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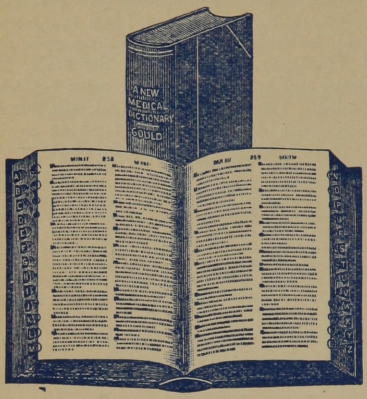

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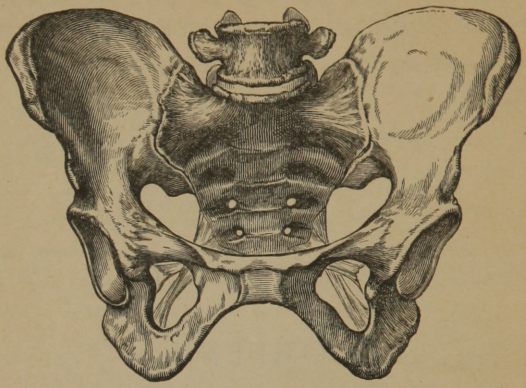

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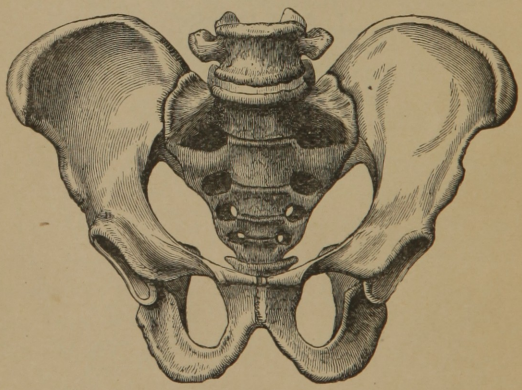

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WILLIAM H. WELLS, M.D.,

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W. H. WELLS.

Philadelphia, October 24, 1893.

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H. G. L.

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QUESTIONS

ON

OBSTETRICS.

INTRODUCTION.

What is Obstetrics?

The science and art of affording aid to women in labor.

What are the synonyms for obstetrics?

Midwifery, accouchement, maieutics, tocology.

What is meant by science and art?

The *science* of Obstetrics embraces the definite rules of procedure founded upon a correct knowledge of the nature of Labor and its complications; the *art* consists in the skilful carrying out of these rules. The science may be taught in books and lectures; the art must be acquired by practice at the bedside.

How may the subject be divided?

1st. The Anatomy of the parts concerned in labor, viz.: the reproductive organs and their surroundings.

2d. The Physiology of these parts.

3d. Their Pathology, including all deviations from the natural course of labor.

4th. The treatment of natural and complicated labor.

What are the reproductive organs of woman?

1st. Internal, viz.: the ovaries, oviducts, uterus, and vagina.

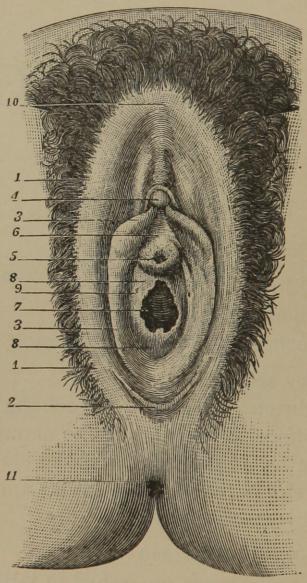
2d. External, viz.: the mons veneris; labia majora and minora;

clitoris; vestibule and fossa navicularis; hymen, or carunculæ myrtiformes; fourchette and perineum; and also the breasts, or mammary glands.

Where are they situated?

With the exception of the breasts and mons veneris, they are

FIG. 1.



VULVA OF A VIRGIN.

1. Labia majora of right side. 2. Fourchette. 3. Labia minora. 4. Clitoris. 5. Urethral orifice. 6. Vestibule. 7. Orifice of the vagina. 8. Hymen. 9. Orifice of vulvo-vaginal gland. 10. Anterior commissure of the labia majora. 11. Orifice of the anus.

placed within the *Pelvis*, or below it, between the thighs. The mons veneris is placed directly upon the symphysis pubis, and the breasts on the pectoralis major muscle of either side, from the 3d to the 7th rib.

THE PELVIS.

What is the Pelvis?

A bony structure, placed at the inferior extremity of the vertebral column, which it supports above, while it rests on the femora below. It is divided into the true and false pelvis.

Why is it called the pelvis?

Because, when clothed with muscles, ligaments, and fasciæ, it resembles a *basin*.

Of how many bones is the obstetrical pelvis composed?

Five: the last lumbar vertebra, sacrum, coccyx, and two ossa innominata.

What is the sacrum?

A wedge-shaped bone, apparently formed by the fusion of five vertebræ. It is curved, being concave in front.

How many articular surfaces does it present?

Six: by three it is connected with the last lumbar vertebra above; by one on each side, with the ossa innominata, and by one below, with the coccyx.

What is the coccyx?

A small and similarly wedge-shaped bone, apparently formed by the fusion of three or four vertebral bodies. It has one articular surface above, by which it is connected with the sacrum. It tapers from that bone, and is supposed to be the remains of the caudal vertebræ of animals.

What are the ossa innominata?

The haunch bones, of irregular shape, articulating internally with the sacrum behind and with each other in front. Each os innominatum is composed of three separate pieces, the *ilium*, *ischium*, and *pubes*. Their point of juncture is found in a cup-shaped depression on the outside of the bone, called the *acetabulum*.

When do the several parts of the os innominatum unite?

By the twenty-fifth year.

What uses has the pelvis?

1st. To support and transmit the weight of the body.

2d. To contain and protect certain organs.

3d. To serve as a parturient tube or canal, through which the child may be definitely guided during labor.

To what parts is the weight of the body transmitted?

To the femora in the erect posture, and to the tuberosities of the ischia in the sitting posture.

How is the weight of the body transmitted to the femora?

By two beams of bone, consisting of the upper part of the sacrum and body of the ilium on either side.

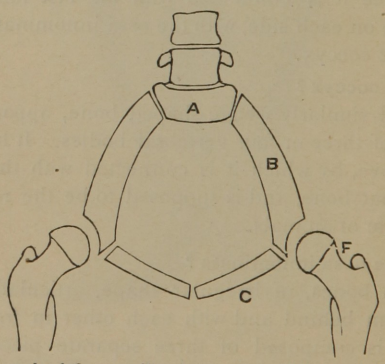
What are these beams called?

The sacro-iliac beams (see Fig. 2).

What prevents these beams from being pushed in and out at their distal ends?

Another beam is placed between them, extending from one acetabulum to the opposite one, consisting of the upper part of the pubes on either side.

FIG. 2.



B, with half of A = the left sacro-iliac beam, transmitting weight to the femur F. C = the body of pubes, constituting with its fellow the pubic beam.

What is this beam called?

The pubic beam (see Fig. 2).

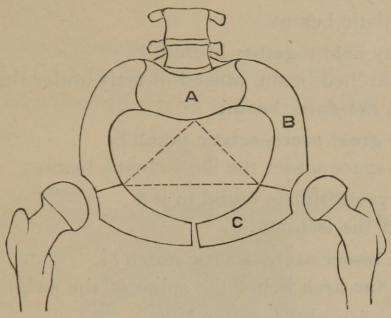
Why are these beams not straight?

They are arched outwardly to make more room in the pelvis, to enable it to fulfil its second and third uses.

How is the diminution in strength of the sacro-iliac beams, caused by this arching, remedied?

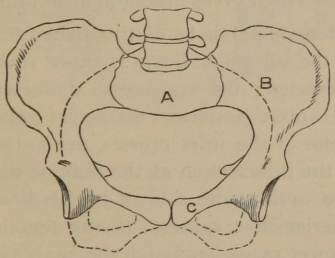
By buttressing the beams by that expansion of the sacrum and iliac bones called the *wings* of the ilia and sacrum (Fig. 4).

FIG. 3.



The same as in Fig 2, but with the beams arched; the dotted lines show the original direction of force.

FIG. 4.



The same as in Fig. 3, with the arches strengthened by the addition of the iliac wings, etc. The dotted lines below show the sub-pubic arch in front and the beginning of the ilio-ischiatic beams.

How are jarring and concussion prevented?

By placing joints at the center of each beam.

How is the diminution of strength caused by these joints remedied?

By covering them with powerful ligaments.

How is weight transmitted from the vertebral column to the tuberosities of the ischia?

By two beams of bone, placed directly under the sacro-iliac beams, consisting of the ischium and under portion of the ilium on either side.

What are they called?

The ilio-ischiatic beams.

How are they held together in front?

By another arched beam, placed directly under the pubic beam, and called the *sub-pubic* beam.

What is the great sacro-sciatic notch?

The arched space under the ilio-ischiatic beam.

What bony projection is found in it?

The spine of the ischium.

What is the lesser sacro-sciatic notch?

The part of the arch below the spine of the ischium.

What is the obturator foramen?

The space between the pubic and sub-pubic beams on each side.

How is it closed?

By a membrane which gives attachment to muscles.

How may the female pelvis be distinguished from the male?

In the female, the sub-pubic beam is more roundly arched and its edges more everted; the transverse diameters are relatively greater, and the antero-posterior diameters relatively less; the transverse diameter of the inlet crosses the antero-posterior at a point in front of the intersection of the oblique diameters, and the ischial spines are to the outer side of plumb lines dropped from the posterior superior iliac spines. (Some female pelves, especially among the lower races, approach the male type.) See Fig. 5.

What joints exist in the pelvis?

Three lumbo-sacral above (one between the bodies and two between the articular processes), two sacro-iliac (one on each side), the pubic joint, in front, and the sacro-coccygeal joint, behind.

What are the pelvic joints called?

Symphyses, and the pubic joint is often called, by way of distinction, *the* symphysis.

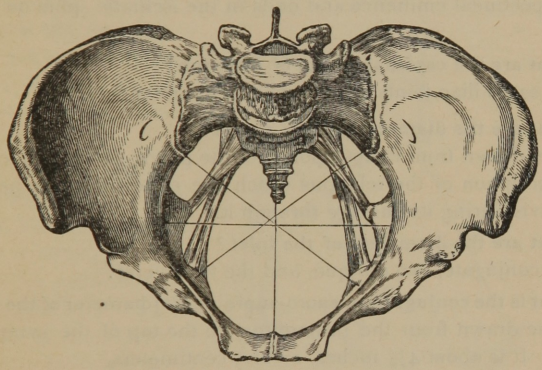
What kind of joints are they?

Amphiarthrodial, with the exception of those formed by the articular processes of the sacrum and last lumbar vertebra, which are arthrodial, and are lined by synovial membranes. The sacro-coccygeal joint is always freely movable, and has a demonstrable synovial sac; the other joints can only be shown to have sacs during pregnancy.

What is the sacral promontory?

The projection or angle formed by the top of the sacrum in front at its junction with the vertebra above. It is often called simply the promontory.

FIG. 5.



What is the ilio-pectineal line?

A bony ridge or raised line, which, beginning at the promontory, extends around each side of the pelvis, within, until it meets the opposite line at the symphysis pubis.

What parts lie above it?

The wings of the sacrum, iliac fossæ, and crests, and the last lumbar vertebra forming the bony parts, or the *false pelvis.*

What lies below it?

The true or obstetric pelvis.

What is the ilio-pectineal line said to bound?

The *inlet* of the pelvis, because the child must first enter the

pelvis through this bony ring. It is called also the *superior strait* and the pelvic *brim*.

Where is the pelvic outlet?

It is bounded by the tip of the coccyx behind, by the tuberosities of the ischia on the sides, and by the sub-pubic arch in front. It is called also the *inferior strait*.

What is the pectineal eminence?

The point in the ilio-pectineal line which is opposite the acetabulum, and is slightly raised above the ordinary level of the line.

What is the ilio-ischiatic line?

A slightly raised ridge, on the inside of the pelvis, which begins at the pectineal eminence and ends in the ischiatic spine on either side.

What are the cardinal points of Capuron?

The sacro-iliac joints and ilio-pectineal eminences.

What are the diameters of the pelvis?

Lines drawn from various points of the pelvic cavity, to facilitate the description of the relations which the child's surface bears to the pelvis during its passage through it.

What are the diameters of the inlet?

The conjugate, two oblique, and the transverse.

What is the conjugate (or sacro-supra-pubic) diameter of the inlet?

A line drawn from the promontory to the top of the symphysis pubis. It is about 4½ inches, or 11.5 centimeters.

What are the oblique diameters?

Lines drawn from the sacro-iliac symphysis of either side to a point in front of the pectineal eminence of the opposite side (Meadows). The one drawn from the right sacro-iliac symphysis is called the right oblique; the one from the left symphysis, the left oblique. They are about 5.3 inches, or 13.5 centimeters.

What is the transverse diameter of the inlet?

A line drawn directly across the pelvis from one pectineal eminence to the other. In the normal pelvis it is about 4.8 inches, or 12.5 centimeters.

What is the circumference of the pelvic inlet?

About 15.8 inches, or 40 centimeters.

What are the diameters of the outlet?

The conjugate and transverse.

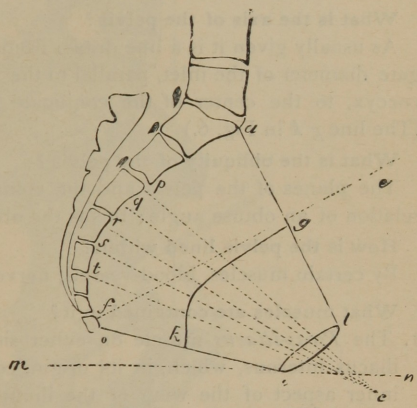
What is the conjugate diameter of the outlet?

A line drawn from the tip of the coccyx to the under edge of the symphysis pubis. It is of variable length, owing to the mobility of the coccyx, but when the latter is extended, during labor, it is the longest diameter of the outlet, and may measure five inches, or about 15 centimeters; ordinarily it measures about 4.3 inches, or 11 centimeters.

What is the transverse diameter of the outlet?

A line drawn from one tuberosity of the ischium to the opposite one, and measures about 4 inches, or 11 centimeters in the normal pelvis.

FIG. 6.



a b. Conjugate diameter of Inlet.
e f. Conjugate diameter of Outlet.

What is the depth of the pelvic cavity?

1½ inches, or 3.8 centimeters in front; 3½ inches, or 8.9 centimeters at sides; posteriorly, 4¼ inches, or 10.8 centimeters, or following the curve of the sacrum, it is about 5½ inches, or 13.8 centimeters. The average diameters are about 4¾ to 5 inches, or 12 centimeters.

What are the planes of the pelvis?

Imaginary levels, drawn through any part of the pelvic circumference (Playfair), to facilitate the description of the relations of the pelvis to the child, vertebral column or horizon. They may be illustrated by pieces of card-board cut so as to fit the pelvic cavity at any level.

What planes are important?

The plane of the inlet and of the outlet.

What is the plane of the inlet?

A plane drawn transversely through the conjugate diameter of the inlet and limited by the circumference of the inlet.

What is the plane of the outlet?

A plane drawn transversely through the conjugate diameter of the outlet, and limited by the circumference of the outlet.

How are these planes used to show the position of the pelvis in different postures?

In the erect posture the plane of the inlet makes an angle of 60° with the horizon. In the semi-recumbent posture the same plane is directly horizontal, and in the recumbent posture it forms a reversed angle of 45° with the horizon.

What is the axis of the pelvis?

As usually given it is a line drawn from the center of the conjugate diameter of the inlet, parallel to the face of the sacrum and coccyx, to the center of the conjugate diameter of the outlet. (The line *g k* in Fig. 6.)

What is the obliquity of the pelvis?

The planes of the pelvis and the spinal column stand in the relation of an obtuse angle; this is the obliquity of the pelvis.

How is the pelvis lined within?

By certain muscles, blood-vessels, nerves, and fasciæ.

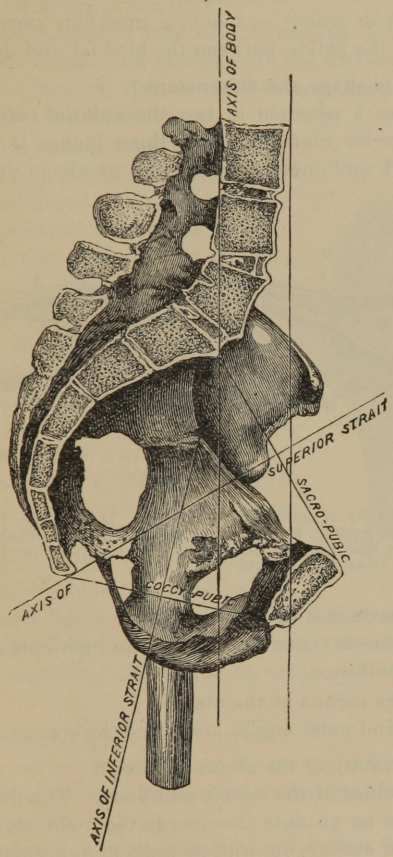
What muscles are contained in it?

1. The *Psoas-iliacus* muscle on either side, consists, first, of the iliacus internus, which, in its origin, covers almost the entire inner aspect of the wing of the ilium, uniting with the psoas magnus, which passes over the upper border of the sacrum. Their conjoined body passes along the border of the sacro-iliac arch, and by a common tendon passes out of the pelvis, between the anterior inferior iliac spine and the ilio-pectineal eminence, to be inserted upon the femur.
2. The *Pyriformis* muscle on either side, which covers with its insertion the face of the sacrum, and passes out of the pelvis under the sacro-ischiatic arch, to be inserted upon the femur.
3. The *Obturator internus* muscle on either side, which covers the anterior pelvic walls and passes out under the sacro-ischiatic arch.

What obstetric uses have these muscles?

Besides serving as a soft lining to the bones, the psoas iliacus furnishes a cushion, or guard, for the iliac vessels and nerves, pre-

FIG. 7.



serving them from pressure, while the pyriformis performs the same office for the sciatic nerve, which lies along its border.

THE REPRODUCTIVE ORGANS.

THE INTERNAL ORGANS.

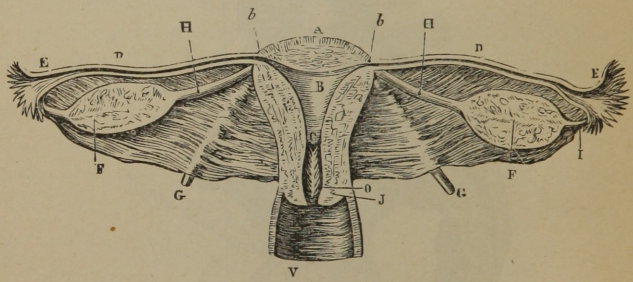
What and where is the Uterus?

The uterus or womb is a hollow muscular organ, situated in the center of the pelvis, between the bladder and the rectum.

What are its shape and dimensions?

It resembles a pear cut in two, the anterior surface being flat, and the posterior rounded. It is three inches long, two inches broad (above), and one inch thick, and weighs in the virgin about one ounce.

FIG. 8.



A. Fundus. B. Cavity of uterus. C. Internal os. D. Fallopian tubes or oviducts. E. Fimbriated extremity. F. Ovary. G. Round ligament. H. Ligament of ovary. I. Tubo-ovarian ligament. J. External os. O. Cavity of cervix, showing rugæ. V. Vagina. *b*. Mouths of oviducts.

Into what parts is it divided?

Into, first, the cervix or neck, about an inch long; and second, the body or fundus.

What are the cornua of the uterus?

The upper and outer angles are called the cornua.

How is the cavity of the uterus divided?

Into the cavities of the cervix and body. The first is fusiform, and appears to be an ante-chamber to the main cavity; the latter is triangular in outline, but with its walls in apposition (see Fig. 9).

What openings are found in the cervix?

The os externum, or os uteri, called also *the* os (J), is a small

opening into the cavity of the cervix at its lower end. The constriction between the cavities of the neck and body is called the os internum (c).

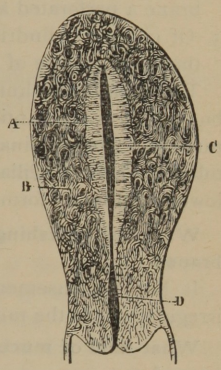
What is the structure of the uterus?

It is mainly composed of muscular tissue, with fibrous connective tissue, blood vessels and nerves. On the outside, it is mainly covered with peritoneum, and on the inside, is lined with mucous membrane, called the endometrium.

How are the muscular fibers arranged?

For the most part they are irregularly and inextricably interlaced and surround the large blood-vessels which penetrate between them, but a circular arrangement of fibers is found in the cervix, while in the body the majority are longitudinal.

FIG. 9.



What kinds of blood-vessels are found in the womb?

The arteries are mainly small, and helicine or spiral, and are derived mainly from the two uterine and two ovarian arteries; the latter also supply the ovaries and oviducts. The veins are short, of large caliber, and freely communicating; these, after emerging from the uterus, form on each side a large plexus, situated in the folds of the broad ligament, known as the utero-ovarian plexus. During pregnancy large sinuses are formed. These peculiarities warrant us in regarding the uterus as composed of a modified erectile tissue.

How is the uterus supplied with nerves?

1st. The main nerves proceed from the plexus uterinus magnus, formed by branches from the superior mesenteric plexus and from the ovarian ganglia.

2d. The sympathetic nervous system also furnishes fibers.

3d. The vaso-motor apparatus has much influence upon the womb.

4th. Independent ganglia, like those found in the heart, are embedded in the uterine tissue.

How is the uterus supplied with lymphatics?

These are divided into three sets, one for each coat of the organ. They are connected with the pelvic and lumbar ganglia, into which they empty.

What kind of mucous membrane lines the uterus?

The membrane lining the body is quite thick and vascular, and is composed—

1. Of a mesh of connective tissue containing many spindle-shaped cells.
2. Of many tubular glands, which give the surface of the membrane a perforated appearance.
3. Of ciliated cylindrical epithelium, which lines the glands and the outer surface of the whole membrane.

The membrane lining the cervix is continuous with that of the body, and is substantially the same, except in being thrown into numerous longitudinal folds, and in containing racemose, not tubular, glands. Cilia are only found in the upper two-thirds, the lower third being formed of pavement epithelium.

