle salts, Seidlitz powder, Apenta or Hunyadi water may be given.

### The Breasts.

These should receive careful attention from the first. Following delivery the nipples should be bathed with an antiseptic lotion (bichloride 1 : 2000), dried, and then covered with castor oil, a small square of sterile gauze being laid over each to protect the clothing. Before and after each nursing the nipples should be bathed with a warm saturated solution of boric acid and dried very carefully. When the breasts are heavy and sagging they may be supported by a binder. Although many different patterns for this are recommended, all that is needed is a strip of muslin sufficiently wide to extend from above to well below the breasts. A layer of cotton should be placed at the outer border of each breast and the two glands raised toward the middle line, the binder being pinned sufficiently snug below to hold them in position. Pressure over the glands should be avoided. If the bandage has a tendency to slip down, shoulder-straps, either pinned or sewed on, will hold it in place. Engorgement of the breast is best treated by massage with warm olive oil and the breast-pump. In giving this only the tips of the fingers should be used and the stroke must be light and from the periphery toward the nipple. Rough and unnecessary



pressure must be avoided, lest traumatism give rise to inflammation and suppuration of one or more lobes.

At the completion of labor the physician should remain in the house for at least one hour, or until all immediate danger of hemorrhage has passed. His visits for the first week thereafter may be once a day. At such times the condition of the patient should be inquired into, the state of the pulse and temperature noted, and directions as to the management of the breasts, bowels, and diet given to the nurse or attendant. The welfare of the child must also be ascertained, and inquiry made concerning the character of the stools, the urine, and the cord, and whether the child is receiving sufficient nourishment from the breast.

### DIAGNOSIS OF THE PUERPERAL STATE.

This is chiefly of medico-legal interest. The diagnosis of a recent delivery is only possible when portions of the foetal remains are found in the birth-canal or the microscopical examination of the discharge, fragments, or scrapings from the uterus verify the condition. The state of the abdominal walls, cervix, vagina, and vulvar outlet may collectively afford additional presumptive evidence, but the whole subject presents so many difficulties that the physician should be guarded in his statements on the witness-stand in a court of law.

### QUESTIONS.

What is the puerperium?

To what is the postpartum chill usually due?

What is the condition of the temperature following labor?

What effect has delivery on the pulse?

What changes take place in the lung capacity?

How is the skin affected?

What are the conditions of the urine postpartum?

To what is ischuria in childbed usually due?

What is the condition of the appetite and bowels following delivery?

Describe the process of involution in the uterus.

What is meant by diastasis of the recti muscles, and to what is it due?

Describe the lochia, and the varieties.

What is the total amount of lochia discharged during the first eight days?

How long does the lochial discharge continue?

Describe the process of lactation.

What is the composition of human milk?

What amount of milk is supposed to be secreted by the breasts during twenty-four hours?

What effect have psychic and nervous conditions on the milk?



- What effect has menstruation on the milk and its secretion?  
What drugs may pass over into the milk and affect the child?  
How long does lactation continue?  
What are the duties of the physician in the management of the puerperium?  
What are after-pains, and what is the treatment?  
What can be said of rest during the lying-in period?  
Describe catheterization of the puerperal woman.  
How often should the catheter be employed.  
How are the bowels to be managed?  
How are the breasts to be treated?  
How long should the physician remain with the patient following delivery, and what is his subsequent duty?  
How is the diagnosis of the puerperal state made?
- 

## CHAPTER XVIII.

### PUERPERAL PATHOLOGY.

THE puerperal woman is especially susceptible to a great variety of physical as well as nervous and mental disorders, some of which occur under other circumstances, but many being peculiar to the lying-in and lactational periods. The physician must, therefore, be ever on the alert to detect and anticipate all morbid conditions which may arise, and by prophylaxis render such complications impossible.

#### POSTPARTUM HEMORRHAGE.

Hemorrhage taking place from the uterus within the first six hours following delivery is designated as *postpartum*, and after that period as *puerperal hemorrhage*. The cause of the primary flooding is to be found either in (1) a relaxed uterus due to atony, the retention of clots or secundines, a full rectum or bladder, the presence of neoplasms (fibroids) within or without the uterine wall, and, rarely, to paralysis of the organ; and (2) to deep lacerations of the cervix or vaginal vault with rupture of an artery,—generally the circular of the cervix,—or the bursting of a hæmatoma or varix.

The **symptoms**, if the hemorrhage is profuse, are those of acute anæmia, pallor, coldness of the extremities, an irregular, feeble and rapid pulse, sighing respiration, restlessness, air-hunger, and, toward the end, possibly convulsions. So much blood may be



poured out from the open mouths of the uterine vessels that the patient may succumb within a few minutes. The external manifestations of the condition are evident; the uterus is enlarged, relaxed, and softened.

**Treatment.**—In the severer forms of hemorrhage no time must be lost in securing uterine contraction. Vigorous friction must be made over the fundus of the womb, and Cr  d  's method employed to expel clots from the interior. The pillows should be removed from under the patient's head and the foot of the bed elevated twelve or eighteen inches. If the uterus does not promptly respond to the friction and pressure, the hand must be inserted into the vagina and womb, all the clots and any placental fragments removed, and the organ compressed between the internal and external hands. While this is being done compression of the abdominal aorta may be made by an assistant. Ergot aseptic should be injected into the patient's thigh at the beginning of active treatment. The physical manifestations of blood-loss must be met with hypodermics of whiskey, brandy, or ether, and the heart stimulated by the hypodermic injection of strychnia (gr.  $\frac{1}{30}$ ), nitroglycerine (gr.  $\frac{1}{100}$ ), and digitalin (gr.  $\frac{1}{100}$ ) in whiskey. The transfusion of normal saline solution under each breast, or better, into a vein, is of the greatest value in these cases. An ounce of whiskey should be added to the solution. The saline and whiskey may also be given by rectum. Heat should be applied to the sides and extremities of the patient. Persistent efforts, often extending over several hours, must be made, the hemorrhage stopped, and the patient restored to a safe condition before the physician should leave the house. If the patient is not nauseated and can swallow, ten grains of carbonate of ammonia together with an ounce of whiskey in three ounces of hot milk may be administered by mouth. Absorption by the stomach under these conditions is usually slow, but some benefit is often derived from the stimulants.

When the hemorrhage is less serious, in connection with the fundal friction, hypodermics of ergot, etc., resort may be had to intra-uterine douches of hot water (120   F.), or the uterine cavity and vagina may be tightly packed with iodoform gauze. This may be left in place for twenty-four hours and then cautiously removed.

In puerperal hemorrhage the cause must be sought for and



removed. If clots, portions of the placenta or membranes are retained they must be detached by the finger and washed away by an intra-uterine douche; if the condition is due to uterine inertia the organ must be stimulated to contraction by ergot and strychnia, and the general tone of the patient brought up by appropriate iron tonics and judicious feeding.

When immediately following delivery the uterus contracts satisfactorily, but persistent bleeding occurs and the patient develops symptoms of blood-loss, laceration of the cervix or the vaginal vault has probably taken place. Such a hemorrhage can only be controlled by the application of one or more stitches as described on page 164.

### SUBINVOLUTION AND SUPERINVOLUTION.

While the consideration of these conditions belongs more especially to gynecology, as both are the direct result of parturition, it is important that the physician should recognize them at an early period and by appropriate measures seek to check their progress. Subinvolution is arrested or retarded involution of the puerperal uterus. It is due to any cause which prevents the reduction of the supply of blood to the uterus following labor or gives rise to pelvic engorgement. It may follow lacerations of the cervix and perineum with mild septic infection, and inflammatory processes inside and outside the womb. Displacements of the uterus, too early getting up, fibroid tumors, constipation and overloaded rectum, and premature resumption of sexual intercourse may also act as etiological factors. The uterus is enlarged, boggy, and, if inflammation is present, more or less sensitive.

The **treatment** consists in the administration of general tonics, regulating the bowels, and the local application of depleting agents and astringents (glycerine, ℥j; tannic acid and iodoform, āā grs. lx).

**Superinvolution of the uterus** is exceedingly rare and is due to atrophy of the organ beyond the normal limits.

**Treatment** is unsatisfactory, especially if the ovaries are also involved, but electricity (faradism) and stimulating applications to the cervix may be tried.



### DISPLACEMENTS OF THE UTERUS.

Increase and prolonging of the lochial discharge and possibly hemorrhage may follow backward displacements of the uterus.

The **treatment** should be postural, the patient lying on her face as much as possible, and later in convalescence assuming the knee-chest position for from five to fifteen minutes several times a day. If this does not succeed in causing the uterus to resume its normal position, it must be replaced and a soft-rubber ring pessary introduced into the vagina to hold it in place.

### FIBROIDS.

These tumors tend to prolong involution and may give rise to hemorrhage, subinvolution, and uterine displacements. On the other hand, these growths, intramural or subserous, often rapidly diminish in size following delivery and may nearly or quite disappear. Unless productive of decided symptoms, treatment is unnecessary. Submucous growths which have become pedunculated should be removed.

### THE BREASTS AND NIPPLES.

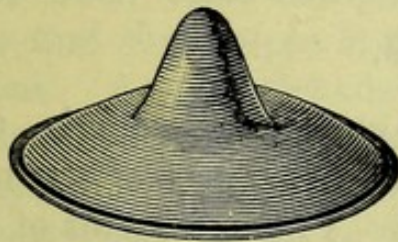
Supernumerary mammæ and nipples may develop on any portion of the body, and at times attain to considerable size. They must be looked upon as freaks of nature. Defects in the nipples are common. The nipples may be depressed, cratered, mushroom-form, or so small and undeveloped that they cannot be grasped by the child's mouth in nursing. During pregnancy an attempt should be made to render deformed nipples serviceable by drawing them out with the fingers several times a day, and by gentle massage they should be stimulated to growth. A glass bottle or test-tube, from which the air has been exhausted by burning a few drops of alcohol at the bottom, applied to the nipple may be used for this purpose, or the breast-pump may be tried. If the nipples are so deformed that it is impossible for the child to nurse or for any reason this is impracticable, the milk may be pumped out at regular intervals and fed to the infant from a nursing-bottle or spoon.



### Sore Nipples.

Some lesion of the nipples occurs in about half of nursing mothers, especially in primiparæ. The soft, moist mouth of the infant, together with the biting action of the jaws, causes maceration of the epithelium and contusion of the nipple, and results in cracks and excoriations which are not only often exceedingly painful, but may lead to serious consequences, opening a way for the entrance of infectious germs to the breast. Excoriations heal readily if protected. The flat rubber nipple shield is best suited for this purpose (Fig. 80), but unless the milk comes very freely it is usually necessary to enlarge the opening at the tip to allow

FIG. 80.



Rubber nipple shield.

FIG. 81.



Nipple shield with glass base.

of its escape. Other forms of shield are sometimes useful (Fig. 81). The shield should be scalded in hot water after using, kept in a weak bichloride solution, and washed again before applying to the breast. If the child refuses to nurse through the rubber it must be coaxed; frequently a little of the breast-milk applied to the outside of the shield or a little sugar-water will act as an incentive. Glycerole of tannin, compound tincture of benzoin, pure aristol, and the solid stick of nitrate of silver may be used when the part refuses to heal of itself. *Strict asepsis must be maintained, and the nipples bathed at intervals in a mild antiseptic solution.* Pain may be allayed by the application of a 4 per cent. solution of cocaine. Cracks and fissures appear at the summit, the sides, and the base of the nipple. They are best treated by the solid stick, a fine point being drawn over the crack to cauterize it. Nursing from the affected breast should be suspended for a time or the nipple shield employed.



### Anomalies of Milk Secretion.

**Agalactia**, or deficient milk secretion, is usually due to some general or constitutional disorder or to faulty development of the gland. To increase the flow of milk the general health of the mother must be given attention and the diet regulated. Galactagogues are valueless, and beer and wine of uncertain utility.

**Galactorrhœa** is an excessive flow of milk persisting after the weaning of the child. In excessive or prolonged milk secretion the health of the mother may become seriously affected.

**Polygalactia** is an excessive secretion of milk during lactation.

The **treatment** consists in the use of saline laxatives, the restriction of liquids, compression of the breasts by the binder, and the exhibition of iodide of potassium in 10-grain doses three times a day. Belladonna and iodide of potassium ointments, equal parts, applied to the breasts often have a marked effect in drying up the milk.

### Mastitis.

Inflammation of the breast is always of septic origin, the germs finding their way into the gland through wounds of the nipples or through the lymphatics and the blood. The two forms of staphylococcus are most often present, and next the streptococcus. Injury of the breast by injudicious massage and the use of the breast-pump often furnish a predisposing cause, and milk engorgement generally precedes the active inflammation. The inflammation is either subcutaneous, parenchymatous, around the smaller ducts, or interstitial, in the interlobular connective tissue. Constitutional symptoms may be slight or severe. The symptoms are pain, swelling and sensitiveness of the affected lobes, or extending over the entire breast. The skin may be reddened, pale, or of a bluish hue where pus points. The temperature may range high (104° F.) according to the degree of inflammation. When pus forms fluctuation may or may not be detected; if submammary the breast appears raised from the chest-wall.

**Treatment.**—In simple engorgement massage of the breast with hot oil, the application of lead-and-opium stupes or the ice-bag will generally be all that is required. If suppuration takes place early evacuation of the pus with drainage and daily syringing with an antiseptic (lysol, 1 per cent.) is indicated. In tuberculous



subjects and those of feeble resisting powers, all of the lobes of the breast may become involved and the condition extend to the other side. In such cases the syr. quinin. ferri et strychniæ phos. should be given (ʒj, t. i. d.), and liberal amounts of whiskey in the form of milk-punch. The condition is often tedious, extending over a period of weeks.