What distinguishing peculiarity has the uterine mucous membrane?

It has no basement layer of connective tissue, and merges irregularly into the muscular tissue.

What kind of mucus is secreted by the uterine mucous membrane?

A viscid, alkaline mucus.

What are ovula Nabothi?

These are racemose glands in the cervical mucous membrane which are sometimes occluded, while the secretion continues until the gland becomes quite large and globular. They are often a source of much irritation.

How does the peritoneum cover the uterus?

It completely invests the uterus above, in front, as far as the junction of the body and cervix, where the bladder touches the womb, and behind as far as the junction of the uterus and vagina.

What is the broad ligament of the uterus?

The extension of the peritoneum over the uterus causes two folds of peritoneum to be brought together at its sides, and these extend

across the pelvis, to be merged into the common abdominal peritoneum. These transverse folds, enclosing muscular and fibrous tissues, blood-vessels, nerves, and lymphatics, are called the broad ligaments, and divide the pelvis into two compartments; in the anterior one the bladder is situated, in the posterior, the rectum.

What are the round ligaments?

They are two rounded cords, composed of fibrous tissue, interspersed with muscular fibers, which extend underneath the peritoneum, from the cornua of the uterus to the top of the pelvis in front, where they pass through the inguinal canal to be inserted in the connective tissue of the labia majora.

What are the utero-sacral ligaments?

Bands of fibrous tissue which pass from either side of the uterus to the sacrum, and are of considerable strength.

What are the vesico-uterine ligaments?

Small folds of peritoneum which pass between the uterus and the bladder.

What is the normal position of the uterus?

The uterus is placed nearly in the center of the pelvis; so that a line drawn from the top of the symphysis to the middle of the second bone of the sacrum would touch its top. Its long axis is nearly parallel to the face of the sacrum and to the posterior wall of the symphysis pubis. But it must be remembered that the uterus is movable, and 1st, rises and falls with the respiratory movements, and, 2d, is pushed backward and forward by the varying conditions of fulness in the bladder and rectum.

What supports the uterus?

1st. The uterus is swung from the sacrum by the utero-sacral ligaments.

2d. It is slightly supported or belayed by the broad, round, vesico-uterine ligaments.

3d. The walls of the vagina act as a fleshy column of support, being in turn supported by the perineum.

4th. "The retentive power of the abdomen" (Duncan), due to the existence of a partial vacuum in the abdominal cavity, aids in maintaining the uterus in its normal position.

What is a double uterus?

A uterus containing two cavities separated by a longitudinal septum. Occasionally the whole genital tract is double, the septum extending to the vulva, so that there are two vaginæ.

Sometimes a single cornu of the uterus is developed to such an extent as to be capable of containing a fetus during gestation.

What are the Fallopian tubes?

The Fallopian tubes, or oviducts, are small tubes which extend from each cornu of the uterus.

What is their structure?

They are continuous in structure with the uterus, being mainly muscular, covered with peritoneum and lined with mucous membrane, which is identical with that of the uterus. The average caliber is one-sixteenth of an inch, and their length about five inches.

How do they terminate?

In an expanded or trumpet-shaped end, called the fimbriated extremity, because it is fringed with little prolongations of tubal tissue, one or more of which is adherent to the ovary of the same side.

What and where are the ovaries?

Two glandular bodies embedded in the posterior surface of the broad ligament, one on each side of the uterus, but not covered by peritoneum. They are about the size and appearance of blanched almonds.

What is the structure of the ovary?

It is mainly composed of dense fibrous tissue, containing muscular fibers and covered by a delicate cortical layer of fibro-plastic tissue, in the meshes of which are found the ovisacs in different stages of development (see Ovulation).

What is the parovarium?

The parovarium, or organ of Rosenmüller, consists of several tubes placed between the folds of the broad ligament. There is one on each side of the uterus. They are supposed to be the remains of the Wolffian bodies, and have no known function. They are analogous to the epididymis of the male. Very large cysts are sometimes developed from them.

What is the vagina?

A tube which serves to connect the uterus and its appendages with the outside of the body. It is attached above to the uterus and terminates below in the vulva.

How is the vagina attached to the uterus?

It is inserted upon the outside of the womb, at the junction of the body and neck, so that the neck of the uterus projects into the tube.

What is the structure of the vagina?

It is composed of fibrous connective tissue and of muscular fibers, for the most part circularly arranged. The external coat is continuous with the ordinary cellular tissue or packing of the pelvis; the middle or muscular coat is composed of two layers of fibers, longitudinal and transverse. It is composed of unstriped or involuntary muscle. Within, it is lined with mucous membrane, which is reflected over the cervix uteri above, and below is continuous with the mucous membrane of the vulva.

How does the mucous membrane of the vagina differ from that of the uterus?

It is composed simply of flat or pavement epithelial cells, and has only a few glands. Numerous depressions or crypts in the membrane answer a similar purpose and secrete a mucus of acid reaction. In the virgin it is disposed in many transverse ridges, called rugæ.

How long is the vagina?

Its anterior wall is quite short, extending from the vulva almost directly to its point of insertion, a small pouch being formed above, called the anterior vaginal pouch. The posterior wall is longer, being prolonged upward to form a larger pouch behind the uterine neck, called the posterior vaginal or retro-uterine pouch. The average length of the vagina is from three to five inches, varying in individuals and in races, two and one-half inches for anterior and a little over three inches for the posterior wall (Lusk).

Where is Douglas' cul de sac?

It is situated in the abdominal cavity, directly behind the posterior vaginal pouch, and therefore between the vagina and rectum.

It is a very important space, because, being the most dependent portion of the abdominal cavity, effusions of blood or other fluid and tumors of various kinds are often to be found in it.

How does the vagina terminate below?

It terminates in a circular fold of mucous membrane called the *hymen.* From the fact that this fold is often more developed in its posterior half, it usually appears as a crescentic fold, stretching across the opening of the vagina. (See 8, Fig. 1.)

What is an imperforate hymen?

The membrane sometimes completely closes the opening of the vagina, and is then said to be imperforate.

What is the structure of the hymen?

It is composed almost entirely of mucous membrane, and is easily torn by the entrance of the male organ, but is sometimes firm enough to resist any ordinary pressure, and may cause delay in labor by its presence.

What are the carunculæ myrtiformes?

When the hymen is torn and greatly stretched, as by the passage of a child's head, or a large fibroid tumor, its fragments undergo atrophy, and there remain little, wart-like elevations in the line of the hymen, called carunculæ myrtiformes. It is said, however, that these bodies sometimes coexist with the hymen, being placed a little distance behind it.

What are the bulbs of the vagina?

They are masses of erectile tissue, mainly composed of short, venous sinuses, shaped somewhat like a pair of saddle bags, and placed over and at the side of the vagina. They are supposed to correspond to the two halves of the male bulbous urethræ.

What are the vulvo-vaginal glands?

The vulvo-vaginal glands, or glands of Bartholin, are two small bodies situated just behind the hymen, one on each side. They are embedded in the cellular tissue around the vagina, and empty by a small duct on either side. They secrete a thin mucus, which is expelled freely, and even by jets, during venereal excitement and coitus.

THE EXTERNAL ORGANS, OR PUDENDA.

See Fig. 1.

What is the vulva?

The name given to the external organs collectively, but often used to denote the genital fissure or vulval canal.

What are the labia majora?

Elevated folds of cutaneous tissue, which are found on either side of the genital fissure.

What is the structure of the labia majora?

They consist of cutaneous folds containing loosely arranged cellular tissue, with some fat. On the outer surface they are covered by a free growth of stout, curly hair, similar to that found in the axilla. On their inner surface they are furnished with a considerable number of sebaceous follicles.

What is the mons veneris?

An eminence of cutaneous tissue, the anterior termination of the labia majora, situated directly upon the symphysis pubis. It is well padded with fat and covered with an abundance of hair.

What is the anterior commissure?

The point just under the mons, where the labia meet in front. The anterior limit of the genital fissure.

What is the posterior commissure?

The posterior limit of the genital fissure, or the point where the labia meet posteriorly. It marks the anterior boundary of the perineum.

What is the fourchette?

When the genital fissure is made to gape by the fingers pulling apart the labia majora, a fold of mucous membrane is made to project behind the posterior commissure, which is called the *fourchette*. The little dimple or cup between this fold and the commissure is called the *fossa navicularis*, but neither of them have any existence until artificially produced in this manner.

What is the clitoris?

A small, cylindrical body, about an inch in length, which resembles and is the analogue of the male penis. It consists of two

corpora cavernosa, which are attached to the under edge of the pubic bone, and by their free end project slightly under the anterior commissure. The part which is visible is about the size of a pea.

What are the labia minora?

Called also the *Nymphæ*. They are two folds of dartoid tissue, covered by skin, which cover the clitoris in a manner similar to the prepuce of the penis, and extend backward along the sides of the labia majora for about one-half their extent.

What is their structure?

Is nearly resembles that of the male scrotum, inclosing also some erectile tissue.

What is the vestibule?

The space which extends from the clitoris to the opening of the vagina, and is bounded laterally by the labia minora.

What and where is the meatus urinarius?

It is the opening of the urethra, and is placed at the posterior limit of the vestibule, and therefore just above the opening of the vagina. It is situated in a tubercle or slight eminence.

How long is the female urethra?

About one and one-half inches.

How is the urethra situated with respect to the vagina?

It lies directly over it, and can be distinctly recognized, by the finger introduced into the vagina, as a tubular ridge above the anterior wall of the vagina.

What is the perineum?

The space between the vulva and anus, and bounded laterally by the tuberosities of the ischia.

What is the perineal body?

It consists of a wedge-shaped band of fibrous elastic tissue, which stretches across from one ischial tuberosity to the other, and is interposed between the termination of the vagina and rectum.

What other structures of importance are found in the perineum?

The transversus perinæi and levator ani muscles, and also fibers of the sphincter muscles, which are placed about the ends of the vagina and rectum.

PHYSIOLOGY.

OVULATION.

What is the function of the ovaries?

To furnish ova, or eggs, which are the primitive germs of the human being, and the necessary female element in reproduction.

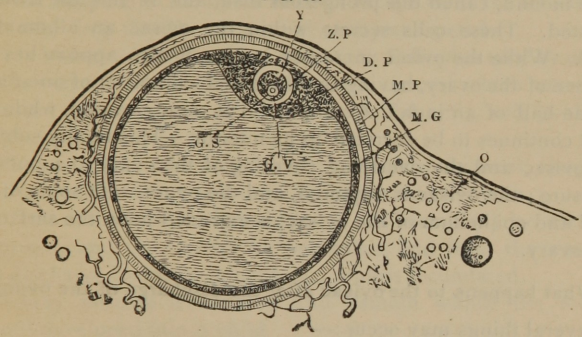
What is the function called?

Ovulation.

How early in life does ovulation begin?

In childhood. (Sinedy and Hausmann found evidence of ovulation in 10 per cent. of infants examined by them.) But it does not occur with much vigor until womanhood.

FIG. 10.



O. Ovarian tissue. Y. Yolk. Z.P. Zona pellucida or vitelline membrane. G.V. Germinal vesicle. G. S. Germinal spot. D. P. Discus proligerous. M. G. Membrana granulosa. M. P. Membrana propria.

Where are the ova found?

In small cystic bodies called ovisacs, or Graafian vesicles (or follicles), there being usually but one ovum in each ovisac.

How many ovisacs exist in each ovary?

They are variously estimated from 30,000 to 650,000, but only a score or so can be observed at any one time.

Describe the ovum when fully developed.

The ovum, when fully developed, is a spherical mass of proto-

plasm, $\frac{1}{120}$th of an inch in diameter. It is structureless, except that it contains at one point a small body like a nucleus, called the germinal vesicle, which in turn contains a smaller body, like a nucleolus, called the germinal spot. The ovum is surrounded by a thin envelope of albuminous matter, called the zona pellu cida, or vitelline membrane, but which is not a distinct membrane until after impregnation, the ovum itself being called, also, the vitellus or yolk.

Describe the process of ovulation.

The ovisac, at first very minute, is embedded in the cortical layer of the ovary. Its wall consists of a layer of cells, called the membrana propria, within which is found a second layer, the membrana granulosa. An accumulation of these cells form a little mound, called the proligerous disk, and in this the ovum is situated. These cells secrete within the ovisac an albuminous fluid. While the ovisac increases in size, it also approaches the surface of the ovary, having then attained a diameter of one-fourth to one-half of an inch. At this point it *stops growing*, while the fluid continues to be secreted in its interior. This finally subjects the ovisac and the overlying covering of the ovary to a bursting pressure; the ovisac is ruptured, and the ovum, with some of the fluid and epithelium of the ovisac, is extruded upon the surface of the ovary.

What happens to the ovisac after the discharge of the ovum?

Several things may occur:—

1. The entire contents of the ovisac may be extruded, the walls collapse, and within a week or two a small linear cicatrix only is left to show that ovulation has occurred.
2. Some blood may be effused into the sac at the time of rupture. A clot is formed, which is slowly absorbed; as its hematin becomes faded and yellowish, it is called the *corpus luteum*.
3. Should the woman become pregnant, the walls of the ovisac may continue to secrete fluid. This is due to the increased blood supply which pregnancy occasions; and this leads to the formation of a large, yellowish body, called the *corpus luteum* of pregnancy.

What coverings has the ovum when it escapes from the ovisac?

It is covered externally by a layer of cells from the membrana granulosa, called the discus proligerous, internally by a thick transparent membrane termed the vitelline membrane, or, from the way in which it transmits light it is called the zona pellucida. The ovum and zona pellucida are not, however, in immediate contact, for between them there is found a space, termed the perivitelline space, which permits ameboid movement of the protoplasm of the egg.

How is the appearance of the ovary affected by age?

In youth it is smooth; after repeated ovulation it becomes fissured and wrinkled; in old age atrophy takes place, and it returns to nearly its infantile appearance.

What happens to the ovum after its escape from the ovisac?

1. It may drop into the abdominal cavity and perish.
2. It is wafted toward the open end of the Fallopian tube by means of a current in the fluid bathing the tissues, which current is caused by the action of ciliated epithelial cells, and is always directed toward the tube.
3. The end of the tube may, by a spasmodic movement, clasp the surface of the ovary and draw the ovum into the tube.
4. When in the tube it is passed on to the womb (*a*) by a ciliary current, and (*b*) *possibly* by peristalsis, and from the womb it is discharged with the mucus, etc., unless fecundated.
5. It may become fecundated and remain within the mother until developed into a child.

How often does ovulation take place?

It is irregular in its occurrence. A number of ovisacs are constantly being developed, with greater or less rapidity, and the amount of the blood supply of the ovary controls the rate of development. Frequent coitus leads to frequent ovulation for this reason.

What is the usual interval between the discharge of successive ova?

Usually once a month, because the greatest increase in the blood supply occurs once a month, during menstruation.

MENSTRUATION.

What is Menstruation?

A periodical disturbance in the female, characterized by—

1. An increase in the vascular tension throughout the body.
2. A special determination of blood to the pelvic organs (or pelvic hyperemia).
3. A renovation of the uterine mucous membrane.
4. A discharge of blood mixed with mucus from the uterus.

How often does menstruation occur?

Once every twenty-eight days; but the interval varies in some women from three to six weeks.

What is the first evidence of menstruation?

An increase in the vascular tension and a sense of fulness in the pelvic region, which may be accompanied by pain.

What effect has the pelvic hyperemia on the ovaries?

By increasing the blood supply it hastens the development of the ovisacs, and one or more usually rupture at this time.

What effect has the pelvic hyperemia on the uterus?

The uterus becomes larger and softer, and its mucous membrane undergoes changes as follows: 1. New cells are formed. 2. The outer layer or layers of epithelium are thrown off. 3. The membrane is turgid with blood and thrown into folds. 4. There is increased functional activity in the mucous follicles, and a more abundant secretion of mucus. 5. Some of the superficial capillaries break down, and an oozing of blood takes place.

What is the clinical course of menstruation?

1. The woman notices a leucorrhea for one or two days.
2. A discharge of blood for three days (average).
3. A continuance of leucorrhea for one or two days.

Is menstruation attended with pain?

Not normally, but the majority of women experience some degree of pelvic pain, because the parts are hypersensitive, from some departure from the normal condition. The pain is usually referred to the "small of the back;" also to the ovarian regions and to the hypogastrium. There also may be present sensations of rapid changes of temperature, chilliness or heat; the bladder

may be quite irritable, and diarrhea may appear. Some women become hysterical at these times.

What peculiarities has the menstrual blood?

1. It is blood mixed with epithelial cells.
2. It does not coagulate when moderate in amount, because it is made acid by the vaginal mucus.

How much blood is discharged during menstruation?

From ℥ss to ℥iij in all; but the amount varies.

Is the blood during menstruation always discharged from the uterus?

No. The uterine mucous membrane sometimes fails to undergo its usual changes, and weakened capillaries in any part of the body may break down under the increased vascular tension. Thus we may have menstrual hemorrhage from the stomach, lungs, breasts, or any part whatever.

What is this condition called?

Vicarious menstruation, or xenomenia.

What are the popular names for menstruation?

To be unwell; to see anything; to be regular; the periods; courses; sickness; monthlies; turns; changes, and flowers.

What is the object of menstruation?

To insure the development of ova by a periodical increase in the ovarian blood supply, and to favor the detention of the ovum in the uterus by the changes in the mucous membrane.

When do women begin to menstruate?

As soon as they become women, which period is called puberty.

When does puberty begin?

It varies, from race, climate, and social condition. The average is at the age of fifteen years.

What physical signs attend the age of puberty?

The reproductive organs are fully developed, the breasts enlarge, the pubes is covered with hair, and the whole form of the girl becomes rounded and womanly.

When do women cease to menstruate?

At about the age of forty-five years, which period is called the *menopause* or *climacteric*, or "the change of life."

What symptoms usually herald the approach of the menopause?

Menstruation becomes irregular and finally ceases. Sudden flushes of heat and cold, and hyperemias of the cerebrum or of other organs of the body may appear. Some women are quite ill at this time.

What happens to the reproductive organs at the menopause?

They gradually atrophy, but the possibility of child-bearing may continue until the age of fifty-five years (F. Barker).

Does the capacity for child-bearing cease with the menopause?

Usually it does; but as ovulation occasionally outlasts the menstrual function, impregnation may in some cases take place after the menopause.

Does impregnation ever take place before menstruation begins?

Ovulation sometimes precedes menstruation, and consequently such a case is possible.

What is the main function of the uterus?

To receive the fecundated ovum, and to retain it until it is developed into a mature fetus.

What is the function of the oviducts?

To convey the ova to the uterus, and the spermatozoa to the ova.

What is the function of the vagina?

It serves as a duct or outlet for the discharge of the uterine secretions, including the escape of the child in labor, and also to admit the male organ, so that the semen may gain access to the ovum.

What is the function of the external organs?

They are endowed with great sensibility, and are mainly concerned with the function of coitus. The nymphæ also serve to direct the stream of urine as it passes from the meatus urinarius.

What is the structure of the breast?

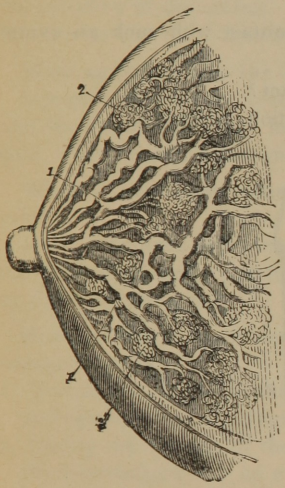
The breast is a gland of the racemose variety, and is composed of fifteen or twenty lobes of glandular tissue, with a packing of areolar and adipose tissue. The lobes are compounded of the lobules produced by the aggregation of the terminal acini, in which the milk is formed. The ducts of each lobule unite with each other to form a terminal canal, called the galactophorous

duct, of which there is one for each lobe (Playfair). These empty upon the face or extremity of the cylindrical appendage called the nipple.

What is the areola?

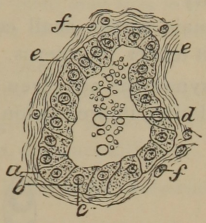
A circular patch of cutaneous tissue around the base of the nipple, of pink color in virgins, and darker in those who have borne children and in brunettes. It contains also many sebaceous

FIG. 11.



1. Galactophorous duct.
2. Lobuli of the mammary glands.

FIG. 12.



ACINUS OF MAMMARY GLAND.

glands in addition to the glands or tubercles of Montgomery or Morgagni. No fat is found beneath the skin of the areola.

What are the glands of Montgomery or Morgagni?

Small tubercle-like projections occupying the inner circle of the areola. They enlarge greatly during pregnancy.

What is the nipple?

The nipple is a conical projection arising from the center of the areola. It is about half an inch in height.

Of what is the nipple composed?

Principally of the terminals of the galactophorous ducts, sebaceous glands, fat, connective tissue, longitudinal and transverse muscular fibers, and skin. It has also been supposed by some to contain erectile tissue.

Affections of the mammary glands will be treated in the chapter on "The Period After Delivery."

PREGNANCY.

What is pregnancy?

The condition in which a woman contains a living and growing fetus.

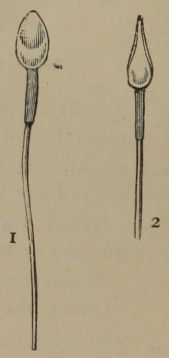
What are the essential requisites for the occurrence of pregnancy?

1. That a fully matured ovum shall be recently discharged from the ovary.
2. That male semen shall come in contact with such an ovum before it leaves the uterus.

What synonyms are given for this act?

Fecundation, impregnation, incarnation, conception.

FIG. 13.



HEAD AND UPPER PART OF SPERMATOZOA.
1. Seen from above. 2. Side view.

What is fecundation?

The act by which the male semen imparts to the ovum the power of developing into a fetus.

What part of the semen has this property?

The spermatozoa; each spermatozoön resembles a ciliated epithelial cell, except in being apparently structureless or homogeneous. Each drop of semen contains thousands, all of which are in constant vibratile motion during life. Their length is about $\frac{1}{500}$ to $\frac{1}{600}$ of an inch.

How long do the spermatozoa retain their vitality?

They have been found in full vigor eight days after their introduction into the vagina.

What is the average rate of motion in a spermatozoön?

About an inch in five minutes (*Henle*).