### **PUERPERAL PYREXIA.**

#### **Non-infectious Fevers.**

The puerperal constitution (Barnes) renders the lying-in woman peculiarly susceptible to a variety of conditions which may influence the body warmth to a greater or less degree. Rise in temperature may be simply a passing nervous whim without pathological significance, or it may indicate the beginning of some serious or even fatal complication. The differentiation between the grave and the simple is not always easy, but is of the utmost importance. Among the conditions which give rise to simple fever are exhaustion following delivery, emotional states, distended bladder and rectum, reflex irritation, and syphilis. All of these can be discovered by careful investigation, and the application of appropriate therapy will remove the existence of a doubt.

### **INTERCURRENT DISEASES.**

During the lying-in state these do not differ greatly in their manifestations from such disorders occurring at other times, but the puerperal condition may somewhat modify or augment the severity of the symptoms.

#### **Malarial Fever.**

This appears at any time during the lying-in period, but the chronic form generally shows its presence on the third day post-partum. During the attack the lochia is liable to be increased, and the flow may be prolonged after the subsidence of the symptoms. There is also a predisposition to puerperal hemorrhage. The fever is usually of the remittent type. During the height of the febrile stage the mammary secretion is suppressed, but reappears later, although in somewhat lessened quantity. The diagnosis



is made from the general symptoms and the presence of the characteristic organism in the blood. Mild septic infection must not be mistaken for malaria.

The **treatment** consists in the administration of large doses of quinine and of arsenic.

### Rheumatism.

This disorder is chiefly interesting from the fact that it may be confused with septic arthritis. A differential diagnosis is not always easy. The symptoms are those of rheumatism under other conditions, inflammation of the joints, fever and profuse sweating. The inflammation of rheumatism is fugacious, while in septic arthritis it is not, and in *the latter the acid sweating is absent*. The rheumatic affection readily responds to the salicylates, while the septic condition remains unaffected. When the rheumatism attacks the uterus the pain is shifting, rarely becomes fixed, and there are irregularities and intermissions.

The **treatment** consists in antirheumatic remedies. The affected joints must be immobilized and counterirritants applied. Of these iodine, belladonna, mercurial ointment, and ichthyol are useful. After the subsidence of the acute symptoms massage and passive movements may be cautiously employed.

### Measles.

This is a rare complication of puerpery, and may be an exceedingly serious one. The temperature runs high, the liability to infection is increased, hemorrhages may take place from the uterus, and the occurrence of pneumonia may prove rapidly fatal.

The **treatment** consists in strict antisepsis, the reduction of temperature, and the relief of symptoms as they arise.

### Scarlatina.

This is also a rare disorder of puerpery, but occurs in sporadic cases and in epidemics in lying-in hospitals. Infection usually occurs through wounds of the genital tract, from contact with fingers, instruments, and clothing, but may also take place through the throat and lungs. Septic infection complicates the condition in about 33 per cent. of cases. Otherwise the disease runs its dis-



inct course, often more or less modified by the puerperal state. Primiparæ are more susceptible than multiparæ.

The **symptoms** usually appear during the first three days of childbed, but no period is exempt from the disease. The angina is ordinarily slight and rarely diphtheroidal in character, but the cervical glands are often considerably enlarged independently of throat symptoms. The eruption usually appears soon after the onset of the fever, rarely being delayed longer than the first or second day. In mild cases the lochial discharge is unaffected beyond acquiring a peculiarly penetrating odor. When the attack is developed prior to the third day postpartum, the secretion of the mammary gland is only slightly diminished, but in late cases the milk is often entirely suppressed.

**Prognosis.**—In uncomplicated cases the prognosis is favorable; when mixed infection is present the outcome will depend entirely upon the extent of the latter.

**Diagnosis.**—This may be difficult. A scarlatiniform rash is frequently associated with cases of mild septicæmia, and a transitory blush may be caused by ptomaine absorption from the intestines. A careful study of the symptoms will, however, usually reveal the true nature of the sickness. This is further confirmed by subsequent desquamation.

**Treatment.**—This does not differ from that of the disease under other conditions. The patient should be isolated and extra care observed in the details of the aseptic management. Nursing of the infant is contraindicated.

### Cystitis.

This is of common occurrence during puerpery, and may be occasioned by injury to the bladder and urethra during delivery, to invasion of microorganisms from the vaginal tract, but is usually due to the uncleanly use of the catheter. The condition is always distressing, and may prove serious or even fatal from exfoliation of the bladder mucosa, or to the extension of the septic inflammation along the ureters to the pelvis of the kidney and the development of pyelonephritis.

**Treatment** should be prompt and energetic. The catheter should never be employed in the puerperal woman except under the most rigid aseptic precautions, as already mentioned. In the



milder forms the internal administration of flaxseed tea and cream-of-tartar will often give relief. Salol (gr. v) with codeine (gr.  $\frac{1}{2}$ -j) or urotropin (gr. viij) three times a day may be given, or the following will be found useful :

R	Extr. hyoseyami fl.,	℥iiss ;
	Extr. tritici fl.,	℥iiss ;
	Spts. ether. nitrosi,	℥j ;
	Aquæ,	q. s. ad ℥iv.

M. and Sig.—Teaspoonful in a wineglass of water every three or four hours.

Along with the internal medication the bladder should be washed out with a pint or more of warm saturated solution of boric acid, or with a mild solution of permanganate of potassium (1 : 10,000 or 20,000), two or three times a day, according to indications.

### Puerperal Insanity.

Insanity developing during the lying-in or lactational periods does not differ in its manifestations from the disorder appearing at other times, the act of reproduction serving only as the exciting cause, and most frequently in individuals showing a hereditary tendency or predisposition. In relation to the child-bearing act insanity occurs most frequently during childbed (9.2 per cent.), then during lactation (5.6 per cent.), and least frequently during pregnancy (3.1 per cent.) (Krafft-Ebing). Of 186 cases of the kind admitted to the Eastern Michigan Asylum, in 9 the mental disorder was attributed to abortion, in 5 to pregnancy, in 17 to rapid child-bearing, and in 137 to puerperal causes. Of 587 cases of insanity among females at the Northern Michigan Asylum, 118, or 20.1 per cent., are recorded as of puerperal origin. The absolute frequency of mental disease developing in puerperal women cannot be determined, as a very large proportion of these cases, probably at least 50 per cent., are cared for at home, and do not find their way into asylums or retreats for the insane where statistics are available.

**Causes.**—While dependent upon many causal factors, insanity *in puerpero* may be due to septic infection, heredity, or physical



breakdown. Eclampsia as a factor is too unimportant to demand consideration.

**Symptoms.**—Puerperal psychoses usually develop during the first twelve days and between the fourth and sixth week post-partum, and during or near the end of lactation. The following symptoms are most frequently observed: hysteria, transitory frenzy, mania, and melancholia. Every case, in the progress of development, is likely to exhibit two or more of the above symptoms. The characteristic features of puerperal brain disorder are, the shortness of the prodromal stage,—which also presents few symptoms,—the early development of hallucinations and their prominence throughout the course of the disease (Fürstner), and the tendency of the condition to recovery. Derangement of the bodily functions, especially constipation, occur in a large proportion of cases. The clinical manifestations do not differ from those under other conditions.

**Prognosis.**—In hysterical insanity and transitory frenzy recovery is usually prompt. In mania recovery is the rule after a period varying from six to eight months. In melancholia the prognosis is less favorable, the average time of the disease being nine months (Krafft-Ebing).

**Treatment.**—Quiet and rest are absolutely essential. If septic infection is present local and general antiseptic treatment must be carried out as in other cases. The various somatic functions must receive careful attention; the bowels must be kept freely open, and the skin active by means of baths and friction. Sleeplessness should be combated by suitable hypnotics—hydrobromate of hyoscine (gr.  $\frac{1}{200}$ ), sulfonal, chloralamid, or chloral hydrate—and the motor disturbances quieted by sedatives—the bromides, valerian, etc.

Feeding is a most important detail of treatment. The diet should be simple but liberal and nutritious, and consist largely of milk, broths, egg-nog, and strong meat jellies. When the patient refuses food, or feeding by mouth is otherwise impracticable, nutrient rectal enemata must be resorted to, or, in rare instances, the nasal tube. When sepsis is present wine and spirits are indicated, and late in the disease ferruginous tonics combined with strychnia and quinine should be given. The importance of attention to the general nutrition cannot be overestimated.



### Puerperal Infection.

Septic infection occurring in the puerperal state is essentially the same as infection of surgical wounds, and is due either to the entrance of bacteria into the tissues and their extension to neighboring parts or dissemination by metastasis through the blood- and lymph-channels, or to the absorption of a toxic material elaborated by microorganisms within the uterus or generative tract. The discussion of this subject presents many difficulties on account of the number and variety of conditions which may be present, so that its broadest outlines only can here be considered. The most common forms of pathogenic bacteria found in this condition are the *streptococcus pyogenes*, the *staphylococcus aureus*, the *gonococcus*, and the *bacillus coli communis*. A single variety of organism may be the infective agent, or two or more may give rise to so-called *mixed infection*. Of the agents causing toxic poisoning little is as yet known. The condition is, however, not as common as was once supposed. It should be distinctly recognized that these organisms may produce different effects under varying conditions. The sources of infection are legion, the most usual being unclean fingers, instruments, and clothing which come in contact with the woman's genitalia. A variety of pathogenic bacteria are always found about the vaginal orifice of the pregnant woman, but are not present in the vaginal secretions, a fact which should teach the necessity of absolute surgical cleanliness as prophylaxis against infection during labor and the lying-in period. In the development of the disease the pyogenic organisms attack the point of least resistance—lacerations, cracks, and solutions of continuity in the parturient tract; the invasion being either slow and progressive or so sudden and overwhelming that the life of the patient is sacrificed before the symptoms have given warning of the seriousness of the condition. The attack is usually ushered in during the second to the fourth day postpartum by a chill or chilly sensations, rise of temperature and a rapid pulse, accompanied by headache and a feeling of malaise. The lochial discharge may be at first increased, but with continued high temperature it is later diminished, and may finally cease; or if the infection be of the putrid variety, the flow may be abundant, of a frothy character, and with a very fetid odor. The secretion of milk is likely to fail, the bowels are usually constipated, and



abdominal and pelvic pains develop. The condition may be superficial at the vulva or vagina, or the lymphatics of the deeper tissues may be involved, the process continuing to the pelvic cellular tissue and the uterus, and from this extending to the tubes, the pelvic peritoneum, the abdominal peritoneum, or by metastasis to distant parts—the liver, spleen, kidneys, lungs, heart, and brain.

The infection may take place primarily in the uterus and by extension or metastasis involve other parts or organs. Beginning from below there may develop ulcers of the vulva, vagina and cervix, vaginitis, endometritis, metritis, parametritis (pelvic cellulitis), metrolymphangitis, metrophlebitis, salpingitis, oöphoritis, pyæmia, and phlegmasia dolens (Williams). If the vulva and vagina are alone concerned, the mucosa appears red and swollen, lacerations and excoriations are covered by a grayish-white exudate, and parts united by sutures take on an unhealthy look. When endometritis and metritis exist the uterus is enlarged, tender, and has a soft and boggy feel. Extension into the broad ligaments (pelvic cellulitis) gives rise to induration and hardness, a distinct mass, and, if suppuration occurs, to fluctuation. The pus may remain localized or, by following the lymphatics, extend backward behind the peritoneum to the psoas muscles and even to the kidneys. An abscess at this point may be absorbed, or, if unrelieved, may rupture into the peritoneal cavity, the vagina, rectum, bladder, or externally above Poupart's ligament. With the formation of pus the fever is high and remitting, repeated chills may occur, and pelvic and abdominal pains, perhaps extending to the leg, are prominent symptoms. Extension of the septic process to the tubes gives rise to pyosalpinx, and if the abdominal ostium of the tube is not closed leakage may take place and localized or general peritonitis result, the latter usually with fatal issue.

Peritoneal involvement is manifested by the usual symptoms of peritonitis. Inflammation about the uterus leaves in its wake bands of adhesion which bind down the organs, and the peritoneum and intestines may become matted and adherent by exudate. In the most virulent form of septicæmia the organisms and their toxic products may be so rapidly disseminated through the system that the patient becomes suddenly overwhelmed, the sensorium is paralyzed, septic coma supervenes, and death occurs before local symptoms have had time to develop. Septic arthritis may be



mistaken for rheumatism. Metastatic abscesses may appear in the joints ; and endocarditis, hepatitis, nephritis, and other inflammations may occur in the course of the disease.

**Treatment of Septic Infection.**—This is *local* and *general*. Ulcers of the vulva, vagina, and cervix should be touched with pure carbolic acid, and the parts kept clean by saline or antiseptic douches. A suppository of iodoform may be introduced into the vagina two or three times a day. Should the temperature rise to 102° F., a local examination should be made, the broad ligaments palpated, and the uterine cavity explored. If the interior of the uterus is smooth, a single intra-uterine antiseptic or saline douche should be given ; if the cavity contains débris or the surface is rough and uneven, curettage followed by the intra-uterine douche is indicated. If this is once well done the necessity for repeated douching is obviated. It should always be borne in mind that meddlesomeness and constant tinkering are productive of great harm, and of themselves may give rise to fatal issue in cases which otherwise might recover.

Abdominal pain may be relieved by the application of hot turpentine stupes, or when heat is not well borne, the ice-bag, or cloths wrung out of ice-water, laid over the abdomen and covered by several thicknesses of flannel, changing as soon as they become heated, may be used. Anodynes and opiates may be administered as required, antipyretics are not desirable ; the temperature should be reduced by cold or hot sponging, a little alcohol or ammonia being added to the water, or the cold or hot pack may be employed. The diet should be nutritious and supporting and at first liquid, and consist largely of milk, but concentrated broths, jellies, and liquid beef peptonoids are also useful. Stimulants are the sheet anchor in septic conditions and should be given liberally. From one to two ounces of whiskey may be taken every three hours in the form of milk-punch, and if possible as much red or port wine also. Women suffering from puerperal septicæmia develop a remarkable tolerance for alcohol, and intoxication from the ingestion of large quantities is of rare occurrence. The bowels should be kept open by salines and bladder symptoms treated as they arise. Diarrhœa, if not too profuse, should not be checked. When medication becomes necessary the salicylate of bismuth in large doses (gr. xxx) may be given.