What agents lengthen the life of the spermatozoön?

Their vitality is promoted by warmth, a slightly alkaline solution, the secretion of the uterus. It would seem also that it is possible for them to live for a considerable time in menstrual blood.

What agents destroy the life of the spermatozoön?

Injection of vinegar, acids generally, strong alkaline solutions, and bichlorid of mercury in a strength of 1 to 10,000 or 12,000; cold, while retarding their movements, does not kill them.

When is sexual intercourse most liable to be followed by conception?

During the week following the cessation of the menstrual flow, the probability being greatest in the earlier days and diminishing as the week advances.

How and where is contact between the spermatozoa and ovum brought about?

1. During coitus the semen is ejected against the cervix uteri and upper part of the vagina.
2. During the orgasm of the female the uterus sucks or pumps the spermatozoa into its cavity, after which their own vibratile motion causes them to ascend the oviduct until they meet the ovum.
3. Fecundation probably occurs most frequently in the oviduct, but it can occur at any point between the ovary and the os uteri internum.

Is it necessary for the uterus to aid the entrance of the semen?

No; fecundation has occurred when the woman was perfectly passive, or unconscious, from drugs, drink, or sleep.

What further means are provided for the retention of the semen?

1. During venereal excitement the round ligaments of the uterus pull it forward and upward. This permits the penis to glide past the cervix and to deposit the semen in the posterior vaginal

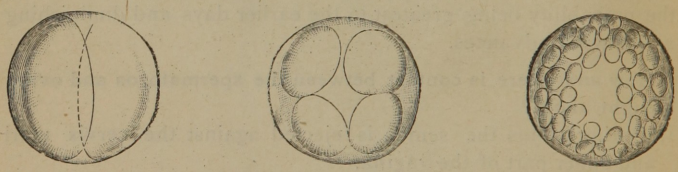
pouch. When the ligaments are relaxed, the cervix resumes its former position, and thus retains the semen in the pouch above; the spermatozoa may then, at their leisure, enter the uterus.

2. It has also been demonstrated that fecundation can take place when the semen escapes upon the vulva, so that the whole distance may be traveled by the spermatozoa unaided.

What changes take place in the ovum after fecundation?

1. When the ovum is mature, two small cells are detached from the main body of cells; these are called polar globules. It was formerly supposed that these were associated with the disappearance of the germinal vesicle, but recent experiments have demonstrated that the germinal vesicle plays an active part in their formation. This can take place independently of fecundation.
2. The portion of the ovum remaining after the throwing off of the polar globules is called the "female pronucleus."

FIG. 14.



SEGMENTATION OF THE VITELLUS.

3. Fecundation is effected by the penetration of the head of one spermatozoön. This is called the "male pronucleus."
4. The male and female pronucleus coalesce. The ovum is now called the oösperm.
5. The *segmentation* of the nucleus and vitellus, *i. e.*, they both split into two masses, these into four, and so on until a large number of segments are formed. (See Fig. 14.)
6. A clear fluid is secreted within the ovum, which presses these segments to the surface of the ovum, where they form a double layer of cells, differing somewhat in size. The outer and larger is termed the epiblast, and the inner and smaller the hypoblast. Together they are known as the blastodermic vesicle.
7. There then appears upon the outside of the vitellus, a small

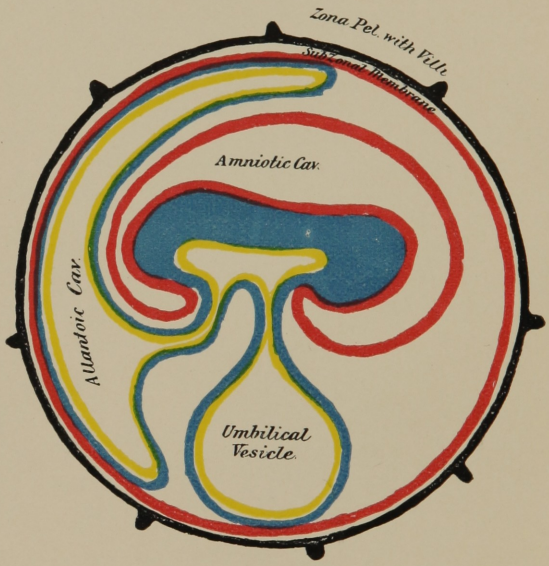


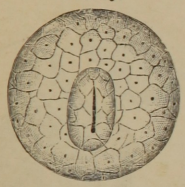
Diagram of the fetal membranes (structures which either are, or have been at an earlier period of development, continuous with each other are represented by the same color). In the center of the ovum can be seen the embryo itself. The diagram also shows the manner in which the three embryonic layers form the new being.

Red, **Epiblast**; *Blue*, **Mesoblast**; *Yellow*, **Hypoblast.**

oval elevation, surrounded by a depression, which is called the *area germinativa.*

8. There appears in the area germinativa a small, dark line, called the *primitive trace.* About this line will be grouped the various parts of the embryo, the rest of the ovum serving only as a covering and for nutriment. (See Fig. 15.)
9. A covering for this trace or embryo is now formed. Thus far the vitelline membrane has been sufficient. The embryonic line sinks into the center of the ovum, while the edges of the external blastodermic layer about the area close around it, inclosing it in a sac called the *amnion.* Between the amnion and the embryo, fluid at a later period is deposited; this constitutes the liquor amnii. (See Fig. 16.) The vitelline membrane then disappears.

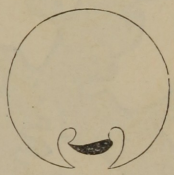
FIG. 15.



THE OUTER LAYER OF CELLS COMPLETED.

The primitive trace in the center of the area germinativa.

FIG. 16.



SECTION OF OVUM.

Shows embryo sinking in toward the center of the ovum, and the way in which the amnion is formed.

What is the mesoblast?

A line of cells developing later between the epiblast and hypoblast.

What are formed from each of these layers?

1. From the epiblast, the epidermis, hair, nails, the epithelium of the mouth, nose, and of the cloaca, glands of the skin, brain, and spinal cord, and organs of special sense.
2. Hypoblast; epithelium of walls and glands of intestines, epithelium of lungs and air passages.
3. Mesoblast furnishes the corium, muscles, bones, connective tissues, muscular layers of digestive tract, blood-vessels, and the genito-urinary system.

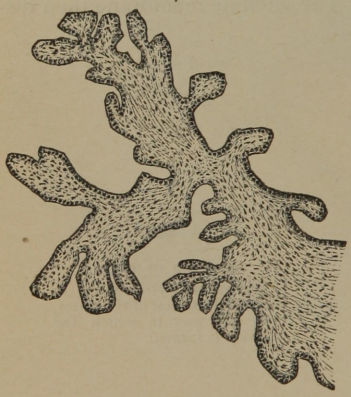
How is the chorion formed?

The outer surface of the external blastodermic layer, or that part which did not follow the embryo within the ovum, now becomes covered with small, shaggy tufts, which are the primitive chorial villi.

What is the allantois?

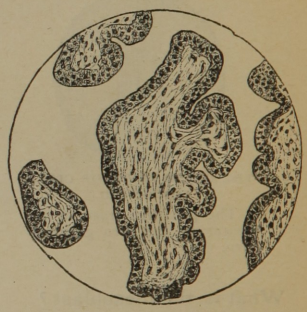
A vascular mass, called the *allantois*, shoots out from the middle of the embryo, and when it has reached the inner surface of the ovum, spreads out, carrying loops of blood-vessels into the villi of the chorion.

FIG. 17.



VILLI OF CHORION.

FIG. 18.



Same as Fig. 17 but seen with a high power.

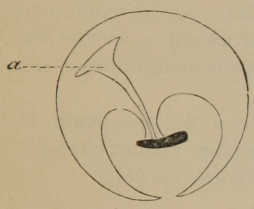
In what manner, then, does the embryo receive its nourishment?

1. Before the formation of the allantois, the nutriment needed for growth is furnished (*a*) by osmosis of fluids from the tissues of of the mother into the ovum, and (*b*) by the fluid materials of the ovum contained within the internal blastodermic layer. While the allantois is formed, this internal layer contracts, its shrunken bulk constituting the *umbilical vesicle*, which finally disappears. (Fig. 20.)
2. By the time the allantois is fully formed, if not before, the ovum

has reached the womb. Its villi, thus provided with blood-vessels, become enlarged and arborescent over that part of the ovum which is in contact with the uterine wall, but atrophy and disappear from the rest of its circumference.

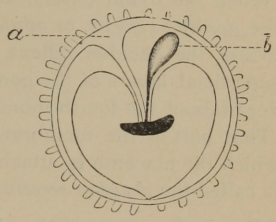
3. When the ovum has reached the uterus, it is detained in a fold of mucous membrane. The edges of the fold grow over the ovum, so as to give it an additional covering of mucous membrane, called the *decidua reflexa*.
4. When the ovum is thus fastened to the uterine wall, the chorionic villi increase in size, and form attachments to the uterine wall underneath it, forming the *placenta*, by which a definite

FIG. 19.



THE AMNION NEARLY COMPLETED.
The allantois carrying blood-vessels to the circumference (*a*).

FIG. 20.



THE AMNION COMPLETED.
a. The allantois completed, having carried vessels into all the projections (villi) of the chorion. *b*. The umbilical vesicle.

vascular connection is established between the embryo and mother.

5. The placenta being formed, the embryo is suspended in the amniotic sac by a cord reaching to the placenta, called the *funis*, or *umbilical cord*, and continues to develop to the end of pregnancy.

What coverings has the embryo at the period when placental circulation is established?

First, the amnion, the membrane nearest the fetal body.
Second, the chorion.
Third, the decidua reflexa and the general uterine wall.

What is the length of time taken by the ovum in passing through the oviduct to the uterus?

From seven to ten days.

What is the size of the ovum on its entrance into the uterus?

From $\frac{1}{50}$ to $\frac{1}{25}$ of an inch.

What changes in the mucous membrane of the womb follow fecundation?

1. The mucous membrane of the womb becomes hyperemic and hypertrophied; it develops new and soft connective tissue, and is thrown into folds. In this thickened state it is called the *decidua vera*, or *uterine decidua*. (This occurs whether the ovum enters the womb or not.)
2. When the ovum enters, adjacent folds grow over it, forming the *decidua reflexa*, or *ovular decidua*. As the ovum increases in size, the decidua reflexa becomes united or welded with the superficial layers of the general mucous membrane, or decidua vera (about the fourth month).
3. That part of the membrane directly under the ovum, and to which the placenta is attached, undergoes greater changes, and is called the *decidua serotina*, or *placental decidua*.

What is the nature of the placenta?

1. The villi of the chorion enter depressions in the decidua serotina, and bands of connective tissue unite the decidua and villi.
2. The venous sinuses under the serotina increase greatly in size, and the villi, by pressure and erosion, finally dip into them. As a result, we have a flat, cake-shaped mass, mainly composed of blood-vessels, which serve to convey nutriment from the mother to the child.

Does the maternal blood enter the circulation of the child?

No. The fetus derives nutriment by endosmosis, through the delicate walls of the villi floating in the maternal sinuses—like the rootlets of a plant—absorbing the elements needed for growth, and discharging effete products by exosmosis. According to some, the villi dip into crypts or depressions of the *decidua serotina* and not into the sinuses, and absorb a secretion called *uterine milk*, which is furnished by these crypts.

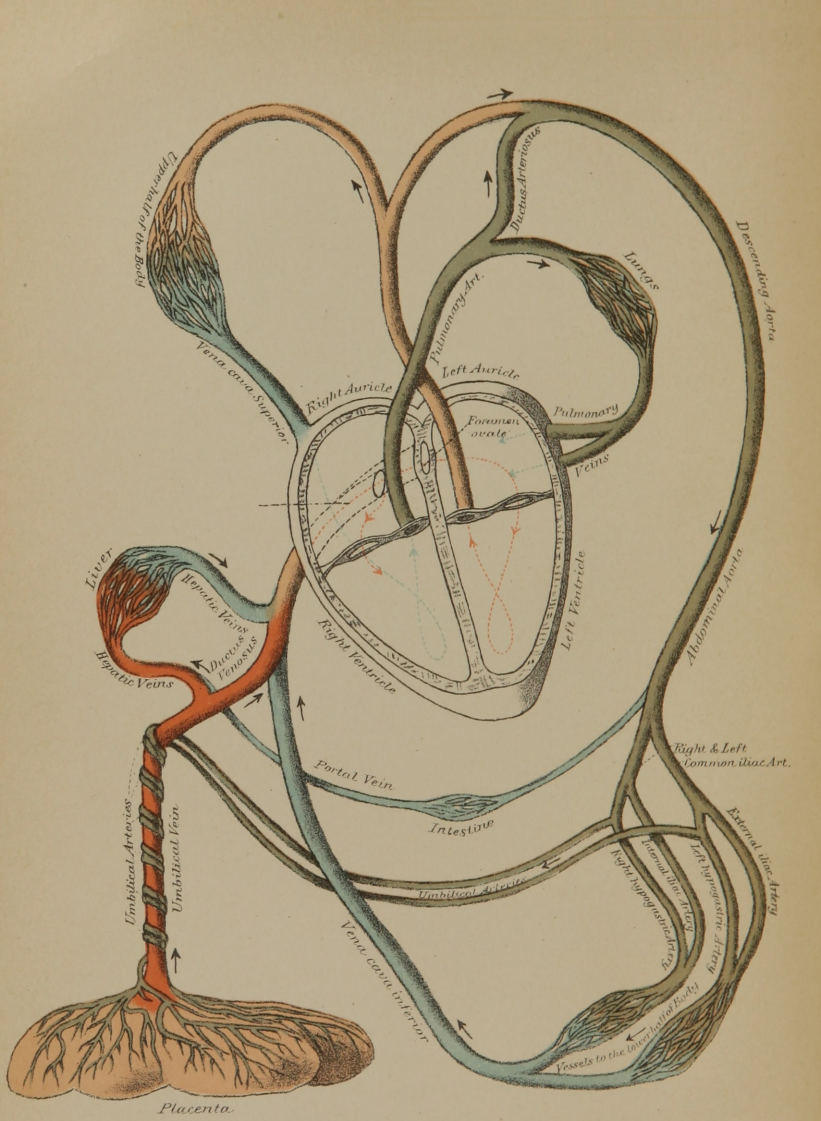


DIAGRAM OF FŒTAL CIRCULATION.

W. Preyer del.

What other function has the placenta?

That of *respiration*. The fetal blood is oxygenated in the placental tufts.

What is the funis or umbilical cord?

The veins of the placenta ultimately unite in a single vein, which passes to the umbilicus of the fetus. Two arteries pass from the fetus to the placenta, and are wound spirally about the vein. These three vessels are imbedded in a substance called Wharton's gelatin, and covered by a membrane derived from the amnion. The whole is called the funis, or umbilical cord.

What are the knots in the funis?

The fetus in its active movements sometimes passes through a loop of the funis, and this, when drawn tight, forms a true knot. False knots are mere knobs or masses of Wharton's gelatin, formed at intervals along the cord.

What are the dimensions of the placenta and funis at full term?

The placenta is about nine inches in diameter, and weighs one pound. The funis averages about twenty inches, the extremes being from three to forty inches in length.

Describe the fetal circulation.

The blood is propelled from the left ventricle of the fetus through the aorta and iliac arteries to the point where the umbilical arteries are given off; through these to the placenta, and back again through the umbilical vein, to the liver, where most of the blood passes through the portal circulation and empties by the hepatic vein into the *vena cava;* the remainder, passing through the *ductus venosus*, empties directly into the vena cava without passing through the liver. From this it enters the right auricle, and is deflected by the Eustachian valve, through the *foramen ovale*, into the left auricle, and thence into the left ventricle. The blood, returning from the head and upper extremities, passes from the right auricle to the right ventricle; to the pulmonary artery through the *ductus arteriosus*, into the aorta. It will be noticed that the venous blood of the fetus is more oxygenated than the arterial. After birth the *foramen ovale* closes and the peculiarly fetal vessels disappear.

What is the liquor amnii?

A clear, slightly saline fluid, secreted from the inner surface of the amnion, and in which the embryo floats.

How much liquor amnii is found at full term?

From half an ounce to several pints—f℥iv on an average.

How large is the ovum (and fetus) in different months?

By the end of the first lunar month of pregnancy the ovum is about the size of a pigeon's egg.

End of 2d month, size of a hen's egg; fetus an inch long.

"	3d	"	"	goose	"	"	3	"
"	4th	"	the	fetus	is	6.6	inches	long.
"	5th	"	"	"		7 -10½	"	
"	6th	"	"	"		11 -13	"	
"	7th	"	"	"		13.7 -15	"	
"	8th	"	"	"		15 -17	"	
"	9th	"	"	"		16 -17½	"	
"	10th	"	"	"		17½-18½	"	

[According to Schroeder.] American children are usually larger at birth.

How soon can the sex of a child be recognized?

Not certainly until *during* the fourth month.

What is vernix caseosa?

An unctuous sebaceous secretion covering the skin of the child for the purpose of lubricating it for delivery. It does not appear until the seventh month.

What is meconium?

The dark-green, semi-fluid contents of the fetal intestine, corresponding to fecal matter in the adult. It contains granular bodies, called *meconium granules*, the presence of which is characteristic of meconium.

What changes occur in the womb itself during pregnancy?

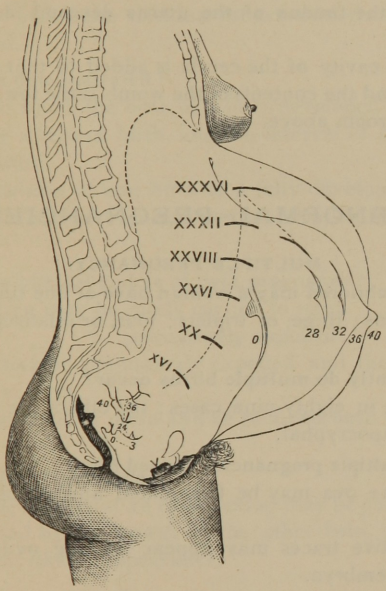
It greatly enlarges, to accommodate the growing ovum, and at the end of pregnancy has a weight of two pounds, and its cavity is a foot in diameter. The cervix enlarges but little (not more than one-half), and its cavity remains separate until the last week or weeks of pregnancy, when the os internum is stretched open and

the two cavities of the cervix and fundus become one. The tissue of the cervix becomes softer to the touch.

What changes in position does the womb undergo?

During the first month the increased weight of the uterus causes it to descend somewhat in the pelvis, or become prolapsed.

FIG. 21.



End of 2d mo.		Still low in the pelvis, and unusually anteverted. Bimanual touch shows it to be as large as a small orange.
"	3d "	The same, but as large as a child's head.
"	4th "	Fundus can be felt just above the symphysis, and being too large for the pelvis, it now ascends.
"	5th "	Fundus midway between umbilicus and symphysis.

End of	6th mo.	Fundus	at level of umbilicus.
"	7th "	"	2 to 3½ finger breadths above umbilicus.
"	8th "	"	1 to 2 finger breadths below ensiform appendix.
"	9th "	"	touches the ensiform appendix.
"	10th "	"	has descended to same position as in eighth month.

Why does the fundus of the uterus descend during the last month?

Because the cavity of the cervix is added to that of the fundus at that time, and the contents of the womb settle toward the pelvis, leaving more room above.

ABNORMAL PREGNANCIES.

MULTIPLE PREGNANCY.

How many children may a woman have at one time?

Two, or twins; three, or triplets; four, or quadruplets; five, or quintuplets.

How frequently do multiple births occur?

Twins, once in eighty-nine cases; the others are rare, and any over five are apocryphal.

How are multiple pregnancies caused?

1. Two or more ova may be fecundated and simultaneously developed.
2. Two primitive traces may appear on one ovum, and each develop an embryo.

These two causes may be combined in the case of triplets, etc.

How may the cause be demonstrated?

Twins developed from separate ova will each have its own placenta and membranes; from a single ovum will have a single placenta, and usually but one set of membranes, though there may be two amniotic sacs.

What is superfecundation?

The fecundation of two ova at different times, *i. e.*, with an interval of several hours, or even days.

How is this demonstrated?

By cases in which a woman has borne twins, one white, the other a mulatto, from separate intercourse with a white man and negro.

What is superfetation?

The fecundation of a second ovum after a first ovum has entered the uterus. It may occur during the first four months of pregnancy, or before the decidua reflexa and decidua vera have become united.

How is this demonstrated?

1. By cases in which the birth of a fully-developed child has been followed by a second birth, after an interval of one, two, three, or four months.
2. By the expulsion at one birth of a fully-developed child and a fetus evidently one or more months less advanced in development.

What is the clinical course of twin pregnancy?

1. Both children may be safely carried to term.
2. " " " prematurely expelled.
3. One twin may be prematurely expelled and the other remain until born at term.
4. One twin may die in utero and be retained until the birth of the other.

What is a fetus papyraceus?

A twin dying in utero at an early period may be partly desiccated, and compressed by the growth of the other twin, being flattened and parchment-like in appearance.

What is a lithopædion?

A dead child may be infiltrated and encrusted by calcareous salts until it is stone-like in appearance. This occurs only after long retention in extra-uterine cysts.

ECTOPIC OR EXTRA-UTERINE PREGNANCY.

What is extra-uterine pregnancy?

Pregnancy in which the fetus is developed in some other locality than in the uterus.

What are some of the causes of ectopic pregnancy?

Broadly speaking, it may be produced by any condition which prevents or renders difficult the passage of the ovule to the uterus, but which at the same time is not sufficient to keep the ovule from being impregnated by the spermatozoa. The most common causes are old inflammations which have destroyed the cilia of the tubes or small polypoid growths obstructing their lumen. They also appear in old primiparæ, and in those who have been previously sterile. Fright during coition has also been given as a cause.

How is it classified?

1. The ovum, after fecundation, may remain in the ovisac and be developed in the ovary, called *ovarian* pregnancy.
2. The fecundated ovum may be arrested in the Fallopian tube, and be there developed, called *tubal* pregnancy. This is the most common form.
3. It may be arrested at the junction of a tube and the uterus (the narrowest part), and be developed partly in the womb and partly in the tube, called *tubo-uterine* or interstitial pregnancy.
4. It may drop from the ovary into the abdominal cavity, and be there developed, called *abdominal* pregnancy.
5. The ovum may develop in one horn of a bicornate uterus.
6. It is also possible for the impregnated ovum to develop up to a certain stage in a hernial sac.