*If no improvement follows general and local treatment the ques-*



*tion of operation must be considered.* Localized collections of pus and fluid in the broad ligament and pelvis should be evacuated through the vagina when possible, the cavity washed out with an antiseptic solution or saline, and a strip of iodoform gauze introduced for drainage. Suppurating tubes and ovaries should be removed by abdominal section. When the suppurative process involves the uterine muscle hysterectomy may give the only chance for recovery. Intraperitoneal abscess and diffuse suppurative peritonitis are to be treated by opening the abdomen, washing out with warm saline, and draining by gauze. In all instances the indication for operation must be positive; then there should be no delay in carrying out the surgical treatment.

The employment of *serum therapy* in puerperal septicæmia has not been followed by the brilliant results anticipated for it. In some instances, especially where the infection is due to a single form of bacterium, the serum treatment is followed by improvement and recovery. In order to be of service the form of organism should be determined by bacteriological examination of the secretion from the uterus, the proper serum selected, and given early and in large doses.

### **Phlegmasia Alba Dolens (Milk-leg).**

This is not an infrequent result of infection. It usually arises from an extension of a thrombosis of the uterine and pelvic veins to the iliac and femoral veins, resulting in a partial or complete obstruction of the vessel. In other, less frequent instances, a lymphatic infection in the parametrial tissue travels from the pelvis along the connective tissue of the large vessels of the thigh and leads to secondary thrombosis.

The **symptoms** may develop at any time between the tenth and thirtieth days or even later. In thrombosis the symptoms are those of general malaise, and there is stiffness and soreness of the leg, especially when moved. Pain from ankle to inguinal region develops and is followed by swelling, the skin of the leg becoming markedly œdematous, white, and shining. Pitting is not at first possible on account of the extremely stretched condition of the skin, but later it is marked on pressure. Fever usually accompanies the attack, but subsides long before the swelling of the leg has disappeared. The femoral vein may be felt as a hard, whip-



lash-like cord, a red line of inflammation often marking its course. In the cellulitic form the skin is white, tense, and hard, the inguinal glands are enlarged and tender, and the swelling extends from above downward. Suppuration and gangrene of the affected leg may take place and prove fatal, or the detachment of a clot into the general circulation and resulting pulmonary embolism may be the cause of sudden death. Occasionally the opposite leg becomes affected. The duration of the disease is several weeks, depending upon the severity of the condition. Even after recovery the affected leg may be more or less disabled for a number of months. Recovery from phlegmasia dolens is the rule; absorption of the clot takes place or the vessels remain occluded and a compensatory circulation is established.

**Treatment.**—Rest in bed in the horizontal position with the leg elevated on a pillow. The leg should be swathed in flannel or cotton wet with some anodyne lotion :

R	Lin. saponis co.,	℥vj ;	
	Tr. opii,	℥iiss ;	
	Tr. aconite rad.,		
	Tr. belladon.,	āā ℥ss.—M.	(Barker.)

After the acute symptoms have subsided the leg may be painted with iodine or smeared with iodine, mercurial or ichthyol ointment to promote absorption.

R	Ichthyol,	
	Plumbi iodidi,	āā gr. xlv ;
	Ammonium chlorid.,	gr. x ;
	Albolene,	q. s. ad ℥j.—M.

*Friction should be avoided lest a clot be loosened and embolism occur.* If abscess-formation takes place the pus must be promptly evacuated by incision. A liberal, supporting diet and stimulants are indicated. The bowels should be kept open by saline laxatives and pain controlled by opiates (Dover's powder, codeine, and morphine when the others are not effective). Later tonics are indicated, quinine, iron, and phosphate of strychnia being useful.



QUESTIONS.

- What is postpartum hemorrhage, and what puerperal hemorrhage?
- What are the causes and symptoms of these hemorrhages?
- What is the treatment (a) directed to the uterus, (b) medical.
- What is subinvolution and superinvolution, and their treatment?
- What effect have uterine fibroids on involution?
- What are supernumerary breasts, and where may they occur?
- What malformations of the nipples may occur?
- How are deformed nipples to be managed during pregnancy?
- What lesions of the nursing nipple may occur?
- What is the treatment for erosion of the nipple?
- What is the treatment for cracks and fissures of the nipple?
- What anomalies of milk secretion may occur?
- What is the treatment of scanty milk secretion?
- What is mastitis, its symptoms and treatment?
- What microorganisms are found in this disease?
- What is the treatment of mastitis?
- What displacements of the uterus may occur following delivery, and to what symptoms do they give rise?
- What conditions may give rise to non-infective fever in pregnancy?
- What can be said of intercurrent diseases during childbed?
- What are the symptoms of malaria in childbed?
- What must be distinguished from malaria in this condition?
- What is the treatment of malaria?
- What are the symptoms and treatment of rheumatism in puerpery?
- What are the dangers from measles occurring during the puerperal period?
- What are the symptoms, diagnosis, dangers, and treatment of scarlet fever in the lying-in period?
- What are the symptoms, causes, and treatment of puerperal cystitis?
- What is puerperal insanity, and at what period of puerpery does it develop?
- What are the causes and symptoms of puerperal insanity?
- What is the prognosis?
- What is the treatment?
- What is puerperal infection?
- What microorganisms occur in this disease?
- What is mixed infection?
- Why is asepsis essential in the conduct of midwifery cases?
- What parts are most likely to be attacked by microbic infection?
- What are the symptoms of puerperal infection?
- What organs may be affected in this condition?
- What different local disorders are produced as the result of puerperal infection, especially about the uterus?
- What is the general treatment of puerperal infection?
- What is the local treatment of puerperal infection?
- When should the curette be used in this condition?
- What surgical operations may be demanded in puerperal infection?
- What are the results of serum therapy?
- What is phlegmasia alba dolens, and to what two conditions is it due?
- What are the symptoms of this disease?
- What is the treatment of phlegmasia dolens?



## CHAPTER XIX.

## THE NEWBORN CHILD AND ITS MANAGEMENT.

THE newborn infant is not, as a rule, prepossessing in appearance. The delicate rose-pink skin is more or less covered by a sticky, white material, the *vernix caseosa*, and with blood and perhaps meconium. The head is large and often disfigured by pressure during labor or a caput succedaneum, and there may be a growth of dark hair from one to two inches long. The eyes are of a dull-leadene hue, and are sensitive to light and bright objects, but incapable of interpreting what is seen. The body is ovoid, the thorax small, and the pelvis undeveloped. The most conspicuous part is the prominent abdomen, containing the large liver, which comprises  $\frac{1}{18}$  of the total body-weight at this period of life. The voice seems developed out of proportion to the size of the individual, and the hearing is dull, but may be impressed by loud noises and confused sounds. At birth the average normal infant weighs between 7 and  $7\frac{1}{2}$  pounds, and measures about  $19\frac{3}{4}$  inches in length, the female child being a trifle shorter. Respiration is irregular and about 45 to the minute. The temperature is about  $99^{\circ}$ , and the pulse, somewhat irregular, ranges from 120 to 140 beats to the minute. The bowels contain a thick, brownish-black material, the *meconium*, which consists of mucus, epithelial scales, and lanugo, which the child has swallowed with the liquor amnii. The urine varies in color, is scanty for the first few days, and has a specific gravity of about 1010.