Are ovarian and abdominal pregnancies common?

No, they are extremely rare; indeed, the most recent investigations throw a doubt on their existence as a primary condition.

What effect has extra-uterine pregnancy on the womb?

It enlarges as in normal pregnancy, up to the fifth month, and its hypertrophied mucous membrane or decidua is cast off in one piece, in several pieces, or in flaky shreds, at from the second to the fifth month.

What are the symptoms of extra-uterine pregnancy?

1. The symptoms of pregnancy in general.
2. The presence of a cystic tumor in the abdomen, usually to be felt also in Douglas' cul de sac.
3. The enlargement of the womb, and
4. The displacement of the womb by the tumor.

5. Irregular, sanguineous discharges from the womb.
6. The expulsion of the enlarged uterine mucous membrane (decidua).
7. Pain, irregular in occurrence, and of intense character.

What points are especially important in diagnosis?

A rapidly growing tumor in Douglas' cul de sac, with an enlarged but *empty* womb, from which portions of decidual membrane have passed, can be nothing else than an extra-uterine cyst. The pain, if present, is characteristic. Abdominal pregnancy *may* proceed to term without exciting any suspicions of its presence.

What is the termination of extra-uterine pregnancy?

1. Rupture of the cyst occurs in 35 per cent., followed by internal hemorrhage, shock, peritonitis, and usually death.
2. The pregnancy may continue until full term, the child dies and (*a*) the tumor is partially reabsorbed, and remains innocuous, or (*b*) inflammation supervenes, and the child is decomposed and evacuated by ulceration into the rectum, vagina, bladder, abdominal walls, or uterus—the woman running the gauntlet of peritonitis, septicemia, pyemia, etc.

When does the rupture of the cyst occur?

In the first half of pregnancy; seldom in second half.

What is the treatment where rupture has occurred?

If sure of the diagnosis, open the abdomen by an incision, ligate bleeding vessels, and remove all blood and fluids.

What is the general treatment of extra-uterine pregnancy?

1. If discovered in the first half of the course, arrest it by destroying the vitality of the ovum.
2. If in the second, operate as in ovariotomy, in hope of saving the child, and as near term as possible. (This is the most modern treatment and is regarded as the best.)
3. If the child is dead, await developments, and interfere only when inflammation, abscess, or other complications demand treatment.

How can it be arrested?

By the faradic current of a battery.

1. An electrode, insulated except at its tip, is to be applied to the tumor, as felt in Douglas' cul de sac, per vaginam. The other

electrode is applied to the upper part of the tumor through the abdominal walls. The choice of poles is immaterial.

2. A moderate current is to be passed through the tumor, and gradually increased ; the application to be made for an hour, and repeated every day for at least six days. The galvanic current, with negative pole in vagina, pressed against the tumor, while the positive is placed on the abdomen.
3. A large dose of morphia should be given before each application of the battery. Injections of strychnine have also been made into sac, in the hope of destroying the life of the fetus.

This treatment is certain if enough electricity is used, and for a sufficient length of time. No other treatment is either certain or safe.

What becomes of the tumor after its arrest?

It is rapidly absorbed, and becomes so small as to be inappreciable and innocuous.

What caution is necessary in operating surgically for the removal of the child?

The placenta must not be removed, because there is no contracting uterus to check hemorrhage after its detachment. It must, therefore, be allowed to remain, and become separated by the sloughing process.

What do we understand by missed labor?

It is a condition in which the fetus is retained in the uterus for any length of time beyond term. Usually some of the earlier symptoms of true labor come on, but do not continue. The fetus generally dies.

HYDATID PREGNANCY.

What is hydatid pregnancy?

Pregnancy in which cystic degeneration of the chorionic villi occurs, caused by a hyperplasia of the mucous tissue, normally forming the fundamental structure of the villi and giving rise to what is called a hydatiform mole.

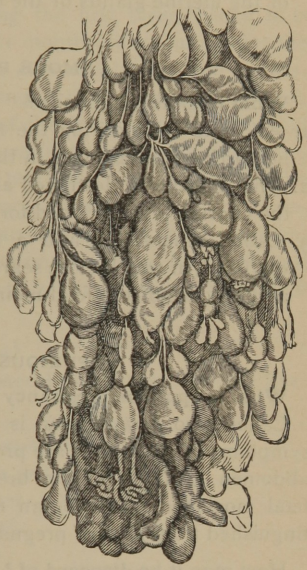
1. The villi are converted into cysts arranged like bunches of grapes, in size from a hemp seed to a bean.
2. The embryo dies and is absorbed.

3. The uterus is finally filled entirely with small cysts, whose average size and appearance is that of a white currant.

What is the microscopical appearance of these cysts?

Their surfaces show the usual epithelium of the villus, but beneath this is a delicate layer of cells, spindle or stellate in character. These enclose the gelatinous semi-fluid masses which are produced by a myxomatous degeneration of the cells. The blood supply of the vesicles is generally much decreased. A secondary increase of the fibrous portion of the villi sometimes occurs.

FIG. 22.



What are its symptoms and termination?

1. The pregnancy begins normally, but in the second or third month—
2. A sudden and rapid increase in size of the uterus occurs, accompanied—
3. By pain and irregular discharge of blood and water.
4. Labor supervenes and the mass of cysts is expelled.

It should be remembered that true hydatids (ecchinococci) may occur in the uterus, but not as a result or accompaniment of pregnancy.

What secondary dangers have resulted from this condition?

Destruction of uterine tissue by penetration of the diseased villi into the sinuses, causing adherence of the placenta. Perforation of the uterus may occur. Uterine rupture has followed this disease.

What is hydrorrhea?

A watery discharge from the uterus, from—

1. Hydatid pregnancy.

2. A tear in the fetal membranes at a point remote from the os uteri, with gradual leaking of liquor amnii.
3. Probably from a watery secretion, or transudation from the uterine mucous membrane, caused by increased proliferation of the uterine glands of the decidua vera.

MOLE PREGNANCY.

What is mole pregnancy?

1. At some time during the first three months of pregnancy a hemorrhage takes place in the ovum.
2. The embryo is destroyed and disappears, while the vitality of the chorion is maintained for several weeks or months.
3. Labor supervenes, and a fleshy, laminated mass or *mole* is extruded, in which close search will always reveal chorionic villi and patches of the fetal membranes.

SPURIOUS PREGNANCY.

What is spurious pregnancy?

Called also *pseudocyesis*, is a condition in which some of the symptoms of pregnancy are present, especially enlargement of the abdomen, changes in the breasts, and *subjective* feeling of the fetal movements, the woman not being pregnant. It is to be distinguished from *feigned* pregnancy.

How may it be disposed of?

A vaginal examination shows the womb to be unenlarged, and the administration of ether will cause the abdominal enlargement to suddenly disappear, when not due to increase of fat in the abdominal walls. It sometimes terminates in spurious labor, a condition in which the clinical phenomena of labor are present in some degree.

PREMATURE LABOR.

What is meant by abortion, miscarriage, and premature labor?

Abortion is properly the premature expulsion of the fetus before it is viable; when occurring during the first three weeks it is known as ovular; up to the fourth month embryonic; after the fourth month fetal abortion. It is also subdivided into spontaneous and artificial, the latter including (*a*) therapeutic, (*b*) criminal. Premature labor is the expulsion of the fetus after viability, but before full term. The older writers restricted the term abortion to the period before quickening (the child not being supposed to be living until then), and miscarriage to the period between quickening and viability. The term miscarriage is now usually applied to expulsion of the product of conception between the fourth and seventh months or after the placenta is formed; after that time it is known as premature labor.

What is meant by the term viable?

A child born after seven lunar months of pregnancy *may* live, and is called viable—liveable.

What are the causes of spontaneous abortion?

Disease or injury (1) to the ovum or fetus, *ovular*,
Disease or injury (2) to the mother, *maternal*,
Disease in the father (3), *paternal*, } as

(1) *Ovular*—

(*a*) Syphilis.

(*b*) Placental apoplexy and detachment, from hemorrhage.

(*c*) Placental degeneration; amyloid or fatty (cystic, *vide* hydatids).

(*d*) Dropsy of amnion.

(*e*) Violence, accidental rupture of the membranes, etc. The death of the fetus from any cause is not always followed by its premature expulsion.

(2) *Maternal*—

(*a*) Hyperemia of the pelvic organs from over exercise, coitus, lifting, use of sewing machine, displacements of the uterus.

(*b*) Irritation of the uterus, as from tumors, mental shock, high temperature in fevers.

(3) *Paternal*—
(*a*) Syphilis.
(*b*) Coitus.

When may artificial abortion or premature labor be performed?

Where, after due consultation, it is determined, that, in the first case the mother's life, and in the second, the lives of either mother or child, or both, are in danger.

Name some indications for therapeutic artificial abortion?

Eclampsia, obstinate uncontrollable vomiting of pregnancy, bad and persistent cases of albuminuria, extreme pelvic narrowing, advanced cases of uterine tumors, placenta previa. Premature labor may be induced in cases of pelvic narrowing, where for any reason symphysiotomy cannot be performed at time, where eclampsia is present or expected; in cases of habitually large fetal head or premature ossification of cranial bones; and in any condition gravely threatening the life of mother and child. (For method of inducing premature labor see chapter on "Induction of Labor.")

What are the symptoms of abortion?

1. Pain, more or less constant, felt in the back, hypogastrium, or ovarian regions.
2. Uterine contractions.
3. Hemorrhage.
4. Dilatation of the os uteri, with softening of the cervix.

What are the dangers of abortion?

1. Hemorrhage; often great, because of the difficulty with which the ovum is separated from the womb.
2. Retention of the placenta, in whole or in part, with subsequent septicemia, hemorrhage, and other dangers.
3. The womb is apt to remain enlarged (see Subinvolution), and uterine disease may result.
4. Pelvic and peritoneal inflammation are more common after abortion.

When are the dangers of abortion most experienced?

In the middle third of the pregnancy. In the first three months the ovum is usually expelled entire, and the chief danger is from hemorrhage during the slow process of dilating the os uteri. In

the next third, the attachments of the placenta are firmer than at any other time; the fetus is first expelled, and the placenta often expelled with great difficulty and piecemeal, combining all the risks at their greatest. In the last three months the process differs but little from normal labor, except in being slower.

Fig. 23.

What are the chief indications for treatment?

1. If patient is seen in time, rest in bed, cold drinks, hypodermic injections of morph. sulph. gr. ⅙, and a light diet. The cause should be searched for and treated. Failing in this, the indications are:—
2. To control hemorrhage.
3. To secure complete expulsion of the uterine contents.

How is hemorrhage to be managed?

1. By applying a tampon until the os is sufficiently dilated.
2. By securing complete delivery and stimulating uterine contractions.

How is retained placenta to be managed?

The placenta must be detached by the fingers or curet, as soon as possible after the expulsion of the fetus. If pressure is made by one hand in the hypogastric region, the womb can usually be forced down low enough to enable the finger to reach to the fundus. A very good method of removing the placenta is by gently scraping it from the uterus by means of the douche curet of Braun, a hot antiseptic fluid of carbolic acid 1 : 40 or creolin ʒss to the quart being passed from a fountain syringe through the curet during the operation. A strip of antiseptic gauze should be carried to the fundus and the vagina tamponed carefully.

What rule should guide us in difficult cases?

To persevere in efforts to remove the placenta as long as we are sure that our efforts are less injurious than allowing it to remain.

What is to be done when the placenta cannot be removed?

1. Use frequent antiseptic injections.

2. Employ remedies to guard against inflammation and septicemia.
3. Renew the efforts to remove the placenta every day.

THE SIGNS OF PREGNANCY.

What are the signs of pregnancy?

The symptoms and physical signs caused by the changes taking place in the woman, and by which we recognize the occurrence.

How may they be classified?

1. Into certain and presumptive, or
2. Into objective and subjective, or
3. According to their etiology, viz:—

I. Signs due to the increase of vital activity.
II. " " " development of the womb.
III. " " " presence of a fetus.
IV. " " " unequal development of the general and generative systems, or semi-pathological signs.

What do we understand by the objective, or certain signs of pregnancy?

They are those which the obstetrician can see, feel, and hear for himself, by the use of various scientific methods.

What are the subjective signs of pregnancy?

Those which are given us by the words of the patient herself.

What are signs due to an increase of vital activity?

The pregnant condition requires that the woman shall supply, not only the needs of her own organism, as before, but shall also build up from ten to twenty pounds of highly organized tissue, viz.: the child and its envelops. *Therefore*, she will need more blood, and, in general, all the vital forces must be increased. This is brought about by the *stimulus* of fecundation, and results in (*a*) increase of appetite, (*b*) weight, (*c*) vigor, and, perhaps, (*d*) sexual appetite. She must eat more in order to make more blood; the increased blood supply will increase her weight and general vigor, while locally the hyperemia of the pelvic organs will cause, at first, an increase in the sexual desire.

Is this class of signs always present in pregnancy?

No. The general system may fail to respond to the stimulus of fecundation, and these signs will be absent or defective, being replaced by the fourth class.

What signs are due directly to the development of the womb?

1. The descent of the womb, due to its increased weight, causes the abdomen to become smaller and flatter during the first month or two. The umbilicus also becomes deeper, for the same reason.
2. Afterward the womb enlarges at a *particular rate*, differing from that of other tumors. (See page 45.)
3. Certain changes occur in the cervix, vagina, and external organs.

What changes are found in the cervix?

It becomes *softer* and deeper red in color. The ascent of the uterus and retraction of the vagina gives the sensation of *shortening*, though in reality it becomes longer. Some increase in the mucous secretion of its cavity is also noticed.

What changes occur in the vagina and external organs?

The increased blood supply causes the vagina to become deep red or violet in color; the external organs are somewhat enlarged, and the perineum is doubled in its antero-posterior measurement, during pregnancy.

With what other things may the pregnant womb be confounded?

The enlargement of the abdomen may be due to *fibroid*, *ovarian*, and other pelvic tumors; to ascites, flatulence, or even excessive deposits of fat in the abdominal walls or mesentery.

Give differential diagnosis between fibroid tumors and pregnancy.

In *fibroids*, palpation shows the uterus to be hard, resisting, and irregular in shape. Menstruation is present, often profuse. The fetus cannot be outlined, nor its heart-sounds heard; they are of slow growth. In *pregnancy*, the uterus is more regular in shape and growth; menstruation is generally absent; the growth is rapid; fetal heart-sounds can be heard, and the fetus outlined by palpation.

Between ovarian cyst and pregnancy.

An *ovarian cyst* is apt to be unilateral in location, its growth is slow, and the general health is bad, as is shown in the face and form of the patient. Fluctuation and signs of fluid are present; menstruation present. The objective symptoms of pregnancy are absent. In *pregnancy*, the tumor is median in position; grows more rapidly; the health is generally good; very little or no fluctuation, except in hydramnios, when the fluctuation is principally in the upper part of the abdomen; subjective and objective symptoms present.

Between ascites and pregnancy.

In *ascites* there is general fluctuation, percussion dulness increasing from above downward. When patient is lying on her back, it is clear in the median line, becoming dull as we proceed toward the flanks. Subjective and objective signs of pregnancy are absent. In *pregnancy*, fluctuation is absent, except in hydramnios; percussion shows dulness in the median line, clear at the flanks; dulness remains constant.

Between excessive deposits of fat in the abdominal wall and pregnancy.

The first occurs late in life; the patient shows similar deposits of fat in other parts of the body; objective and subjective signs absent.

What changes are due indirectly to the development of the womb?

Lines from distention, a median brown line, the cessation of menstruation, contractions of the uterine walls, and certain changes in the breasts.

Are these signs found only in pregnancy?

Each one of them is found to accompany other conditions, but when all or many of them are present, they furnish strong presumptive proof.

What are lines from distention?

Called also *lineæ albicantes;* they are small patches of shining tissue, whiter than the surrounding skin, found on the lower part of the abdomen, especially in the iliac regions, upon the flanks,

thighs, and sometimes upon the breasts. They look like small "gores" inserted in the skin, or like cicatricial tissue. Average size one inch long and one-quarter inch broad.

Are they due to distention or stretching of the skin?

Being found on the thighs, and also in young girls with rapid development of the hips, they are probably due only to rapid growth of the skin. They rarely disappear, and are, therefore, only of value in a first pregnancy.

What is the median brown line?

A narrow, brownish discoloration of the abdominal skin, extending from the symphysis to the ensiform appendix, in the median line, and of little value as a sign of pregnancy.

Is menstruation always suspended by pregnancy?

In the great majority of cases. Some women continue to menstruate for a month or for several months; a very few menstruate throughout pregnancy; a few cases are recorded in which the women menstruated only when pregnant. As the decidua reflexa is not usually united to the vera for the first three months, there *may* be a menstrual hemorrhage from the womb during that time; but it is probable that any bloody discharge from the genital tract after the first month of pregnancy is not a true menstruation, but a hemorrhage, and an indication of threatening abortion. The real reason for the cessation of menstruation is the effect which fecundation produces upon the system.

Is menstruation stopped by other things than pregnancy?

It often ceases for a few months in newly-married women, and may be stopped for one or more periods by mental emotion, change of climate, especially if following a sea voyage, acute or chronic disease, and especially by phthisis.

What is meant by contraction of the uterus during pregnancy?

The walls of the uterus are always in a state of intermittent contraction. Hence the hand of the physician placed on the abdomen of a woman may detect them (the womb becoming harder) every twenty or thirty minutes (Braxton Hicks).

What changes occur in the breasts?

1. They may become enlarged.

2. Pain or discomfort may be felt.
3. They may contain milk, which can be pressed from the nipple.
4. The nipple and areola become darker (sometimes almost black).
5. A circular ring of dark splotches may be developed at a short distance from the areola, called the secondary areola, developed after the fifth month.
6. The sebaceous follicles about the areola become enlarged, and contain sebaceous matter.
7. Lineæ albicantes may appear on them.

One or more of these changes are *always* present in pregnancy, though any of them may occur in other conditions. Their *presence*, therefore, is of less importance than their *absence*, in settling a diagnosis.

What are the signs due to the presence of a fetus?

1. The sounds of the fetal heart.
2. Fetal movements.
3. Fetal parts found on palpation.
4. The utero-placental souffle.
5. The funic souffle, and
6. Ballottement.

What is meant by the fetal heart sounds?

At any time during the latter half of pregnancy, the beating of the fetal heart may be heard by placing the ear (or stethoscope) over the abdomen of the mother, being distinguished from the maternal pulsations by difference of rhythm.

What does the sound resemble?

The ticking of a watch under the pillow, with a rate of 115–160 pulsations per minute.

Where and when are heart sounds best heard?

When at the earliest period (about the fourth month) at which the heart sounds are audible, they are best heard over the fundus uteri; after that time the point of maximum intensity varies with the position and presentation.

Where are they best heard in the various presentations?

The abdomen being divided into four parts by two imaginary lines, one extending from the ensiform cartilage to the pubes, the

other, the transverse, dividing the uterus into two equal parts; in vertex presentations the heart sounds are best heard below the transverse and to the left or right of the perpendicular line.

In Face presentations, on the transverse, and to the left or right of the perpendicular line.

In Breech presentations, usually to the left or right of the central line and somewhat higher than the corresponding vertex presentation would be.

In Shoulder presentations the heart sounds are usually heard on or near the perpendicular line.

What are the fetal movements?

The fetus moves about freely, and strikes out with feet and hands against the uterine wall. If the hand of the observer is placed upon the mother's abdomen, these slight blows may be felt. If not felt at once, they may sometimes be produced by wetting the hand in cold water and applying it suddenly to the abdomen. This causes contraction of the uterus, which inconveniences the fetus and causes it to make demonstrations.

When can the fetal movements be first felt?

Not until after the fourth month, or until the uterine and abdominal walls have come in contact.

Can the fetal movements be simulated by anything else?

Some women have the power to contract their abdominal muscles suddenly and irregularly, so as to simulate the fetal movements. Such instances are rare. Women often deceive themselves into feeling the fetal movements when they are not pregnant.

What is palpation?

This consists in gentle manual pressure made with both hands for the purpose of ascertaining the position of the fetus in utero.

How is palpation performed?

The woman after having her bladder emptied and the rectum thoroughly evacuated either by an enema or purgative, lies on a bed with limbs extended, the abdomen being covered only by a sheet. The physician, standing at the side of the bed, places his hands with the palms together, the ulnar side down, the finger tips being

immediately above the mons veneris. The hands are now gradually separated and passed upward along the abdomen, gently pressing and outlining the fetus between them.

How are the different fetal parts recognized by palpation?

The head can be recognized as a hard globe more or less movable; the breech as a larger, less movable, body at some distance from the head; in its neighborhood small movable bodies, the feet, can be felt. Between the head and breech a ridge, hard and little movable, can be made out; this is the back of the fetus.

What is the utero-placental souffle?

A bruit or whirring sound, which may sometimes be heard in the abdomen. It is variously supposed to be produced in the uterine sinuses, the placental circulation, the uterine or hypogastric arteries, and elsewhere. It is heard also in some fibroid tumors. It is of little use as a positive sign of pregnancy.

What is the funic souffle?

A similar but less intense bruit, synchronous with the fetal heart, and supposed to be produced in the vessels of the funis. It is rarely heard.

What is ballottement?

If, when the woman is in the erect posture, a finger (introduced into the vagina) is pushed suddenly against the anterior wall of the womb, the fetus, if present, will first be pushed up into the liquor amnii, and will then drop back. If the finger is held in position, the return of the fetus to its resting place may be felt and recognized. The maneuver is called ballottement, and may be practised between the third and fifth months, inclusive.

What is quickening?

The time at which the mother first feels the fetal movements. The escape of the uterus from the pelvis (which is a requisite for feeling the movements) is sometimes sudden, and attended by peculiar sensations and faintness.

What is Braxton Hicks' sign of pregnancy?

Intermittent uterine contractions felt when the hand is placed on the abdomen. They are felt about the end of the third month.

What is Hegar's sign of pregnancy?

With one finger in the rectum and the other hand applied to the abdomen, the body of the uterus above the utero-sacral ligaments is found to be softened.

What are the semi-pathological signs of pregnancy?

1. When the general system fails, in whole or in part, to respond to the stimulus of fecundation, the mother's blood has a double call upon it, and is either diminished in quantity or deteriorated in quality. This leads in turn to the imperfect nutrition and impoverishment of the nerve centers and of various organs, and as a result we may have such symptoms as :—

(*a*) Morning sickness.

(*b*) Protracted vomiting.

(*c*) Neuralgia.

(*d*) Neuroses and mental disturbances.

(*e*) Dyspepsia.

2. Ordinarily the growing womb finds a sufficient amount of room to expand in, but it sometimes, owing to natural defects, corsets, etc., exercises injurious *pressure* upon its surroundings, causing :—

(*a*) Difficulties in micturition.

(*b*) Constipation and hemorrhoids.

(*c*) Albuminuria and edema.

(*a*) Dyspnea.

3. From excess of natural functions we may have (*a*) plethora, (*b*) salivation, (*c*) hirsuties, (*d*) chloasma.

What is the condition of the blood during pregnancy?

It is found to be more watery, its serum being deficient in albumin and the number of colored corpuscles considerably diminished. It is usually considered that the fibrin increases at this time.

What is morning sickness?

Nausea and vomiting, just after rising in the morning. It is usually limited to the early months of pregnancy, or when the volume of blood is not yet increased, although there is not enough for mother and child. It is, therefore, due to the want of sufficient blood, and the consequent cerebral anemia due to the sudden

change in the circulation upon awakening from sleep and resuming the upright position. The cause, probably, is the same as produces other reflex disturbance at this time—namely, a sympathetic disturbance caused by the stretching of the uterine fibers by the growing ovum and consequent irritation of the uterine nerves.

A similar form of vomiting is sometimes met with at other times of the day, after special exertion, and especially mental effort.

How should morning sickness be treated?

It is sometimes relieved by slowness in arising, and by taking a cup of coffee before rising, and may be cured by the use of nutrients and blood-making agents.

What is the "vomiting of pregnancy"?

Continuous or protracted vomiting in pregnancy depends—

1. On the deficiency and deterioration of the blood.
2. The irritable condition of the nerve centers, due to their impoverishment from defective blood supply.
3. To an exciting cause, such as disease of the uterus, acting with the other sources.

It may be so grave as to apparently threaten life (rare), and this being well known, the quack calls every fit of nausea by this name, and cures it!

What are the indications for treatment in severe vomiting?

1. To remove any sources of irritation which may coexist with the general state of the blood. Thus, inflammation and abrasions of the cervix uteri may exist in some cases, and their removal by proper applications may cure it.
2. To control the irritability of the nerve centers, which may be done by rectal enemas of chloral and bromid of potassium.
3. To improve the blood supply, by administering nourishing fluids in small doses, frequently repeated, beginning with milk and lime water.

In mild cases any of the anti-emetics may be used, as the oxalate of cerium, with or without the subnitrate of bismuth, etc.,

What forms of neuralgia are met with in pregnancy?

Almost any form. The most common is odontalgia. Toothache is due (1) to the "cry of the nerve for healthy blood," and (2) to the fact that phosphate of lime is largely needed in the construc-

tion of the fetus, and when not sufficiently present in the food may be absorbed from the teeth.

What mental disturbances are met with in pregnancy?

The woman may become irritable, peevish, and capricious. She may have absurd cravings for strong food (pica), or may even develop mania.

How is difficulty in urination caused?

During the first months the descent and anteversion of the uterus may cause pressure on the bladder. After the womb has ascended above the pelvis, there is rarely any difficulty until its descent, during the last week, when pressure is again caused.

How are constipation and hemorrhoids caused?

Constipation may be due to the deteriorated (hydremic) state of the blood, but it is also due to direct pressure of the uterus upon the bowel, impairing its tonicity, or even acting mechanically. Hemorrhoids are caused in the same way.

What displacements of the womb may occur during pregnancy?

1. Early in the pregnancy the increased weight of the womb may increase the natural tendency of the womb to fall forward (*anteversion*), causing some disagreeable pressure on the bladder. This will be relieved by rest in the recumbent posture, and will soon cease.
2. When the womb is about to ascend from the pelvis, a full bladder or unusual action of the abdominal muscles may push the *fundus uteri* back and under the promontory, so as to incarcerate the womb in this position (*retroversion*). This causes great pain and retention of urine. The woman is to be placed in Sims' position, or on her hands and knees, and the womb pushed up and a little to one side, so as to clear the promontory.
3. Prolapse of the womb sometimes occurs, but generally gives no trouble after the womb is large enough to rest above the inlet.

How are the albuminuria and edema caused?

Albuminuria may be due to the state of the blood or to the pressure upon the kidneys or renal veins.

Bright's disease may coexist or originate with the pregnancy. Generally the disorder is transient and terminates with delivery.

Edema, usually limited to the lower extremities and vulva, may be consequent upon renal disease or due to pressure upon the abdominal and pelvic venous trunks.

How is dyspnea caused?

By pressure upon the diaphragm. It therefore appears late in pregnancy, and is usually relieved during the last weeks by the descent of the uterus.

What is meant by plethora in pregnancy?

The natural increase in the blood-making function is occasionally excessive, and too much blood is furnished, leading to attacks of vertigo and other symptoms of that condition.

What are salivation, chloasma, hirsuties?

(*a*) Salivation is an increased flow of saliva, usually found only in the latter half of pregnancy, and often accompanied by ulcerations in the mouth.

(*b*) Chloasma is an excessive deposit of pigment in the skin. Though usually confined to the mammary areolæ and the brown line, it may occur on the face, the entire abdomen, and flexures of the joints, suggesting Addison's disease.

(*c*) Hirsuties is an excessive or abnormal growth of hair, usually on the face, and fortunately rare.

Which of the signs of pregnancy are certain signs?

Those due to the presence of the fetus, and of these but two are absolutely certain, viz.: the sound of the fetal heart, and outlining the fetus by palpation. Except in the very rare instances before mentioned, the peculiar feeling caused by the impact of the fetal parts against the abdominal wall can be counted among the positive signs of pregnancy.

Which of the presumptive signs are the most important?

The cessation of menstruation; the regular and symmetrical development of the uterus; the changes in the breasts; morning sickness, and quickening.

At what date are the important signs available?

1. The fetal heart, rarely before the fourth month.
2. Ballottement, third to fifth month, but its failure may be due to want of skill and other causes.

3. The cessation of menstruation, usually after the time for the first period, or immediate. Amenorrhea is always a suspicious circumstance in *healthy* women, *previously regular*, whether married or not, when not accompanied by ill health in some form.
4. The increased size of the uterus may almost always be made out by bimanual touch, at from four to six weeks. If at a second examination, a month later, a further symmetrical enlargement, at the usual rate, is noted, the fact of pregnancy is scarcely to be doubted.
5. The changes in the breasts may begin in the second month, but are rarely marked until the middle of pregnancy, which is true of most of the presumptive signs.

What is the duration of pregnancy?

It is somewhat variable, but it is sufficiently accurate to regard it as continuing through ten menstrual periods, ten lunar months, or 280 days.

What are the limits of variation?

From 245 to 300 days, with possibilities in either direction.

What method is usually employed to calculate the duration?

Count nine calendar months forward (or three backward) from the date of the last menstruation; add to this seven days. Ex. End of menstruation, Jan. 10th; 3 months back = Oct. 10th; add 7 days = Oct. 17th, as the *probable* date of confinement.

What causes pregnancy to come to an end?

The important theories are—

1. Power's. The uterus is a peristaltic tube, with circular fibers in the cervix acting as a sphincter. As the child grows it presses upon this sphincter, and the sum of all successive irritations finally causes it to relax, and the uterus to expel the child.
2. King's. The uterus has a definite limit of growth. The fetus does not attain its limit of growth *in utero*, and therefore distends the uterus when the latter stops growing. This irritates the uterine fiber and causes it to contract and expel its contents.
3. The foreign body theory. The womb is always irritated into contracting upon a foreign body, and the fetus becomes such a

body at the end of pregnancy. There is probably truth in each view of the matter.

Why is the ovum not a foreign body during pregnancy?

Because of the intimate vascular connections between the chorion and the uterine mucous membrane.

How does the ovum become a foreign body?

By the fatty degeneration and atrophy of the connections between the ovum and uterus, which occurs during the last weeks of pregnancy.

What effect has this upon the uterus?

It causes a gradually increasing irritation of the muscular fibers, until contractions are excited sufficiently powerful to expel the child.

LABOR.

What is labor?

The process by which the child and its ovular attachments are expelled from the womb.

What changes take place in the female organism immediately before labor begins?

1. Owing to the descent of the presenting part, *the uterus sinks lower in the pelvis.* The abdomen then becomes somewhat smaller, respiration less difficult, and by a decrease of pressure on the stomach, digestion may be improved. The bladder is now pressed on, producing irritability, walking is more difficult, and there is apt to be edema of the lower limbs. This sinking of the uterus is more common in primiparæ.
2. *Hypersecretion of the cervical glands.* A secretion of thick glairy mucus is produced by the cervical glands. Later, owing to the partial detachment of the decidua and consequent slight hemorrhage, this secretion becomes tinged with blood, and in common language is spoken of as "a show."
3. The *labia at this time are apt to be somewhat separated*, the secretions of the vaginal glands are increased, and relaxation takes place in its walls.

What essential steps occur in labor?

1. The enlargement of the os uteri until it is of a size sufficient to permit the passage of the child.
2. The expulsion of the child.
3. The expulsion of the placenta and membranes, also called the after-birth, or secundines.

Into how many steps is labor divided?

Into three. I. The stage of dilatation (of the os uteri).
II. The stage of expulsion of the child.
III. The stage of expulsion of the after-birth.

By what force are these occurrences produced?

By the contraction of the uterus, aided by the abdominal muscles.

What are the contractions of the uterus called?

Labor-pains, because usually accompanied by painful sensations in the back or hypogastrium.

What are painless uterine contractions?

These are contractions of the uterine muscle felt by placing the hand upon the abdomen, and are found in the last period of pregnancy. They are not of sufficient force to excite the pain sense.

What symptoms are of the greatest importance in showing that labor has actually begun?

Regular uterine contractions, accompanied by the dilatation and effacement of the cervix.

How long does a contraction last?

Each contraction lasts for from a few seconds to two minutes. Their duration increases with the progress of the labor, becoming longer and stronger as it advances. The average duration is a little less than one minute (according to Westermarck about 69 seconds).

How long is the interval between them?

At the beginning of labor they are from a half hour to ten minutes apart. The interval diminishes as labor advances, and toward the end may be from five minutes to only one minute apart.

What effect have the contractions upon other muscles?

When powerful, or when the second stage is half finished, they are accompanied by contractions of the abdominal muscles, which are almost entirely involuntary, and the woman strains or "bears down." The muscles of the extremities also become rigid during the expulsive effort.

How much pain accompanies a uterine contraction?

In an entirely normal labor in a healthy woman, the pain is slight; in any case, during a bearing-down effort, the consequent cerebral fulness causes some physiological anesthesia. But in perhaps the majority of labors there is some abnormal condition present which makes the contractions inconveniently painful.

What are the characters of the pains in each stage?

During the *first stage of labor* the patient usually speaks of the pains as being in the back, in the lumbo-sacral region, and are of a grinding character. They frequently extend down to the pubes.

In the second stage, the pains are more intense, and are spoken of as "bearing-down pains;" they are referred to the lower part of the abdomen and vagina. Cramps occur in the legs. The woman often complains of sensations of tearing and stretching of the vaginal and perineal tissues. At the end of this stage the uterine contractions become entirely involuntary.

How is the dilatation of the os effected?

1. The simultaneous contraction of all the uterine muscular fibers tends to pull apart the edges of the os, since there alone the fibers are absent.
2. The uterus is longer than broad, and its longitudinal fibers more numerous than the others; therefore, during a contraction it tends to become broader than long, which forces the contents of the uterus against the os.
3. The circular fibers about the os undergo a spontaneous dilatation, and this appears to be increased by the free secretion of mucus from the cervical glands.

What effect upon the contents of the uterus may be noticed during a contraction?

The force tends to move all the contents (child and liquor amnii) toward the os uteri; but fluids being more movable than solids,

the liquor amnii is forced toward the os, while the child is driven away or recedes from it.

What is the bag of waters, and how formed?

The gradual distention of the membranes by the liquor amnii, which is forced in advance of the child, forms a bag filled with fluid in the os uteri. This becomes tense during a pain and relaxed during the intervals, and by its even pressure greatly aids in the dilating process.

Is the bag of waters always formed in labor, and what variations occur?

1. Sometimes the amount of liquor amnii is so small that no bag forms.
2. The membranes may rupture prematurely, and thus prevent it.
3. The membranes may be so greatly distended that the bag of waters reaches to the vulva. Usually it contains only a few ounces of fluid.

Of what service is the bag of waters after the os is fully dilated?

Of none; and the progress of the labor is suspended until the contractions are powerful enough to rupture the membranes and permit the escape of the liquor amnii.

What practical deduction follows from this?

That the physician should rupture the membranes as soon as the os is fully dilated.

How is the expulsion of the child effected?

By the contractions of the uterus aided by the contraction of the abdominal muscles, and according to a definite mechanism, depending upon the manner in which the child is placed.

How is the after-birth expelled?

Theoretically, the placenta becomes folded longitudinally, ground off the uterine walls by contractions and then expelled. If nature does not do this in a short time, it is best to deliver the placenta by manual means. The expulsion usually takes place in from ten to fifteen minutes after birth of the child.

What is the best method of delivering the placenta?

The method of Credè, so called after its chief promulgator.

1. Place the hand upon the lower part of the abdomen and rub, stroke, or knead the uterus. This will cause the womb to contract energetically, and in so doing to ascend and move forward. Then—
2. Grasp the uterus through the abdominal walls, with one or both hands, and *squeeze* the placenta from it. If successful, the escape of the placenta may be recognized, and the latter will be

FIG. 24.

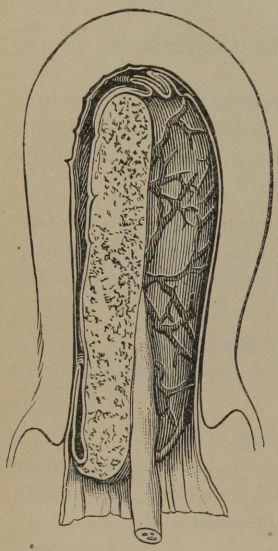
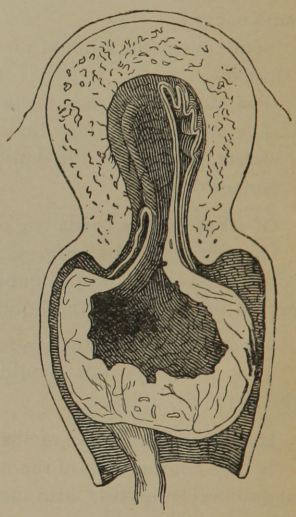


FIG. 25.



found at the vulva, or even shot out into the bed. If not, wait a few minutes and repeat both maneuvers. If the placenta is dislodged as far as the vulva, remove it, taking care to twist the membranes into a rope, by rotating the placenta, in order to avoid leaving any strips behind. *Never pull upon the funis.*

What other advantages has this method?

It secures complete contraction of the uterus, and empties the

uterine sinuses; preventing hemorrhage, inversion of the womb, uterine thrombosis, and almost all other complications.

What is the normal duration of labor?

It is variable. Collins, in over 16,000 cases, found that 84 per cent. completed labor within six hours, or less. It is probable that in strictly normal cases three or four hours should suffice for the stage of dilatation, one hour for the second stage in first labors, and ten to thirty minutes in subsequent labors. The third stage, being artificial, is terminated at the will of the physician, and should rarely be delayed longer than ten or fifteen minutes. The average duration is from 10 to 15 hours.

Define the terms primipara, multipara, etc.

A woman in her first pregnancy and labor is called a *primipara;* in subsequent labors a *multipara*, or, if greater accuracy is required, the number may be given thus: 2 para, 3 para, etc.; one who has had one child, and is not now pregnant, is called a *unipara;* a woman who is not a virgin, but who has never had a child, is called a *nullipara*. Adjectives are formed from these words, as, a primiparous woman, etc.

Why is labor longer in primiparæ than in multiparæ?

Very commonly labor comes on from one to three weeks earlier in primiparæ; consequently the changes in the cervical canal are not as far advanced, and dilatation is slower than in multiparæ. During the second stage the vagina and external parts of the primipara dilate more slowly, and thus occupy a longer time.

What foundation is there for the statement that a woman who conceives late in life will have a difficult labor?

An old primipara is apt to have, first, some inflammatory trouble of the cervix, leading to difficulty and delay in the first stage, and, second, to have an unyielding sacro-coccygeal joint, delaying the second stage. Otherwise there is nothing to cause a difficult labor in these cases.

What are the ordinary duties of the physician in a case of labor?

During the first stage, the physician should see that his patient has a room as comfortable as possible, one that is light, well ventilated, does not open directly into a water-closet, or where sewer gas can gain access. If possible there should be an open fireplace

in the lying-in room. Labor having begun, he should see that the patient is given a bath, her hair neatly braided, that she is clad lightly and in a manner giving sufficient warmth. A short night dress is best, as it does not become soiled during the delivery. The patient's bowels should be well opened by an enema of glycerin and water or soap and water, and care should be taken to see that no urine is in the bladder. If urination cannot take place spontaneously, it must be drawn off by a catheter. Before making the first examination the physician should see that the patient is given one copious vaginal injection of a solution of bichlorid of mercury 1 : 5000, creolin one per cent. Before proceeding to the vaginal examination, the fetus may be outlined by external palpation. As few internal examinations as possible should be made. It is well to have the patient walking about during this stage. Simple food may be allowed.

How should the hands of the obstetrician be prepared before examining a woman?

The hands and arms to the elbow should be first washed thoroughly with soap and warm water. Secondly, in a solution of bichlorid of mercury 1 : 2000, creolin two per cent., or other equally efficient antiseptic solution. He should carefully scrub the hands with a nail brush while using both the soap and water and the antiseptic solution. The obstetrician should not go directly from a post-mortem, or any case of contagious disease, to the lying-in room.

How should an examination be made?

Place the patient on her back, with the knees drawn up, or on her side with her face turned from the examiner. Anoint the index and middle fingers with fresh lard, vaselin, or other unguent, and introduce into the vagina, passing the hand under the thigh until the vulva is reached. Introduce the index finger alone at first; if necessary, the middle finger may be added, which will give an additional reach of about one inch.

What should be learned from the first examination?

1. If the woman is pregnant;
2. If she is in labor;
3. The condition of the os uteri, as to dilatation and dilatability;

4. The state of the membranes, and existence or not of a bag of waters;
5. The presentation and position of the child;
6. The condition of the soft parts generally, as to temperature, moisture and dilatability;
7. The size of the pelvis.

The most important thing is the condition of the os.

How frequently should examinations be made?

Often enough to keep informed as to the progress of the case. As this will vary greatly in different cases, no rule can be made. Usually, it is proper to examine every hour or half hour during the first stage. Meantime the physician need not be in the room, unless to encourage the patient; but may be in an adjoining room, or even absent himself from the house. When the second stage begins, his place is by the bedside. If progress is slow, examination may be made as in the first stage; if rapid, the finger placed on the perineum during a pain will warn him as to the approach of the end.

How should the bed be prepared?

If a bed can be particularly selected, it should be narrow and not too low. It should be so placed as to allow easy access from both sides. The bedding should consist of a hair mattress or a straw paillasse. Feather beds should not be used over the mattress. An oilcloth, rubber blanket, or thick comfortable should be placed upon the mattress, to keep it from being soiled by the discharges. A sheet folded several times should be placed upon this, under the woman's hips, which may be withdrawn when the labor is over and replaced by a clean one.

When should the woman be placed in bed?

There is no special need until the os is nearly dilated, unless the labor is tedious, when her strength will be conserved by lying down and keeping quiet.

How should she be dressed?

The chemise should be tucked up, well above the hips, to prevent soiling, and therefore the need of changing it after delivery. A night-robe may be worn over this, and she should be covered with bed-clothes adapted to the temperature of the room.

What preparations should be made for the infant?

Its clothing should be made ready and aired. Several ligatures for the funis and a pair of scissors should be provided. Both hot and cold water should be in readiness.

What hygienic measures are to be carried out?

1. To see that the bowels are moved by an enema, if there has not been a recent passage.
2. To require the woman to urinate occasionally.
3. If thirsty, give her water to drink.
4. See that the room is properly ventilated.
5. If there is any deviation from the normal course of labor, ascertain and remove it by appropriate treatment.

What things are to be prevented?

Crowding the room by unnecessary company. Meddlesome practices of old women, such as giving "teas," and in general anything which will disturb the woman, mentally or physically.

What objections to giving anesthetics to make the labor painless are urged by those who oppose this practice?

1. The pain is not great, unless some abnormal condition is present, which should be sought for and treated.
2. Natural labor lasts but a short time.
3. Anesthetics protract the labor.
4. They increase the risk of hemorrhage (post-partum).
5. From the same cause (imperfect contraction of the womb) they increase the liability to all the puerperal diseases.
6. They endanger the child's life (especially chloroform).

How are these objections met by the advocates of obstetric anesthesia?

1. The proper administration of an anesthetic during labor renders the act painless, and prevents the exhaustion which may follow the protracted suffering, often severe.
2. It is not proved that, when properly administered, they protract the labor or increase the risk of hemorrhage, and even granting the latter objection, this risk can be overcome by careful management of the third stage of labor and the use of ergot.
3. If rightly administered in suitable cases, the danger to the mother and child is not increased.

4. It prevents the sudden expulsion of the child and consequent violent tearing of the perineum.

When may an anesthetic be used in normal labor?

During the second stage of labor, when the pain is severe, as when the head is passing through the os uteri or vulval orifice, provided no condition exists which would be considered a contra-indication to etherization for surgical purposes, and provided the uterine contractions are of normal intensity.

How should an anesthetic be given?

As the object in view is to deaden the pain, not to produce unconsciousness, the ether or chloroform should be given in small quantities, inhaled only during the pains and withdrawn in the intervals between them. In the last stage of labor, while the fetal head is passing over the perineum, it is generally best to increase the amount of anesthetic, producing for a moment complete unconsciousness.

What anesthetic is to be preferred?