## CARE OF THE INFANT.

## The Eyes.

As soon as the child is born, if this was not done immediately following extrusion of the head from the vulva, the eyelids should be carefully wiped clean of vernix and discharge which may adhere to them with absorbent cotton and a warm saturated solution of boric acid. This is an important prophylactic measure, and may be the means of preventing serious inflammation of the conjunctiva. One or two drops of 1 per cent. silver nitrate solu-



tion should be instilled into each eye as a prophylaxis against gonorrhœa of the eyes *in all cases, where the mother has had a profuse vaginal discharge during the pregnancy or where a diagnosis of gonorrhœa in the mother has been made.* This should never be omitted, when these or other indications suggest the possibility of infection of the eyes of the child.

### Bathing.

The vernix caseosa is very tenacious and difficult to remove with water, but is easily separated by fat or oil. The child must, therefore, be thoroughly anointed with olive oil, white vaseline, fresh butter or lard, or some such material before it is placed in the bath. The temperature of the first bath may be 100° F., the heat being gradually lowered with increasing age of the child to 90° F., in winter, and from 80° to 85° F. in summer. A full plunge bath, except in the instance of very feeble infants, is preferable to washing one part at a time. The infant is placed in the tub, the nurse supporting its head with one hand to keep it out of the water, while with a soft cloth and soap she rapidly goes over the whole surface of the head and body, and then quickly lifts the child into a large and previously warmed towel, in which it is enveloped. Such a bath may be given in less than five minutes. After drying and powdering the flexor surfaces with some infant dusting-powder, the cord should be retied. This is essential, as the cord often shrinks during the bath, hemorrhage occurs, and the infant perishes or remains feeble from the anæmic condition resulting. The cord is then wrapped in a piece of dry absorbent cotton and laid on the left side of the child's abdomen. The child should then be weighed and dressed.

### Clothing.

The infant's clothing should be plain, comfortable, and sufficiently extensive to permit of several changes a day should this be necessary. Separate garments for day- and night-wear are desirable. The wardrobe in duplicate should consist of a diaper of cotton or linen cloth; a binder of soft, fine flannel wide enough to extend from ensiform to pubis; a flannel or knit shirt, sleeveless and opening in front; a long flannel skirt; a muslin dress or slip; a "pin-blanket" or jacket, and stockings or long knit shoes.



### Sleep.

The healthy infant should sleep from eighteen to twenty hours out of the twenty-four, and should cry for at least half an hour during the waking hours.

### Nursing.

After the mother has somewhat recovered from the strain and fatigue of labor, in eight or ten hours, the child may be put to the breast. Until the establishment of lactation this may be repeated every four or five hours. As soon as the milk "comes in," the child should be put to the breast *every two hours "by the clock" during the day, and every four hours "by the clock" during the night. Between times it may be given plenty of cool boiled water to drink.*

### Artificial Feeding.

If on account of deformity of the nipples, deficiency or absence of secretion, the infant is unable to nurse, resort must be had to artificial feeding. For this purpose a great variety of milk preparations and artificial foods are recommended. One of the best of these is known as the Meigs' mixture. For this good cows' milk, sugar of milk, and some lime-water is all that is required. A quart of milk is allowed to stand in a cool place until the cream rises, when the top pint is poured off and reserved for use. The sugar-water is prepared by dissolving 18 drachms of sugar of milk in a pint of water. This should be kept in a cool place. The mixture is prepared as follows:

Top milk . . . . .	3	tablespoonsful.
Sugar-water . . . . .	3	"
Lime-water . . . . .	2	"

This makes a four-ounce mixture and should be enough for three or four feedings, according to the capacity of the child. If doubt exists as to the purity of the milk it may be Pasteurized. A Mason jar containing the milk and sugar-water, or ten nursing bottles, may be placed in hot water and kept at a temperature of 170° F. for a half hour. The jar or bottles must then be tightly stopped, and placed in the refrigerator to cool. Before feeding, the mixture must again be heated to 96° or 97° F., the stopper removed, and a rubber nipple slipped over the neck of the bottle. If Pasteurizing is done, the lime-water must be added just before feeding, as the heating process precipitates the lime.



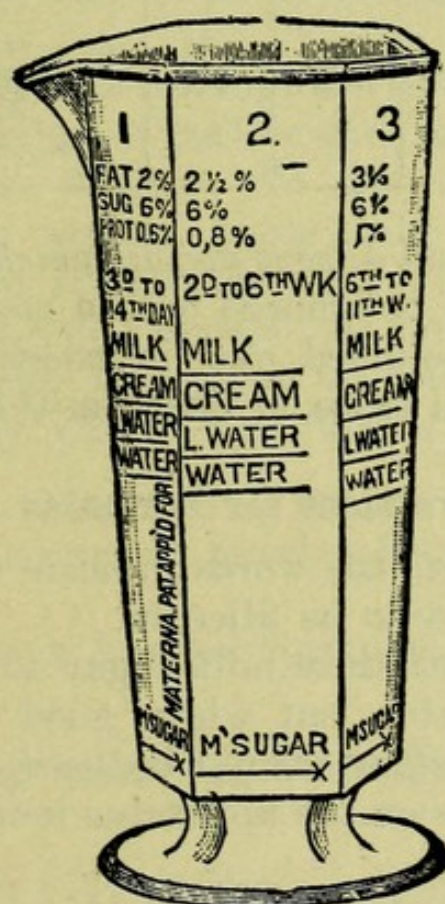
As the stomach-capacity of the neonatus is only  $\frac{5}{8}$  of an ounce, not more than an ounce should be given at a feeding during the first few days of life. *Less harm will come from a little under-feeding than from an overloaded stomach.*

The rubber nipple should be scalded after each using and kept in a solution of boric acid until again required.

### The "Materna" (Estraus) Glass.

For the *home* modification of milk this enables physicians to cope successfully with the ever-perplexing problem of artificial infant feeding. It is devised upon the now accepted idea that cows' milk in a modified form is the most rational substitute for mother's milk. Heretofore the expense of milk modified in accordance

FIG. 82.



with a prescription, and the difficulty of having it properly modified at home, have prevented many physicians from recommending its use.

### Description of the Apparatus.

This apparatus consists of a glass jar showing seven panels, with a lip, capable of holding 16 ounces (Fig. 82).