1. Chloroform is most generally used, because it is quicker in its action, more pleasant to take, and less is required to produce the effect for which it is given.
2. Ether is probably safer, and appears to be less likely to enfeeble uterine contractions.

What disturbances often attend the end of the first stage?

1. The woman is very apt to vomit, which relaxes and prepares the soft parts and increases the uterine contractions.
2. A rigor sometimes occurs, temporarily suspending labor, but with hot applications to the feet and a hot drink, it usually speedily ceases.

What duties are required during the second stage?

1. To rupture the membranes, if this does not occur spontaneously.
2. To observe the descent of the child, and to be ready to remedy any departure from the normal course.
3. To prevent the laceration of the perineum.
4. To complete the delivery of the child.

How should the patient be treated during this stage?

It is best that she should be in bed and covered only by a sheet

or blanket during the entire second stage. She should lie on her side with her back toward the attending physician, her night dress well drawn up under the arms. A nurse should support the upper thigh, or a stout pillow may be placed between the knees. A sheet might well be attached to the head of the bed and given to her to pull upon during a pain. The lateral position makes perineal rupture more difficult and makes the examination much easier. Vaginal examinations will be more frequently necessary in the second stage than during the first; they should be made often enough to follow accurately the position of the presenting part in its course along the birth canal.

How are the membranes to be ruptured?

By pressing the finger against them while they are made tense by a contraction. If they are too thick and strong to yield to this, the nail of the middle finger may be prepared as follows: First, make a straight cut in the free border of the nail and in the middle line of the finger. Second, pare away the free border on one side of the cut, which will leave a sharp, knife-like edge.

If the bag of waters is large, it is well to place a cloth in front of the vulva before rupturing, in order to soak up the liquor amnii when discharged.

What occurrences often attend the end of the second stage?

1. The woman wants to sit on the chamber, even when the bowel is empty; due to the pressure of the child's head on the bowel. Of course, she is not to be allowed to sit up at this time.
2. Cramps in the leg often occur from pressure of the descending head against the sciatic nerve. Rubbing the leg affords relief.

How is the perineum to be guarded?

The obstetrician, sitting beside the patient, should have before him a basin containing a solution of bichlorid of mercury 1 : 5000, or other efficient antiseptic solution, in which small pieces of cotton or gauze have been placed. With one hand over the upper thigh, he, with the thumb on the occiput and the fingers on the anterior part of the fetal head, guides it away from the perineum or holds it back during a pain; the other hand, placed against the perineum, should gently and steadily press from the sides toward the center and upward toward the symphysis; or by bringing out the head in

the absence of a pain, if possible. When the head greatly distends the perineum, and a part of the occiput protrudes, pass two fingers into the rectum, and place them on the brow, malar bones, or chin of the child, as may be convenient. Place the thumb on the occiput. The head may then be controlled and prevented from passing through the vulva during a pain. If, when a pain has subsided the head be now pushed over the perineum, laceration will be prevented. It is also necessary that the woman shall not bear down at this time. Anesthesia should be complete as the head passes over the perineum.

What is episiotomy?

An operation designed to save the perineum, by making small incisions into its margin, on either side of the median line.

What is to be done when the head is born?

1. Ascertain if the funis is around the child's neck, and, if so, unwind it.
2. If no uterine contraction appears to be forthcoming, pass a finger into the vagina, below the child's neck, and hooking it into an axilla, withdraw the child, taking care that the shoulders do not lacerate the perineum.

What is the first attention to be rendered to the child?

1. Pass a finger into its mouth to remove any mucus which may be there.
2. If it does not at once cry, let it hang head downward for a moment; give it a slight spank on the buttocks, dash a small quantity of cold water on it; all mucus should be carefully removed from the child's mouth by small pieces of rag dipped in a weak solution of boric acid; or use other means of resuscitation until it gives a good cry.
3. When it has cried well, tie the cord.

How is the cord to be tied?

A ligature of several strands of sewing thread or other material should be tied two or three finger-breadths from the child's navel. A second ligature should be applied several inches from this, and the cord cut between the ligatures with scissors. If there is much Wharton's gelatin in the cord it is well to hold it firmly at the

navel, and endeavor with the finger and thumb to squeeze out the gelatin or "strip" the cord. After cutting the cord see that the ligature is firm, and that no blood is escaping, and hand the child to the nurse.

How is the cord to be dressed?

The physician is usually expected to dress the stump of the cord attached to the child. Take a piece of antiseptic gauze, linen, or muslin (old and soft), dipped in a solution of boric acid or baked brown, about four inches square; cut a hole in the middle large enough for the cord to pass through; slip it over the stump and fold it so as to thoroughly cover it.

What are the two principal forms of asphyxia neonatorum?

Asphyxia livida, in which the child is cyanotic, the face and skin generally are of a dusky purple hue, the conjunctivæ are injected, and the eyes protrude. The cord pulsations are generally slow and full.

Asphyxia pallida, the child is pale and generally relaxed; the surface is cold and the appearance anemic.

How would you treat a child suffering from asphyxia?

In the livid form cut the cord, allowing a dram or two of blood to escape. In asphyxia pallida it is well to press the blood from the cord toward the umbilicus. The child may be placed in a hot bath, its head supported, and a small quantity of cold water dashed over the chest. In the latter case friction should be made over the body as soon as the infant is removed from the water.

How may a child be resuscitated when apparently still-born?

If it does not at once respond to spanking or dashing water upon its chest, resort—

1. To Sylvester's method of artificial respiration. The child is laid upon its back with its shoulders slightly elevated. The physician, standing at the head, grasps the arms at the elbows and alternately raises them above the head and depresses them against the chest.
2. To Schultze's method. The obstetrician, standing, takes the child in both hands with the head pointing toward the operator. The fingers lie across the back at the scapulæ, with the thumbs against the sides and front of the chest. The face now looks

upward. The child is now raised until it is above the operator's head; in so doing the lower part of the trunk and extremity, as well as the head, fall backward. By swinging the child in this manner, the body is alternately straightened out and doubled, causing a depression and elevation of the diaphragm and favoring in- and ex-piration.

3. To mouth to mouth insufflation. Wipe the baby's face, compress the nostrils with the fingers of one hand, and press the other hand upon its epigastrium. Then apply your mouth to the child's and blow into it. The pressure of the second hand prevents the air from entering the intestines.
4. A galvanic battery may be used.

Attempts at resuscitation should be continued as long as there is any hope of success. If, however, no heart-beats or pulsation of any of the arteries can be felt after five or ten minutes, further attempts rarely do much good.

What attentions are to be rendered to the woman?

1. The placenta is to be delivered after the manner of Credè (*vide* p. 71).
2. An inter-vaginal douche of 1 gallon of solution of bichlorid of mercury 1 : 5000, creolin one per cent., or other antiseptic solutionshould be given.
3. The soiled clothing is to be removed and an antiseptic napkin placed at the vulva to receive the discharges.
4. A broad bandage or "binder" should be applied around the abdomen.
5. The uterus should occasionally be felt through the abdominal walls, to be sure it remains contracted.

What is the position of the womb after delivery?

Just after the delivery of the placenta the womb should be in the hypogastrium, its fundus reaching half way to the umbilicus, and feeling as hard as a stone. In a short time (generally within the hour), the abdominal muscles regain their tonicity, and the "retentive power of the abdomen" draws the womb upward, its fundus reaching nearly or quite to the umbilicus.

Why does a rigor often occur just after labor?

1. The bedding and clothes are apt to be wet with the discharges.

2. The withdrawal of the child takes away a source of bodily heat, its temperature being nearly a degree higher than that of the mother.

When may the physician leave, and when should he return?

He may leave within half an hour, if the woman has been cared for as above and is in good condition. He should return within from twelve to twenty-four hours; and in general those who watch their patients best will have the least trouble.

What should a physician carry with him in attending an obstetric case?

A physician attending a case of labor should have with him his forceps, a silver catheter, an English catheter of small size, the latter to use in case the child is asphyxiated, needles, a needle-holder, catgut, silkworm gut, or silk or wire for sutures; a Davidson or fountain syringe with a good glass or hard rubber injection tube, the holes for the escape of the liquid being at the sides and not at the end, a set of Barnes' dilators, a pair of uterine dressing forceps, and a hypodermic syringe. He should also have some ergot, chloroform, morphia, and strychnin in soluble tablets, carbolic acid, powders or tablets of bichlorid of mercury, and sulphuric ether. At the house, hot water, ice, brandy or whisky, and a new English catheter No. 10 should be at hand.

What are after-pains?

The pain sometimes experienced after labor, due to the contractions of the uterus. They are rarely felt by primiparæ, and usually increase in severity with each subsequent labor. They may occur only a few times, or may keep up for several days. If severe enough to need treatment, opium and camphor, in powder, or as in paregoric, will be the proper remedy.

What is the caput succedaneum?

An edematous swelling formed on the part of the presentation in advance, caused by the pressure upon the circulation in the presenting circumference by the grip of the cervix, vagina, and pelvic walls. It forms only when the head is arrested at any point for some time.

How long does it remain?

For several days after birth, if not interfered with.

THE MECHANISM OF LABOR.

What is meant by the mechanism of labor?

The purely mechanical movements involved in the passage of the child through the pelvis, in distinction to the vital and clinical conditions connected with the process.

With what is the mechanism of labor concerned?

With three things:—

1. The body to be propelled.
2. The tube through which it is propelled, and
3. The propelling force.

What is the propelling or motive force in labor?

1. The contractions of the uterus, principally, aided by
2. The contractions of the abdominal muscles.
3. The elastic resistance of the perineum.

When is the first or uterine force exerted?

Throughout the entire labor, and is the main and necessary force.

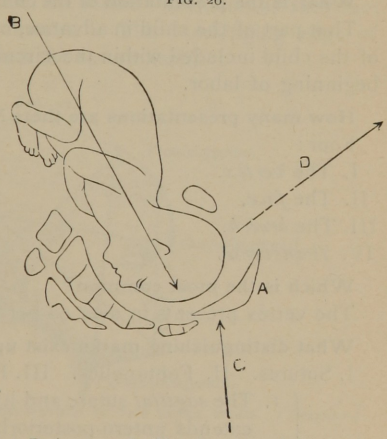
When is the second or abdominal force exerted?

It may be voluntarily exercised at any time, but usually is reflexly excited when the head is low in the pelvis, becoming almost involuntary.

What effect has the abdominal force?

1. It aids the uterine force directly, by pushing the child onward, and
2. Indirectly, by holding the womb down and preventing it from being pushed upward by the pelvic resistance to the passage of the child.

FIG. 26.



A. Perineum; *B.* The direction of the uterine force; *C.* The direction of the perineal force; *D.* The resultant of the two forces, in which the head moves.

When and how is the perineal force exerted?

After the child has reached the outlet, it can go no further without passing through or over the perineum. The uterine force is unable to propel it in any direction except against or through the perineum. A new force is therefore provided in the elastic resistance of the perineum, which tends to push the head back in *nearly* the opposite direction (a little forward as well). Therefore the head moves in the resultant of the two forces, and *over* the perineum.

What form does the child assume in its intra-uterine growth?

It is substantially an ovoid, or egg-shaped figure, the extremities being flexed and pressed against the trunk.

What relations may it assume to the pelvic inlet?

Either end (the head or breech), may be opposite the inlet, or it may lie transversely across it.

What is the presentation of the child?

That part of the child in advance, or, more accurately, that part of the child included within the circumference of the inlet at the beginning of labor.

How many presentations are there?

Four:

I. The *vertex*.
II. The *face*.
III. The *breech*.
IV. *Transverse*.

Which is the most common?

The vertex presents in over 90 per cent. of all labors.

What distinguishing marks exist upon the head?

I. Sutures. II. Fontanelles. III. Protuberances.

I. Sutures.
1. The *sagittal* suture and its continuation, the *bi-frontal*, extends antero-posteriorly between the parietal and frontal bones.
2. The *lambdoidal* suture extends from the posterior limit of the sagittal suture between the occipital and parietal bones, making a V-shaped line.
3. The *coronal* suture extends between the parietal and frontal bones, crossing the sagittal at right angles.

II. Fontanelles.

1. The *posterior fontanelle*, a small, triangular enlargement of the sutural membrane, at the junction of the sagittal and lambdoidal sutures.
2. The *anterior fontanelle*, a large, quadrilateral enlargement of the sutural membrane, at the junction of the sagittal and coronal sutures.
3. The *postero-lateral* fontanelles, one on each side, at the inferior limits of the lambdoidal suture.

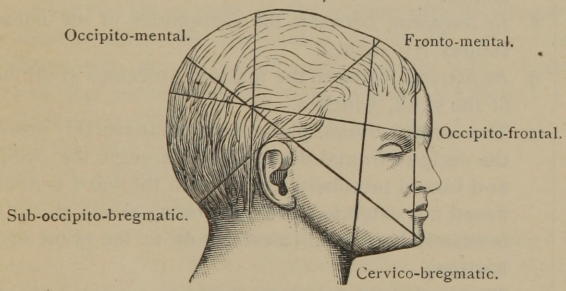
III. Protuberances.

1. The *parietal protuberances*, called also eminences or bosses, situated in the center of each parietal bone.
2. The *frontal* protuberances, situated at the sides of the frontal bones.
3. The *occipital* protuberance, situated in the center of the occipital bone.

What is the object of the sutures and fontanelles?

They admit of the mobility and overlapping of the bones, so as to diminish the size of the head in labor. Incidentally they furnish us with important "landmarks." The overlapping edge of bone is usually felt, rather than the suture itself.

FIG. 27.



ANTERO-POSTERIOR AND VERTICAL DIAMETERS OF THE FETAL HEAD. (*Tarnier.*)

What are the diameters and planes of the fetal head?

The diameters are lines drawn from one point to another; the planes are imaginary levels drawn transversely through different points of the head; each for the purpose of facilitating the description of the relation of the head to the pelvis in labor.

Name the diameters and planes.

Diameters.

1. The *occipito-mental* diameter, drawn from the highest point of the occiput to the point of the chin, and measures 5¼ inches.
2. The *occipito-frontal*, from the occiput to the root of the nose, about 4½ inches.
3. *Sub-occipito-bregmatic*, drawn from the junction of the occiput with the neck to the point of intersection in the large fontanelle of the coronal and sagittal suture, 3¾ inches.
4. *Fronto-mental* extends from the top of the forehead to the point of the chin, 3¼ inches.
5. *Cervico-bregmatic*, from the middle of the large fontanelle to the upper part of the neck near the larynx, 3¾ inches.
6. The *cervico-frontal* diameter, drawn from the apex of the forehead to the occipital ridge or nape of the neck, and measures a little less than 4 inches, or 4— in.
7. The *bi-parietal* or transverse diameter, drawn from one parietal protuberance to the other, and measures 3¾ inches.
8. *Bi-temporal*, between the extremities of the coronal sutures, 3¼ inches.
9. *Bi-mastoid*, between the mastoid processes at the base of the skull, 3 inches.

Planes.

1. The *occipito-frontal* plane, drawn transversely through the occipito-frontal diameter (or through the occipito and frontal protuberances); when the head is neither flexed nor extended (the body being erect), this plane is exactly horizontal (corresponds to the plane of the horizon).
2. The cervico-frontal plane, drawn transversely through the cervico-frontal diameter. When the head is *half flexed*, this plane is horizontal, and therefore may be called the plane of demi-flexion.
3. The cervico-bregmatic plane, drawn transversely through the cervico-bregmatic diameter. When the head is *completely* flexed, this plane is horizontal, and therefore may be called the plane of complete flexion.

What outline is intercepted by these planes?

In the occipito-frontal, an elliptical outline; long diameter 4½ inches. Transverse diameter 3¾ inches.

In the cervico-frontal, an elliptical outline; long diameter 4— inches. Transverse diameter 3¾ inches.

In the cervico-bregmatic, a circular outline; long diameter 3¾ inches. Transverse diameter 3¾ inches.

What important deduction may be drawn from these facts?

The more the head is *flexed* the *smaller* is the outline presented.

What is the circumference of the fetal head?

The circumference of the head from the chin to the vertex, using the latter term to express the highest part of the skull, without reference to any fixed anatomical point, is about 14¾ inches. The circumference at the sub-occipito-bregmatic diameter is but 13 inches. (Lusk).

Name the important diameters of the fetal trunk.

The bis-acromial 4.7 inches. Is capable of compression. Bis-trochanteric, 3.5 inches.

In how many ways may the vertex enter the pelvis?

The elliptical outline of the head may enter with the *occiput* in front and to the left or right, *i.e.*, in relation with the ilio-pectineal eminences of either side, and behind and to the right or left, *i.e.*, in relation with the sacro-iliac joint of either side. There are, therefore, four positions of the vertex, named as follows:—

1. Left Occipito-Anterior.
2. Right Occipito-Anterior.
3. Right Occipito-Posterior.
4. Left Occipito-Posterior.

How many positions are there of the Face presentation?

Since the face has also an elliptical outline; with the *mentum* or chin at one end in relation with the sacro-iliac joints or ilio-pectineal eminences of either side, we have the same arrangement as in the vertex, or:—

1. Left Mento-Anterior.
2. Right Mento-Anterior.
3. Right Mento-Posterior.
4. Left Mento-Posterior.

How many positions are there of the Breech presentation?

Since the breech has also an elliptical outline, with the *sacrum* in a direct line with the occiput, we have the same arrangement as in the vertex, or:—

1. Left Sacro-Anterior.
2. Right Sacro-Anterior.
3. Right Sacro-Posterior.
4. Left Sacro-Posterior.

How many positions are there of the Transverse presentation?

For the sake of uniformity we may assume an elliptical outline for the shoulder, with the *dorsum*, or back of the shoulder, as the name-point. This gives us the same arrangement as in the other presentations, or:—

1. Left Dorso-Anterior.
2. Right Dorso-Anterior.
3. Right Dorso-Posterior.
4. Left Dorso-Posterior.

How may the positions be more briefly designated?

By initials, as L. O. A. for left occipito-anterior, R. S. P. for right sacro-posterior, and so on.

How may these sixteen positions be represented in a single scheme?

			Or by initials only.
Left	Occipito	Anterior.	L. O. A.
Right	Mento	Anterior.	R. M. A.
Right	Sacro	Posterior.	R. S. P.
Left	Dorso	Posterior.	L. D. P.

How is the head situated at the beginning of labor in the L. O. A. position?

The occiput points to the left ilio-pectineal eminence; the bi-frontal suture is opposite the right sacro-iliac symphysis, and the sagittal suture lies in the right oblique diameter.

What is the mechanism of delivery in the L. O. A. position?

1. *Flexion* occurs, whereby the cervico-frontal, or even the cervico-bregmatic diameter, is substituted for the occipito-frontal, thus reducing the outline presenting in the pelvis.

2. The head *descends* in the pelvis, and at the same time a *leveling* movement occurs by which the forehead descends more rapidly than the occiput, and becomes level with it.
3. While the head descends it also *rotates*, so that the sagittal

FIG. 28.

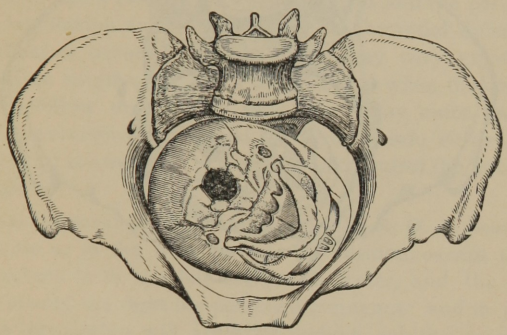
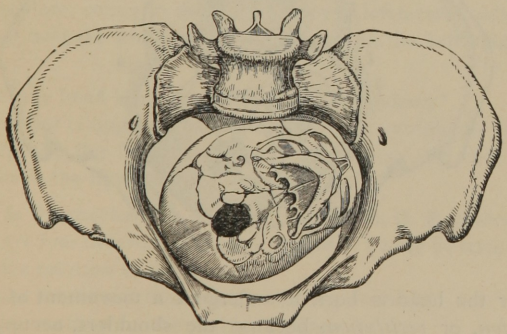


FIG. 29.



suture is finally brought into the median line by the time the head reaches the pelvic outlet: the shoulders, having also rotated occupy the transverse diameter of the outlet.

4. When the head reaches the outlet the occiput or nape of the neck remains fixed under the sub-pubic arch, while the forehead and face sweep over the perineum by a movement of *extension*.

FIG. 30.

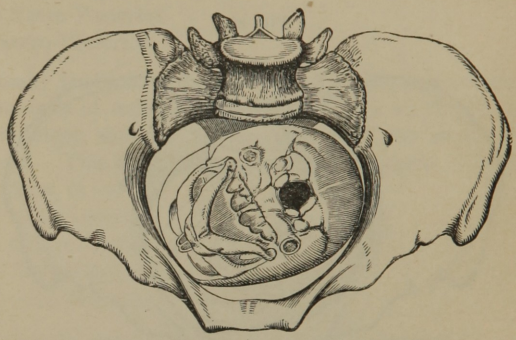
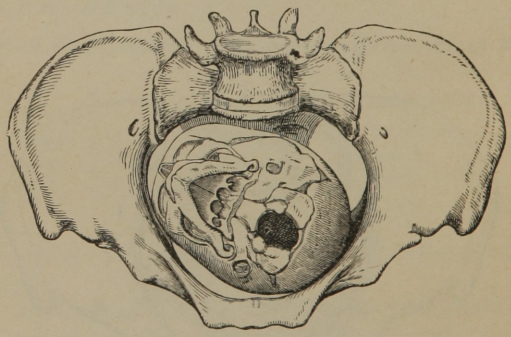


FIG. 31.



5. After the head is born it undergoes a movement of *external rotation*, or *restitution*, because the shoulders, occupying the transverse diameter of the outlet, now undergo a movement of *internal rotation*, so that the bis-acromial diameter is finally brought into the median line, the right shoulder turning under the pubic symphysis.

6. The right shoulder is now forced down under the sub-pubic ligament, and, the trunk pivoting upon the arm just below the shoulder, *delivery of the body* occurs by a movement of latero-flexion.

What variations occur in the mechanism of the L. O. A. position?

If there is not a close fit between the head and the pelvis there may be less flexion and rotation, but no substantial difference in the mechanism occurs. The shoulders may vary greatly, due usually to the length of the neck and the time when they are compelled to follow the head. Thus, they may enter the pelvis directly transversely and rotate indifferently into either oblique diameter, and at any level, which will also control the movement of restitution.