One of the panels presents an ordinary ounce graduation, the other six panels present six different formulas for the modification of cows' milk, each formula so arranged as to make it suitable for a certain period of the infant's growth, viz.:

FORMULA.	1	2	3	4	5		6
Fat . . . .	2%	2½%	3%	3½%	4%		3½%
Sugar . . .	6%	6%	6%	7%	7%		3½%
Proteids .	06%	08%	1%	1½%	2%		2½%
	3d day to 14th day.	2d to 6th wk.	6th wk. to 11th wk	11th wk to 5th mo.	5th mo. to 9th mo.		9th mo. to 12th mo.
Milk, parts	1¼	15⁄8	2	4½	6	Milk, parts.	9¾
Cream, "	1¼	15⁄8	2	2	2		
Lime- water, "	1	1	¾	¾	¾	Cream, "	1
Water, "	12½	11¾	11¼	8¾	7¼	Barley-gruel, "	5¼
Milk- sugar, "	1	1	1	1	1¼	Granulated sugar, "	¼

*The physician should always decide which formula is to be used. All the others should be ignored until a change is directed. The food should be compounded once in twenty-four hours, the apparatus being filled once, twice, or thrice, as the occasion may require.*

#### Directions for Formulas 1-5.

The lines *underneath* the words indicate the points to which the various ingredients are to be filled in.

1. *Milk-sugar*.—Introduce milk-sugar to the line thus marked. Milk-sugar is preferable, but where good milk-sugar cannot be obtained granulated sugar should be used, in just half the quantity. The small cross on the apparatus indicates the point for the latter emergency.

2. *Water*.—Add *boiled* water (hot) to the water mark, stir until sugar is dissolved. If any particles are to be seen floating in the solution it should be filtered either through absorbent cotton or a piece of clean muslin (two thicknesses).

3. *Lime-water*.—Ordinary lime-water as bought in the drug-store should then be filled to the low-water mark.

4. *Cream*.—This should be the ordinary cream (16-20 per



cent.) as obtained in bottled milk, and as commonly delivered by the dairyman, and should be filled to the cream mark. If cream is bought separately, the ordinary light cream should be used and never the very heavy cream.

5. *Milk*.—Ordinary good cows' milk should be used and filled to the milk mark.

6. Stir the entire mixture.

7. The whole should then be poured into separate bottles and sterilized, or Pasteurized if desired, and stoppered with cotton and placed immediately upon ice.

### Directions for Formula 6.

1. *Sugar*.—In this formula granulated sugar should be used instead of milk-sugar. Introduce the same into the vessel to the line thus marked.

2. *Barley-gruel*.—In this formula barley-gruel should be used instead of water, and filled to the line thus marked. Barley-gruel should be prepared as follows: To one tablespoonful of pearl barley (after soaking several hours) add one pint of water, a pinch of salt, and boil for five or six hours, adding water as it boils away. Strain through muslin; or, one rounded tablespoonful of Robinson's barley flour; rub up with cold water, and add to one pint of boiling water; cook fifteen minutes, stirring, and strain if lumpy.

3. *Cream*,  
4. *Milk*,  
5. *Stir*,  
6. *Sterilize*,  
} add the same as in other formulas.  
} same as in other formulas.

### Schedule for Feeding a Healthy Child During the First Year.

FORMULA.	Age.	Number of feedings in 24 hours.	Interval between feedings by day.	Number of night feedings 10 P. M.—7 A. M.	Quantity for one feeding.	Quantity for 24 hours.
1	2-14 days . . .	10	2 hours.	2	1-2½ oz.	10-25 oz.
2	2-5 weeks . . .	10	2 "	2	2-3½ "	20-32 "
3	5-10 " . . .	8	2½ "	1	3-4½ "	24-36 "
4	10 wks.—4 months	7	3 "	1	4-6 "	28-42 "
5	4-9 months . .	6	3 "	0	5-8 "	30-48 "
6	9-12 " . .	5	3½ "	0	7½-9½ "	37-48 "



A *large* child should receive the maximum quantity and sometimes even a little more; a *small* child should receive the smaller quantity and sometimes a little less. The hours for feeding should be kept conscientiously as indicated. A *large* child, or one with a strong digestion, may be able to pass from one formula to the next more rapidly than the weeks indicated. A *delicate* child, or one with a very feeble digestion, will often require a slower increase than the weeks indicated.

### Wet Nursing.

If instead of artificial feeding a wet-nurse should be preferred, in the selection of a suitable person several conditions are requisite. *The woman must have been recently delivered, so that the period of lactation will correspond closely with the age of the child which is to be nursed; she must be healthy and without constitutional or acquired taint; the milk must be abundant and of good quality; and she must be cleanly in her habits and of good disposition.*

### QUESTIONS.

- What is the appearance of the newborn child?
- What is its average weight and length?
- What is the rate of respiration, pulse, and what the temperature?
- What attention should be given the child's eyes immediately after birth?
- What is the proper manner of bathing the infant?
- What should be the temperature of the first and subsequent baths?
- What articles of clothing will be necessary?
- How much should the infant sleep during the twenty-four hours?
- When should the child be put to the breast, and how often?
- Under what conditions should artificial feeding be resorted to?
- What is Meigs' mixture, and how is it prepared?
- In what does Pasteurization consist?
- What is the stomach-capacity of the newborn child?
- How much should be given at each feeding during the first few days?
- Describe the "materna" glass and its uses.
- What are the principal requisites in the wet-nurse?



## CHAPTER XX.

### DISEASES OF THE NEWBORN CHILD.

#### ASPHYXIA.

THIS is due to non-oxygenation of the blood and the accumulation of carbon dioxide. Its principal causes are compression of the cord and brain during delivery, the premature separation of the placenta, and death of the mother before the completion of labor. In partial asphyxia the face and lips of the child become blue and livid, the pulse is full and slow, and only irregular, spasmodic attempts are made at respiration. As the condition progresses the color of the face becomes paler, cardiac action fails, and the child dies. Several methods for resuscitating the child are in vogue. In many instances all that is necessary to start respiration are a few sharp slaps by the hand on the buttocks, chest, or back. The throat should be cleared of mucus by the finger wrapped with gauze, or better, "*blown out*," by placing a few layers of gauze over the nose and mouth and then blowing vigorously into the mouth. This will clear out the entire upper respiratory tract very well indeed. If hot water is at hand, the child may be plunged into a bath at 105° F., and immediately after into another of cold water, keeping up surface friction, and these repeated until respiration begins.

#### Artificial Respiration and Resuscitation.

##### Byrd's Method.

The child lies on its back across the palmar surfaces of the physician's hands. The two extremities of the trunk are then alternately pressed together (*expiration*) and relaxed (*inspiration*), flexing and extending the spine respectively.

##### Sylvester's Method.

The child is placed on its back on a table with a roll under the neck to extend the head. The arms are then seized by the elbows and drawn well above the head for *inspiration*, while for *expira-*



tion they are carried to the sides of the thorax, which is gently compressed. Much is gained if, at the same time, the child is stimulated by heat. Place a partially filled hot-water bag under the child's back, and keep the chest warm by the application of cloths wrung out of hot water.

### Schultze's Method.

The child, facing in the same direction as the operator, is seized by the shoulders, the physician's thumbs being in front and the forefingers hooked under the axillæ from behind. By swinging the body and extremities of the child upward and toward the operator the thorax is compressed and *expiration* takes place. Reversing the movement, and allowing the body to fall backward, the thorax is expanded and *inspiration* follows. The method is rough, but effective. *It should not be employed, except as a last resort, with weakly infants.*

### Laborde's Method.

This consists in seizing the tongue with forceps and making intermittent tractions, eight or ten to the minute.

## INDIGESTION.

In the infant gastric derangement is due to some unsuitable condition of the breast-milk or to improper feeding. Vomiting of curds and undigested material takes place, and the discharge from the bowels contains undigested matter and may be greenish or greenish-yellow in color and frothy. The odor of the stools is sour. Colic is usually a symptom, and the child appears imperfectly nourished and loses in weight.

The **treatment** consists in evacuating the bowels by castor oil (ʒj-ij), calomel,  $\frac{1}{10}$  grain every half hour or hour until five doses have been taken, or the milk of magnesia may be given (ʒj-ij). The diet must be regulated. Breast-milk should be examined as to constituents, or the artificial food modified or changed. When gastric digestion is weak a grain of pepsin may be given after each feeding with benefit. Forbe's diastase may be given with the bottle three or four times a day.



**CONSTIPATION.**

Often the fault of diet. Suppositories of soap, glycerine or gluten may be used, or warm soap-and-water enemas given. Cream or melted butter in  $\frac{1}{4}$ - to  $\frac{1}{2}$ -teaspoonful doses, administered three or four times a day, is often all that is required. Calomel (gr.  $\frac{1}{20}$ ) every half hour for three or four doses, or 10 to 15 drops of equal parts of castor oil and glycerine are excellent.

**COLIC.**

This is usually the result of indigestion. Pain may be relieved by chloral, one grain to the drachm of water. Warm water injections often assist in expelling the gas. A warm spiced poultice to the abdomen often gives relief. The following is useful:

R	Sodii bicarb.,	gr. ij ;
	Tr. opii camph.,	gtt. j ;
	Ol. anisi,	gtt. $\frac{1}{20}$ .

This may be given in warm water and repeated every fifteen minutes until five or six doses have been given. Calomel, castor oil and glycerine are indicated.

**DIARRHŒA.**

This is another condition largely dependent upon faulty digestion. *The bowels should be evacuated to remove all irritating matter.* Castor oil or calomel may be given. To check the discharge bismuth subnitrate (gr. iij) and pepsin (gr. j), or small doses of chalk-mixture, or paregoric (gtt. iij) should be given.

**OPHTHALMIA NEONATORUM.**

Purulent conjunctivitis in the newborn child is generally the result of gonorrhœal infection, but it may be caused by other germs than that of Neisser. The disease usually develops during the second or third day after birth. The eyelids may become enormously swollen, and pus in considerable quantities may be poured out. If unrelieved the eye is irreparably damaged. Parturient women having a discharge should receive antiseptic douches



as a preventive of blenorrhœa in the child. The eyes must be kept strictly clean and free from discharge by hourly, or oftener if necessary, bathing with warm saturated solution of boric acid. Pledgets of cotton cooled on ice may be placed on the eyes at intervals of a few minutes to relieve the swelling. A drop or two of a 1 per cent. solution of nitrate of silver should be instilled into the eye every three or four hours, according to the severity of the attack.

### URIC ACID INFARCT.

Normally it is said the pelvis of the kidney of the newborn child contains a collection of these crystals. Washed out with the urine they seldom give rise to harm, but occasionally cause death. When the stain on the napkin is bright and the urine scanty, the child should receive plenty of water, and the occasional administration of spts. ether. nitrosi (gtt. x) in sugar-water will be followed by relief.

### MASTITIS.

Swelling of the breast-glands occurs in both male and female infants. Cleanliness and the bathing of the breasts in an antiseptic solution, together with cotton over the gland and the support of a bandage, is usually all that is required. Camphorated oil may also be applied. *The practice of rubbing the part to reduce the swelling is pernicious, and productive of abscess formation.* If suppuration of the gland occurs the abscess must be opened early.

### THRUSH.

This is a fungus disorder and usually arises from lack of proper washing out of the child's mouth after nursing. It is characterized by the appearance of white patches scattered over the buccal mucous membrane.

The **treatment** consists in sopping the patches with a saturated solution of boric acid, or a solution of sodium sulphite (3j-3j).

### SEBORRHŒA CAPITIS.

This is due to lack of cleanliness. The scalp must be washed with green soap and water, dried, and zinc oxide ointment liberally applied. If water is not well borne, olive oil may be used instead.



QUESTIONS.

- Describe the symptoms of asphyxia neonatorum.
- What are the degrees, their causes, and prognosis of this condition?
- How would you treat asphyxia neonatorum?
- Describe the method of hot and cold "tubbing."
- Describe Byrd's method of resuscitation.
- Describe Sylvester's method of resuscitation.
- Describe Schultze's method of resuscitation.
- Describe Labordes' method of resuscitation.
- What are the causes, symptoms, results, and treatment of indigestion?
- What are the causes and treatment of constipation?
- What are the causes and treatment of colic?
- What is the treatment of diarrhœa?
- What is the clinical course and treatment of ophthalmia neonatorum?
- What is uric acid infarct, and its treatment?
- What is mastitis? Does it require treatment?
- What is the importance of thrush, and its cure?
- Why should seborrhœa capitis require attention?



CHAPTER 10

The first part of the chapter discusses the importance of the study of the history of the United States. It is a subject that is often overlooked, but it is one that is essential to our understanding of the present. The second part of the chapter discusses the importance of the study of the history of the world. It is a subject that is often overlooked, but it is one that is essential to our understanding of the present. The third part of the chapter discusses the importance of the study of the history of the United States. It is a subject that is often overlooked, but it is one that is essential to our understanding of the present. The fourth part of the chapter discusses the importance of the study of the history of the world. It is a subject that is often overlooked, but it is one that is essential to our understanding of the present. The fifth part of the chapter discusses the importance of the study of the history of the United States. It is a subject that is often overlooked, but it is one that is essential to our understanding of the present. The sixth part of the chapter discusses the importance of the study of the history of the world. It is a subject that is often overlooked, but it is one that is essential to our understanding of the present. The seventh part of the chapter discusses the importance of the study of the history of the United States. It is a subject that is often overlooked, but it is one that is essential to our understanding of the present. The eighth part of the chapter discusses the importance of the study of the history of the world. It is a subject that is often overlooked, but it is one that is essential to our understanding of the present. The ninth part of the chapter discusses the importance of the study of the history of the United States. It is a subject that is often overlooked, but it is one that is essential to our understanding of the present. The tenth part of the chapter discusses the importance of the study of the history of the world. It is a subject that is often overlooked, but it is one that is essential to our understanding of the present.



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