What is the mechanism of delivery in the R. O. A. position?

The same as in the first, or L. O. A. position, except that the sagittal suture is in the left oblique diameter, and the occiput directed toward the right ilio-pectineal eminence; and in general the same description will apply throughout, substituting right for left, and vice versa.

How often does this position occur?

Very seldom, owing to the infrequency of left lateral obliquity of the womb, and the presence of the rectum on the left side of the pelvis.

How is the head situated in the R. O. P. position?

The occiput is opposite the right sacro-iliac symphysis, the forehead opposite the left ilio-pectineal eminence, and the sagittal suture lies in the right oblique diameter.

What is the mechanism of delivery in the R. O. P. position?

There are four different processes by which it may be terminated:

1. Anterior rotation at the inlet.
2. Anterior rotation at the outlet, or during descent.
3. Anterior rotation on the perineum, and,
4. Posterior rotation throughout.

What is meant by anterior rotation?

The rotation of the head so as to bring the occiput in front, thereby converting the position into an R. O. A.

How does anterior rotation occur?

1. From the fact that the foramen magnum is near the occipital end of the head, the shoulders are thrown further back in this position, and therefore the right shoulder impinges upon the vertebral column or promontory. If it should be pushed off on the right side, the child's back will be brought in front. This twists the neck, and the untwisting force of its elastic structure tends to rotate the head with the occiput in front. This occurs most easily at the inlet, next at the outlet or during descent, and rarely, even when the head has reached the perineum.
2. The resistance of the posterior pelvic wall to the occiput is greater than that of the anterior wall upon the forehead, owing to the narrowing of the pelvis under the sacro-iliac arch, which also aids in anterior rotation, and according to some, is the only cause.

What must occur before anterior rotation?

Flexion, continued until the circular cervico-bregmatic outline is reached.

Under what circumstances does posterior rotation occur?

If the child's back is turned toward the mother's back, and remains so, the head cannot rotate anteriorly, and is delivered with the forehead under the sub-pubic arch.

What difficulties are encountered in posterior rotation?

1. The labor is more prolonged, because the uterine force is transmitted through the posterior and narrow portion of the pelvis.
2. The perineum is endangered, because the head cannot be fully flexed while passing over it.

How may we recognize the R. O. P. position?

1. At the beginning of labor the anterior fontanelle (usually large) will be found very accessible in front and to the left.
2. As flexion occurs the fontanelle will move upward and become less accessible, which is directly the reverse of the course followed by the posterior fontanelle in L. O. A.

How should the R. O. P. position be managed?

As soon as discovered, a reasonable effort should be made to rotate the shoulders with the back in front, by external manipulation. This may be aided by two fingers placed upon the vertex,

and similarly employed in endeavoring to rotate the head. If these efforts fail, we may leave the case to the uterine efforts, until it is evident that natural delivery will take too long, when we should employ the forceps.

What is to be avoided ?

Attempts to rotate the head without reference to the position of the shoulders. It endangers the child's life, from over-twisting of the neck, and is rarely successful.

What is the mechanism of delivery in the L. O. P. position ?

The same as in the third or R. O. P., except that anterior rotation converts it into an L. O. A., and in general left is to be substituted for right, and vice versa, throughout the description.

What are the causes of the Face presentation ?

1. From a misdirection of the uterine axis (due to pendulous abdomen and the like) the contractions may propel the head, originally presenting the vertex in such manner that its occiput is arrested at the brim, while the facial end, being free, descends. Thus an L. O. A. may be converted into an R. M. P., and an R. O. P. into an L. M. A.
2. External violence or jarring may disturb and change the presentation.
3. The child may, by reflex movements, extend its head.

What plane and diameters are described in the Face presentation ?

A plane drawn through the anterior limit of the anterior fontanelle, the malar bones, and the junction of the chin and neck, is called the *trachelo-bregmatic* plane.

It is of elliptical outline and nearly parallel to the cervico-bregmatic plane, but smaller. Its long diameter is called the trachelo-bregmatic; its transverse diameter, drawn from one malar bone to the opposite, the *bi-malar*.

How is the head situated in the L. M. A. position ?

The chin is opposite a point in front of the left acetabulum; the anterior fontanelle is opposite the right sacro-iliac symphysis. The features of the face (eyes, nose, mouth, etc.) may be felt between the points.

What is the mechanism of delivery in the L. M. A. position?

The head descends with its trachelo-bregmatic diameter presenting in the oblique diameter, and without difficulty, until the cervico-bregmatic plane has entered the pelvis. By this time the diameter of the neck or upper part of the chest is added to the cervico-bregmatic diameter, and this constitutes too large a bulk to pass. Delay therefore occurs.

How is this difficulty overcome?

As soon as the head can reach far enough to be acted on by the perineum, the perineal force (see page 84) will cause the head to be flexed, and allow it to sweep easily over the perineum. Therefore, if the head is small, or the neck long, there may be no delay in flexion and delivery. Otherwise the head must remain stationary until it is moulded and wire-drawn, so as to enable it to reach the perineum.

What effect has this delay, etc., upon the child?

1. It is endangered by the pressure upon its cervical structure.
2. The caput succedaneum forms easily upon the face, and the parts may be perilously swollen and infiltrated.

What treatment is demanded, and why?

Since the delivery can be readily accomplished by securing flexion after the face has reached the inferior strait, we should assist the mechanism—

1. By attempting to flex the head with the fingers, and
2. With the forceps, if the fingers fail, or traction is necessary to bring the head low enough to be flexed.

What is the mechanism of the R. M. A. position?

The face enters the pelvis with the chin in front and to the right, and in general the same description will apply, substituting right for left and vice versa, throughout.

What is the mechanism of the R. M. P. position?

1. The trachelo-bregmatic plane enters the pelvis with the chin opposite the right sacro-iliac symphysis. The forehead remains stationary at the front part of the brim, while the base of the skull and upper part of the chest attempt to advance under the sacro-iliac arch, which is impracticable.

2. The shoulders will thus be made to impinge upon the vertebral column, and will have a tendency to be pushed to the right of the promontory, with the back in front. This will twist the neck, and tend to rotate the head into an R. M. A. position, when the labor is terminated as in that position.

The key to the mechanism, therefore, is *anterior rotation* at or near the inlet. If this fails to occur, the head and chest become tightly wedged, and unless the head is very small, or the pelvis large, delivery is impossible.

What is the mechanism of the L. M. P. position?

The face enters the pelvis with the chin behind and to the left, and in general the same description will apply, substituting left for right and vice versa, throughout.

What is the Brow presentation?

A variety of the Face presentation, the upper part of the face presenting. It is either converted into a full face or into a vertex presentation, or cannot be delivered naturally unless the head is very small.

What plane and diameter are described in the Breech presentation?

A plane drawn transversely through the ilia and sacrum, called the bis-iliac, from its long diameter, drawn between the crests of the ilia. It is of elliptical outline and almost identical with that of the shoulders.

How is the breech situated in the L. S. A. position?

The sacrum is in front of the left acetabulum, the right ilium under the left sacro-iliac symphysis; the left ilium in front of the right acetabulum, and the pubes in the free space in front of the right sacro-iliac symphysis.

What is the mechanism of the L. S. A. position?

The bis-iliac diameter enters the pelvis in the left oblique diameter, rotating during descent, so that when it arrives at the vulva the left ilium is directly in front and the sacrum directly toward the left side. Since the breech is quite compressible, advantage is taken of this to enable it to pass out of the vulva with less distention of the perineum, by one of the hips passing in advance of

the other. The breech being born, the body and legs emerge, next the shoulders, following the same mechanism, and finally the head, which enters in the right oblique diameter, and passes down strongly flexed.

What is the mechanism of the R. S. A. position?

The same as in the first, substituting right for left, etc.

What is the mechanism of the R. S. P. and L. S. P. positions?

So far as the breech is concerned, the mechanism is the same as in the sacro-anterior position (making allowance for change in *direction*). But when the head enters the pelvis it will be in an occipito-posterior position, and there will be the same need for anterior rotation as in the corresponding vertex positions.

What dangers are connected with the breech presentation?

1. Compression of the funis.
2. Premature respiration.
3. Inhalation of mucus, etc.
4. Extension of arms over head.
5. Extension of the head.
6. Rupture of the perineum.

How may the funis be compressed?

If there is any delay in the birth of the head after the body is born, the funis may be compressed between the head and pelvic walls, thus asphyxiating the child.

What is premature respiration?

After the birth of the body, the contact of air may excite respiration, and abolish the placental circulation. Delay after this may result in asphyxia.

How may inhalation of mucus occur?

The child may respire while the head is detained in the passages, and may draw mucus or fluids into the lungs, causing either asphyxia or pneumonia after birth.

How may the arms be extended?

The arms are naturally flexed upon the child's body, and pass out with it, but if arrested by the pelvic walls, they may be extended alongside of the head, increasing its diameter, and making delivery impossible until they are brought down.

How are the arms to be brought down?

One or two fingers are to be passed by the child's head and laid upon an arm from behind. The arm is then to be pushed across

the child's *face*, and so on until brought down by the side of the body. This may be repeated with the other, if both are extended.

How may the head be extended?

The head is usually so tightly grasped by the uterus and vaginal walls as to be kept flexed, but if the pelvis is small, or improper traction is made upon the body, it may be extended, and will then present a large outline in passing through the pelvis. This makes its advance more difficult, and may cause a laceration of the perineum.

What is the fetal mortality in the breech presentation?

From 30 to 50 per cent.

How should a breech case be managed throughout?

As a rule it should not be interfered with until the breech is born. The physician should then—

1. As soon as the hips are delivered, draw down a loop of the cord, as otherwise it may be compressed between the child's head and the pelvic brim during the descent of the former, and, not being able to pass down as rapidly as is required, it may be torn off at the umbilicus or so stretched as to interfere with the placental circulation. If the cord is pulsating strongly, place the loop thus drawn down out of the way in the postero-lateral part of the pelvic excavation. If the pulsation is feeble or absent, hurry the delivery.
2. As the shoulders are coming down, endeavor to secure anterior rotation if it is in a posterior position.
3. As soon as the body is born, bring down the arms, if extended.
4. If the head is not at once born, pass two fingers to its mouth, to secure a supply of air and to admit of respiration.
5. Draw the body down against and parallel to the perineum (to flex the head). Then elevate the body, turning it over on the mother's abdomen while making traction. An assistant, if possible, should press upon the hypogastrium, to force the head down. Repeat the maneuver, if necessary.

What is Smellie's Method of Extraction of the after-coming Head?

In this method the body of the child is wrapped in a warm napkin and placed astride the operator's arm. The index and middle

fingers are on the canine fossa on each side of the child's nose. Upward pressure is made at the same time with the fingers of the other hand upon the occiput. By raising the trunk, the head is rolled out over the perineum. The head must be completely rotated before this method can be used. This method is particularly adapted for extraction when the fetal head has entered the pelvis.

What is the so-called Smellie-Veit modified method?

This consists in combined traction on the chin and shoulders and is frequently used when the above method has failed. One hand is introduced as in the Smellie method and the index and middle fingers of the other hand should be forked upon the shoulders. A somewhat downward traction should be made, until the cervical region is under the pubes. If, by an upward movement of both arms the body is elevated, the face will rotate over the perineum. It is claimed that by this method the greatest traction can be used with the least damage to the child.

What means should be used where the occiput has rotated into the hollow of the sacrum?

Lusk advises in cases where the forehead is pressed against the symphysis to reverse the above-named method. As the fingers are forked upon the shoulders, the back of the child should rest upon the arm. The chin should be flexed with one or two fingers of the other hand. Traction should be made in a downward direction.

What is the method of Prague?

The feet are seized with one hand, and the body directed nearly vertically downward. While this is being done the fingers of the other hand are hooked upon the shoulders, so that the finger-tips rest above each clavicle. Both hands exercise traction at the same time. It is sometimes necessary when uterine contractions are weak, to have an assistant make pressure on the head through the abdominal walls. After the head has passed the superior strait, the feet should be quickly raised toward the mother's abdomen.

How should this method be modified where the occiput rotates into the hollow of the sacrum?

The body of the child should be directed toward the mother's abdomen, so as to cause rotation of the occiput over the perineum.

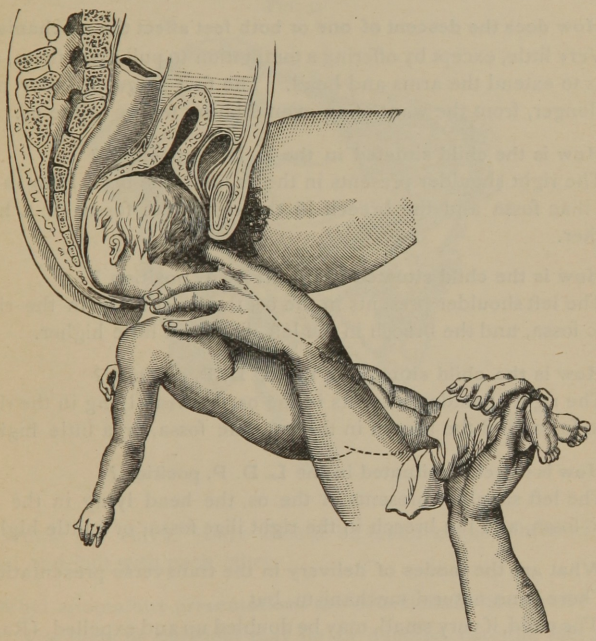
In what cases is the Prague method of greatest service?

In somewhat contracted pelves, in which the chin normally is partially extended as the head engages in the sagittal diameter of the brain. (Lusk.)

What caution is necessary in pulling upon the child's body?

The neck breaks with the weight of 100 pounds, and decapitation occurs with 120 pounds. (Matthews Duncan.)

FIG. 32.



Under what circumstances is earlier interference indicated?

When the labor is unduly protracted we may suspect that the soft breech is spreading out and being wedged in the pelvis, rather than being molded into a shape suitable for passing. We may then—

1. Carefully introduce the hand and bring down one or both legs to use in making traction, or
2. We may use a *fillet*. Pass a silk handkerchief or roller bandage over the child's groin, to use in making traction. A "blunt hook" or other metallic instrument should never be used on a living child.

What varieties of the breech presentation occur?

One or both feet or legs may come in advance of the breech, which is called a Breech footling.

How does the descent of one or both feet affect the mechanism?

Very little, except by offering a temptation to pull upon them, and thus to extend the arms and head. The first stage of labor may be longer, from the want of an even dilating wedge in the os.

How is the child situated in the L. D. A. position?

The right shoulder presents in the os uteri, the head lying in the left iliac fossa and the breech in the right iliac fossa, or a little higher.

How is the child situated in the R. D. A. position?

The left shoulder presents in the os, the head lying in the right iliac fossa, and the breech in the left iliac, or a little higher.

How is the child situated in the R. D. P. position?

The right shoulder presents in the os, the head lying in the right iliac fossa, and the breech in the left iliac fossa, or a little higher.

How is the child situated in the L. D. P. position?

The left shoulder presents in the os, the head lying in the left iliac fossa, and the breech in the right iliac fossa, or a little higher.

What are the modes of delivery in the transverse presentation?

There is no natural mechanism, but

1. The child, if very small, may be doubled up and expelled. (Rare.)
2. The child may be spontaneously turned in utero, so that it becomes either a vertex or breech presentation. (Rarer.)
3. After the child has been doubled up the breech may be pushed down after great efforts. This is called spontaneous evolution. (Rarest.)

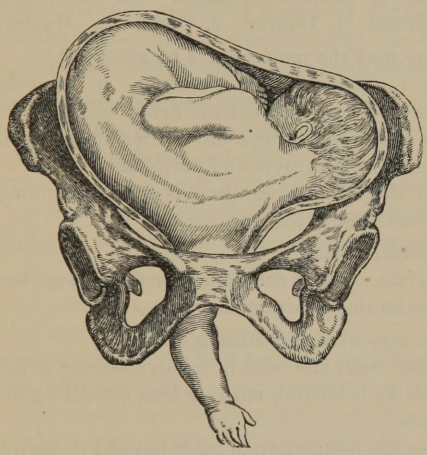
How should a transverse presentation be managed?

We should not await any of the spontaneous methods, but turn the child to a vertex or breech presentation. (See Version.) If this is impossible, we will have to perforate the chest and reduce the size of the child. (See Embryotomy.)

What variety of the transverse presentation occurs?

The hand or arm may be in advance of the shoulder, and may

FIG. 33.



present at the vulva. Care should be taken not to confound the hand and foot with each other.

What anomalous presentations are occasionally observed?

1. The body of the child may be so doubled that the feet present with the vertex or face. 2. One or both hands may be added to the vertex or face presentation. 3. The funis may present with any of the others.

PATHOLOGY OF LABOR.

DYSTOCIA.

What is dystocia?

The technical name for labor which departs from the normal standard.

How is labor rendered abnormal?

By disease, defect, or accident affecting—

1. The motive force. 2. The fetus and its attachments. 3. The mother's tissues or general condition. We have, therefore, three classes of dystocia: 1. Uterine; 2. Ovular; 3. Maternal.

In what way may the motive force be affected?

It may be: 1. Excessive. 2. Deficient. 3. Irregular.

What evils may excessive uterine action occasion?

1. Precipitate labor, involving a too sudden emptying of the womb, with laceration of the cervix and perineum.
2. Rupture of the womb when there is much resistance. Opium, chloral, or anesthetics will control it.

What is deficient action?

Uterine *inertia*, or any deficiency in the power, length or frequency of the uterine contractions.

What evils may uterine inertia occasion?

The principal one, and which involves many evils, is *delay* in the labor. Delay is hurtful, more or less, according to the stage in which it occurs.

1. At all times the protraction of labor beyond its normal limits enfeebles the mother and endangers the child's circulation.
2. In the second stage additional dangers arise, from pressure upon the maternal tissues, with possibilities of sloughing, fistulas, and septic processes.
3. In the third stage inertia may lead to fatal hemorrhage, thrombosis in uterine sinuses, with subsequent septicemia and other diseases.

What are the causes of uterine inertia?

1. Defective innervation or circulation of the uterus.
2. Paralysis of the uterus from over-distention.
3. Organic defects in the uterine muscles.

In what ways may the innervation and circulation of the womb be affected?

The nervous supply of the uterus being spinal, cerebral (vasomotor), and ganglionic, it may be affected by mental emotion, the shrinking from pain of the hysterical temperament, improper ventilation, or from either direct or indirect disturbance of the uterine center. The latter may be occasioned by malarial poisoning or by reflex influences from other disturbed organs. Premature rupture of the membranes is frequently associated with inertia, probably as cause.

How may the uterus be paralyzed from over-distention?

The walls of the uterus may be mechanically over-distended by twins or dropsy of the amnion, making the contractions feeble.

What organic defects are met with?

The uterus which has frequently gone through the processes of pregnancy, often has its fibrous and uncontractile element increased at the expense of the muscular tissue. This decreases the power of the uterus; hence, old multiparæ frequently have protracted labor from this cause. It is said that fatty degeneration sometimes occurs.

How should uterine inertia be treated?

If sufficiently great to unduly prolong labor we should—

1. Endeavor to ascertain and remove the cause.
2. Place the woman under the best hygienic conditions.
3. If the source of reflex disturbances cannot be removed, we may quiet the nerve center by chloral, opium or the bromid of potassium, after which the inertia is commonly relieved.
4. Quinin is always useful in malarious districts.
5. Massage and stroking of the uterus through the abdominal walls may be tried.
6. If over-distention exists we should early rupture the membranes.
7. In the second stage we may *supplement* the uterine force (*a*) by Kristeller's method, (*b*) by the forceps.

What is Kristeller's method?

Place the hands on the abdomen (facing the woman's feet). Endeavor at intervals to *push* the child through the pelvis. Called also *expression*.

What should be avoided in treating inertia?

The use of oxytocics.

What are oxytocics?

Drugs credited with the power of directly affecting the uterine muscle, and of causing or strengthening contractions, such as ergot, cinnamon, borax, and many others. Of these the one most used is ergot.

What objections exist to the use of ergot in labor?

It is uncertain in action, and when it does act, causes tonic contraction of the uterus and an unremitting effort to expel the child. If this takes place before the os is dilated laceration of the cervix may occur; if the head is large, rupture of the womb may occur; in any event, the placental circulation will be continuously compressed, and the child in danger of asphyxia. Ergot should never be given before the birth of the child, and from its uncertainty, should never be depended upon in the third stage.

What objections exist to the use of stimulants?

A dose of whisky is often given, increasing the woman's courage and the contractions of the abdominal muscles. But if labor is not speedily terminated, reaction follows, and the labor will be retarded.

What is irregular action of the uterine force?

Irregular contraction of special fibers instead of general contraction of all. Its typical form is called "ante-partum hour-glass contraction." In this condition, a circular band of fibers, usually a little above the cervix, contracts firmly and tonically, while the rest of the womb remains inert. This holds the child tightly in the womb, and suspends normal contractions.

How should this be treated?

Relaxation should be attempted by anesthesia or by emetic doses of ipecac. These failing, our only resource is in artificial delivery by forceps, or Cesarean section, or embyrotomy.

What obstructions to delivery are encountered in the maternal tissues?

1. At the os uteri; rigidity, edema, atresia, or displacement.
2. In the vagina; fibrous bands, atresia, persistent hymen.

3. An unyielding perineum.
4. Tumors, including a distended bladder or rectum.
5. External; edema and thrombus of the labia; hernia.
6. Deformities of the pelvis.

What is rigidity of the os (or cervix) uteri?

An unyielding and undilatable condition, due—

1. To organic changes, and, 2, to temporary spasmodic contraction of the oral fibers. The first form is due to inflammatory or hypertrophic conditions by which the cervical fibers have become thickened and fibrous. The second form may occur at any time during the first stage of labor, and is usually associated with uterine inertia.

How may organic and functional rigidity be distinguished?

1. In organic rigidity the edges of the os are *thick* and *dense*, and the cervix has not entirely disappeared.
2. In rigidity from spasm the edges of the os are *thin* and *tense*, giving the sensation of sharp, wiry resistance. It is also associated with some constitutional disturbance, the woman being nervous and restless and the vagina hot and less moist than usual.

What treatment is indicated?

1. In organic rigidity the uterine contractions should be allowed ample time to force open the os; this failing, incisions should be made with a bistoury. The patient should be placed in Sims' position, the speculum introduced, and the incisions made radiating from the os, to a sufficient extent to allow the head to come through with or without the forceps. The condition is rare, and such extreme measures are rarely called for.
2. Functional rigidity depends upon much the same causes as uterine inertia, and demands similar hygienic treatment. Chloral, gr. xv, every hour, will be found effective. Overstretching may be used. This is accomplished by inserting the index and middle fingers within the os, and spreading them forcibly, so as to stretch the oral fibers. The fingers exert so little real force that no judicious person can do harm with this procedure. It may be repeated in an hour, or with two or three successive contractions. If necessary, Molesworth's or Barnes' dilators may be used, to dilate with more force and rapidity.

What is edema of the cervix?

An infiltration of serum, especially into the anterior lip of the cervix, which impairs its dilatability. It is due to pressure from the child's head.

What is the indication for treatment?

To remove the cause; as long as the head remains the swelling will continue; hence deliver with forceps before it becomes too extensive.

What is atresia of the os uteri?

Entire closure of the os, due to inflammatory adhesions of the cervical lips. It is very rare, and demands similar treatment to organic rigidity.

What is displacement of the os uteri?

Removal of the os from its usual place in the vagina, usually due to a forward displacement of the fundus. This in turn is due to a relaxed condition of the abdominal muscles. [Cases are recorded in which the fundus of the womb rested on the woman's knees, in the sitting posture, throwing the os so far back as to make it inaccessible.] The same condition is sometimes caused by tumors, displacing the womb in any direction, but the usual displacement of the os is backward, toward the promontory.

What are the dangers of this condition?

1. The child's head is pressed against the anterior wall of the cervix, and is unable to leave the womb, unless through a rent in the anterior wall.
2. The incautious examiner may mistake the thinned wall for the membranes, and make the rent himself. This condition is common enough to warrant every one in making the discovery of the os and the condition of its edges the first duty in labor.

What treatment is indicated?

Replace the womb by pushing the fundus backward, while, if possible, the finger is hooked into the os and it is pulled forward. If the displacement has been great, a bandage should be applied around the abdomen to retain the uterus in position.

What treatment is indicated for a small vagina, obstructive bands, etc.?

A vagina small enough to impede delivery will require the

forceps to be used. Bands or a persistent hymen may be incised. While the head distends and makes tense the band, a knife placed between the head and band is allowed to be pushed through. Care should be taken to cut as little as possible, and to tear rather than cut after the edge is severed.

How may the perineum obstruct labor?

1. The perineum may be congenitally defective in structure, or have been imperfectly developed during pregnancy, constituting organic rigidity.
2. Or its muscular fibers may be in a condition of spasm, or functional rigidity. The same measures may be used which are applicable in rigidity of the cervix, but the forceps may be used instead, which render us independent of the perineum.

What is to be done when tumors obstruct delivery?

The treatment of a distended bladder and rectum is obvious. Empty them. No rule can be laid down for other tumors. If the tumor is safely removable or can be diminished in size, it may be done. If not, the child must be lessened in size.

What treatment do the external tumors (edema, thrombus and hernia) require?

1. When edema of the labia is extensive enough to obstruct delivery, a number of punctures should be made with a fine bistoury, which will speedily drain and remove it.
2. A large thrombus occasionally distends the labium obstructively. A free incision should be made, the clot turned out, and hemostatics applied if necessary.
3. Hernia rarely complicates labor. If irreducible, it requires avoidance of bearing down.

What is the most common classification of contracted pelvis?

1. *The pelvis æquabiliter justo minor*, or generally contracted pelvis, in which all the diameters are equally contracted. The *pelvis æquabiliter justo major*, in which all the diameters are enlarged.
2. The *flattened pelvis*, in which the conjugate diameter especially is diminished. The other diameters may be normal.

As subdivisions of the last we have :—

(A) *Simple* flattened, in which only the conjugate is decreased in size. This is the most frequent form of pelvic contraction.

(B) Generally flattened, in which the narrowing extends also to the transverse diameter.

(C) Rachitic flat. The diameter between the anterior superior spines is equal to, or greater than the distance between the highest points of the iliac crests.

3. The *obliquely contracted pelvis*, principally caused by spinal curvature, hip disease or coxalgia, by a non-symmetry of the sacrum. Greatest dimension is in the oblique diameter.
4. The *funnel-shaped pelvis*, produced by posterior curvature or *kyphosis* of the lumbar spine. The conjugate is lengthened and the transverse diameter diminished.
5. The *compressed pelvis* resulting from rachitis, or osteomalacia.
6. *Spondylolisthetic pelvis*, narrowing caused by a slipping forward of the last lumbar vertebra upon the sacrum.
7. *Pelvis narrowed* by exostoses, fractures, etc.

What is Scoliosis?

Lateral curvature of the spine. It may only impair one side of the pelvis, but if great, may cause serious deformity.

What effect may the justo major pelvis have on labor?

Usually labor is terminated quickly. Complications may arise however from the fetus turning transversely or from precipitate labor.

What effect may the justo minor pelvis have on labor?

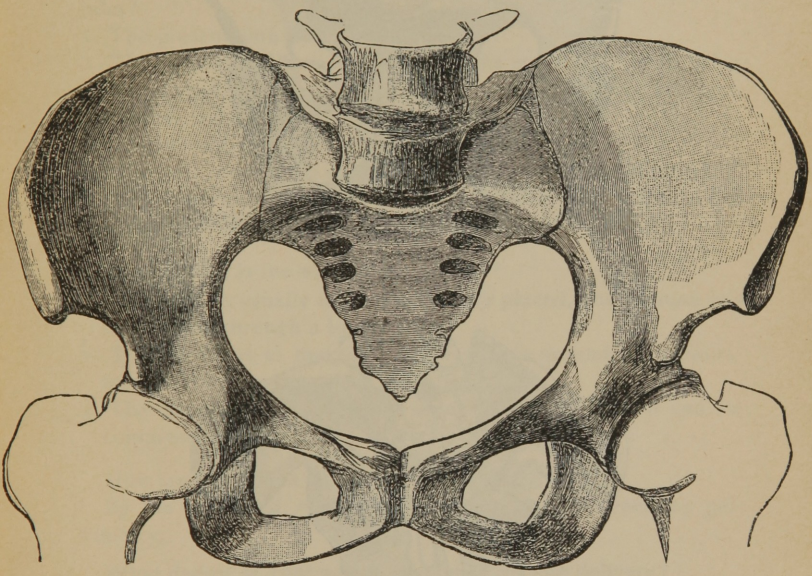
If the child and pelvis are proportionate in size, labor goes on as usual, but in ordinary cases the labor begins when the head is at the superior strait, strong flexion occurring. The biparietal diameter is in relation with the conjugate.

Describe the rachitic flat pelvis and its effect on labor.

All the individual parts are decreased in size; the sacrum is pushed forward and downward; the vertebræ are pushed forward between the wings. Usually, the venters of the ilia are inclined more strongly toward the horizon, separate more anteriorly, and are less curved. The result of this is that the distance between the anterior superior spines is as great, or greater, than that between

the highest points of the iliac crests. The pubic arch is widened and the pelvic cavity kidney shaped. If the head presents, the sagittal suture lies in the transverse diameter. The head, instead of entering the pelvic cavity at the latter part of pregnancy, may be turned aside at the superior strait. The transverse diameter is in relation with the conjugate, the anterior parietal bone becoming a fixed pivot against the pubic arch, while the posterior descends

Fig. 34.



beneath the promontory. An attempt is made to produce extreme flexion. After the head has descended into the pelvic cavity labor proceeds in the usual way.

Describe the principal characteristics of the osteomalacic pelvis.

In this form of deformity softening of the bones has caused the bending inward of the anterior half of the pelvis, bringing the two pubic rami very near together in the form of an irregular beak

or projection. Indications of osteomalacia will probably appear in other parts of the body. The disease may make its appearance during pregnancy.

FIG. 35.

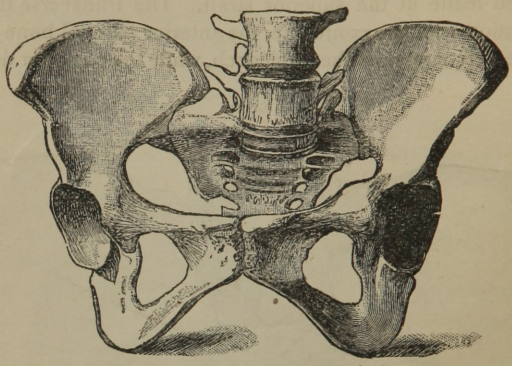
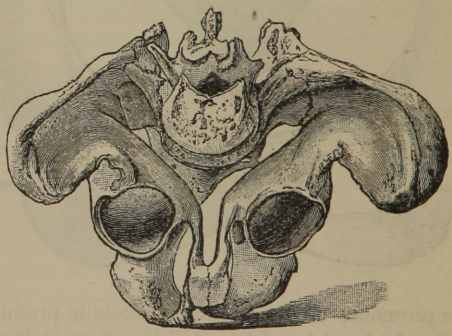


FIG. 36.



Describe the deformity resulting from Coxalgia.

The narrowing is principally oblique. In unilateral hip disease, the diseased femur is much decreased in size; the diseased hip is pushed out from the symphysis and its anterior half is more arched. From the inactivity of the glutei muscles and the

increased action of the iliacus internus, the ilium is more vertical than usual, the healthy half of the pelvis is flattened and narrowed, the diseased half is hollowed out and dilated.

Do deformities of the inlet affect the whole course of delivery?

Generally the trouble is over when the head has passed through the inlet, the rest of the pelvis being undeformed.

What effect upon delivery is occasioned by deformities of the inlet?

1. The presentation is apt to be irregular.
2. The agreement between the axes of the uterus and pelvis being disarranged, the uterine force is deflected, which protracts both the first and second stage.
3. The normal mechanism of delivery is perverted.
4. The inlet is made too small to admit of the child passing readily.
5. The maternal tissues are more apt to suffer from pressure due to the misdirection of the uterine force.

In what way is the mechanism altered?

1. The head is usually more *transversely* placed, and rotation has to be made through a longer arc.
2. The head has to make a curved passage around the promontory before it can enter the inlet.
3. The narrowing of the pelvis delays the head until it can be compressed and moulded to a suitable size.

How are degrees of deformity estimated?

By the length of conjugate diameter, as determined by pelvimetry.

What degree of contraction is compatible with delivery?

Much will depend upon the skill of the physician, but in general terms, it may be said that with a conjugate of three inches or more, a living child *may* be extracted, with or without the forceps; three to two and a half inches, may be delivered by forceps or version, or at worst by craniotomy; two and a half or less, may be delivered by craniotomy, but the statistics show that the Cesarean section is as safe. (Parry.)

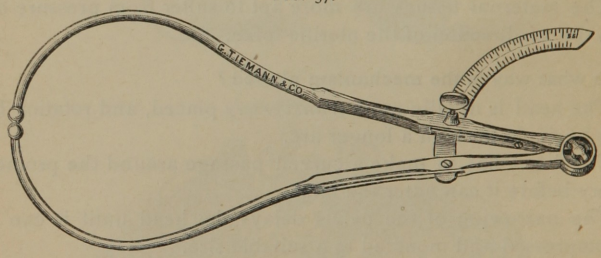
KIWISCK'S TABLE.

	INCHES		LINES		WEEK
With a sacro-pubic diameter of	2	and	6 or 7	induce labor at the	30th
When the sacro-pubic diam. is	2	and	8 or 9	" " " "	31st
" " " " "	2	and	10 or 11	" " " "	32d
" " " " "	3			" " " "	33d
" " " " "	3	and	1	" " " "	33d
" " " " "	3	and	2 or 3	" " " "	34th
" " " " "	3	and	4 or 5	" " " "	35th
" " " " "	3	and	5 or 6	" " " "	36th

How would we ascertain the condition of a woman's pelvis?

1. By her history: as to rickets in childhood; the time of dentition; when the latter is late, it is a sign of imperfect bone formation. The shape of the head, etc.;

FIG. 37.



2. The history of previous labors. Continued prolonged labors should cause a suspicion of pelvic deformity;
3. By inspection of the patient's external appearance in regard to deformities in locomotion, etc.;
4. External pelvimetry. The external measurements taken from certain fixed landmarks on the living pelvis, by an instrument known as a pelvimeter, are generally classed as certain signs. These measurements should be taken with the patient on her back, preferably on a table, and covered with a sheet or woolen comforter. The head and shoulders should be raised and the knees flexed.

What are the anatomical landmarks from which these measurements are taken?

Between the anterior superior spinous processes of the iliac bones; the distances between the iliac crests, the inter-trochanteric and the external conjugate. In measuring the above the physician should stand by the side of the patient, and holding the pelvimeter between the thumb and fingers, the points should be applied to the outer sides of the points above mentioned. In measuring the external conjugate, the patient should lie on her side with her face away from the physician.

Between anterior spines,	. . . . .	10 inches	or 24 cm.
" the highest points of the iliac crests,	. .	11 "	" 28 "
" trochanters,	. . . . .	12¼ "	" 32 "

The external conjugate is taken from the fossa just beneath the spinous process of the last lumbar vertebra to the middle of the upper border of the symphysis pubis. It is about 8 inches or 20 cm. This is also sometimes spoken of as Baudelocque's diameter, from its author.

How may the internal conjugate be measured?

By subtracting 3½ inches, or 9 centimeters, from the external conjugate. This is the allowance for the soft parts, sacrum and pubes. Thus the remainder, 4½ inches, or 11 centimeters, is the average length of the internal conjugate, or conjugata vera. To measure this, one or two fingers of a well asepticized hand should be passed into the vagina and extended so as to reach the sacral promontory. The point at which the anterior commissure of the vulva touches the hand may then be noted and the reach measured. This is the diagonal conjugate. Deduct one inch from this for the thickness of the pubes, and we have the true or internal conjugate.

In the normal pelvis, or where a very slight degree of contraction exists, the promontory cannot be reached.

How may the outlet be deformed?

By a narrowing of the transverse diameter, due to a too close approach of the ischia; or of the conjugate diameter, due to

anchylosis or rigidity of the sacro-coccygeal joint. The first is rare, and the second common in old primipara.

What treatment is indicated?

Sufficient additional force to enable the head to pass, which is best furnished by the forceps.

OVULAR DYSTOCIA.

What departures from the normal condition occur in connection with the fetus and its envelopes?

1. The *membranes* (*a*) may rupture prematurely; (*b*) may be too tough; (*c*) there may be an extra amniotic sac; (*d*) there may be hydrops amnii.
2. The funis (*a*) may prolapse; (*b*) may be too short.
3. The child may be enlarged or deformed by (*a*) hydrocephalus; (*b*) hydrothorax; (*c*) ascites; (*d*) edema; (*e*) putridity; (*f*) by ankylosis of joints.
4. Parts of the child may be displaced: (*a*) prolapse of arm or foot by head; (*b*) arm behind the occiput.
5. There may be more than one child, called multiple labor.

What effect has the premature rupture of the membranes?

1. No bag of waters is formed to assist in dilating the os.
2. The uterine walls close upon the irregular projections of the child, instead of upon the evenly pressing water-sac, and irregular contractions may occur.
3. The first stage is prolonged.
4. The child is subjected to greater pressure, and may be injured.

What harm is occasioned by too thick membranes?

Hours may elapse in fruitless efforts of the womb to rupture them; and they require to be artificially punctured.

What is a "caul"?

In rare cases, where there is little liquor amnii and the membranes are elastic, the child is born with its head enveloped in the membranes, which is called being born with a caul. [The membranes, when dried and preserved, are said to be a charm against death by drowning.] The practical point is to tear or cut open the sac as soon as possible, to prevent asphyxia of the child.

What is an extra-amniotic sac?

An effusion or secretion of fluid which sometimes occurs between the amnion and chorion. When the bag of waters is formed during labor, the sac will be formed by this fluid, and when the chorion is ruptured the fluid will escape, giving the impression that the true bag of waters has ruptured. A new bag will then form, enclosed only in the amnion. It is of no importance, except in the matter of diagnosis.

What is hydrops amnii?

Dropsy of the amnion or over-secretion of fluid by the amnion. This may take place to the extent of over a gallon, distending the uterus, enfeebling and sometimes destroying the child. If the amount of fluid is great, it is well to pass a bandage around the abdomen before evacuating it, and stimulants should also be at hand.

What is prolapse of the funis?

The funis, or rather a *loop* of the cord, may fall in advance of the head. There may be only a small knuckle, or several inches may prolapse, so that the cord even reaches to the vulva. This endangers the child's life, from pressure, but is rarely an impediment to delivery.

With what may the funis be confounded?

With a loop of intestine, which also may be met with after rupture of the womb. The finger may be passed entirely around the funis; with the intestine, the mesentery will prevent.

What treatment is indicated?

The funis should be pushed up above the inlet in the interval between pains, and when the presentation is forced down by a contraction, it will probably be retained. This can be done by the fingers or by repositors invented for the purpose, and may be aided by placing the woman in the knee-chest posture. It can also be done by carefully placing a loop of cord around the funis, attaching it to a moderately hard catheter, and pushing it gently back into the empty pelvic diameter. If the advance of the presentation does not retain it, a small piece of sponge passed between the head and the inlet will often succeed. If the cord is surely pulseless it

may be left alone, but if the child is alive and the funis cannot be retained, prompt artificial delivery is indicated.

In what way does a short funis impede delivery?

By preventing the child from descending completely through the pelvis. It may be only five inches long, and if of normal length, may become shortened by being wrapped in one to four coils around the child's neck.

How may a short funis be recognized during labor?

1. The head is arrested low in the pelvis; it then advances slightly with each contraction, and is abruptly jerked back by the tension of the cord.
2. Constant pain is felt in the womb, over the placental insertion. Fortunately, the occurrence is rare, since the diagnosis is not easy unless the head is born, and aid is difficult to render.

What treatment is required?

Delivery by main force until the cord can be reached and cut, or is ruptured.

What is hydrocephalus?

Enlargement of the fetal head by excessive development of the cerebro-spinal fluid. It may be so great as to double the length of the head diameters. The bones are thin (in extreme cases expanded and parchment-like in texture), and the sutures and fontanelles greatly enlarged. It is often associated with spina bifida.

How may it be recognized?

By the softness of the head and the enlargement of the sutures and fontanelles. Moderate degrees are not recognized with certainty until the forceps are applied, when the wide divergence of the handles show the increased bulk of the head.

How should it be managed?

Simple perforation of the skull will allow the fluid to escape, and permit the collapsed cranium to be withdrawn. The brain should also be broken up before the child is withdrawn.

How may hydrothorax and other enlargements of the fetus obstruct delivery?

Effusion of serum in the chest (hydrothorax), abdomen (ascites),

external cellular tissue (edema), may enlarge the bulk of the child and obstruct delivery. The joints may be ankylosed in such a position as to increase its bulk. A child dying in utero and becoming putrid may be swollen, but usually causes trouble only by poisoning the mother.

In any of these cases it may be necessary to reduce the bulk of the child by embryotomy.

How is prolapse of the hand or arm by the head to be treated?

The prolapsed member is to be pushed up, as in the case of prolapse of the funis. If the arm is behind the head (Simpson) and the diagnosis can be made, turning is indicated.

In what way may the foot or feet complicate head presentations?

One or both feet may present alongside of the head, in which case the child must be more or less doubled up. It may be noticed that these accidents often occur together, feet, arms and funis, in varying proportions, prolapsing at the same time.

How is the complication to be treated?

If recognized before the rupture of the membranes, the feet may either be pushed up or the child turned. If at any time we find turning to be very difficult or impossible, we may know that the child is dead (because difficult to turn and doubled), and at once perform embryotomy.

How may the shoulders give trouble in delivery?

By not entering the pelvis, but catching at the inlet, thus preventing the head from advancing.

How may this be recognized and treated?

By the manner in which the head advances and is retracted, as in the case of a short funis, and by external palpation. By external pressure the shoulders may be pushed into their proper place.

TWIN LABOR.

How can twin pregnancies be diagnosticated?

The diagnosis is often difficult, but generally can be determined by hearing two distinct fetal heart sounds, and fetal movements

are stronger. By palpation, two fetal forms can be made out. The abdomen is much swollen; there is considerable bulging at each side. Sometimes a well-marked depression or sulcus occurs in the median line.

What is the usual course of twin labor?

After the first child is born a short rest occurs; the pains recur (usually within fifteen minutes) and the second child is born, and so on, if more than two.

What difficulties may occur in twin labor?

1. Both children may attempt to enter the pelvis at once and become wedged.
2. After one head has reached the outlet, the second may enter the pelvis, with the same result.
3. Head locking may occur.

What is head locking?

When the first child is born by the breech, its chin may catch upon the chin of the second child presenting by the head.

What general rules may be laid down for these complications?

1. To push up one child and allow the other to come down, if possible.
2. When one child is partially born and the other wedged in with it, the first child is to be sacrificed in order to save the second.

What are the fetal appendages in multiple pregnancies?

If the pregnancy results from the fecundation of one ovule containing two germinal vesicles, or a single germ dividing into two, there is a single placenta and communicating vessels. In these cases but one chorion exists; generally each child has its own amnion. When the development results from the impregnation of two ovules, the vessels of the placenta do not connect. In these cases each fetus has its own chorion and amnion. Early in development a separate ovular decidua exists for each. Later, through absorption of the dividing membrane, there is but one decidua for both.

What forms of twin monsters complicate delivery?

The principal forms are—

1. Two nearly separate bodies united in front by the thorax or abdomen (ex., Siamese twins).
2. Two nearly separate bodies, united back to back by the sacrum and lower part of spinal column (ex., North Carolina sisters).
3. Dicephalous monsters; the bodies single below, but the heads separate.
4. The bodies separate, but the heads are partially united.

The two latter are almost invariably still-born. (Playfair.)

EFFECT OF MATERNAL CONDITIONS ON LABOR.

What maternal conditions may affect labor?

1. Syncope. 2. Hemorrhage. 3. Rupture of the uterus. 4. Eclampsia.

How does syncope affect labor?

Usually by only temporarily suspending the uterine contractions. If associated with organic heart disease it may prove fatal. The treatment is the same as indicated at any other time.

What forms of hemorrhage are met with?

1. From detachment of a normally implanted placenta, before the birth of the child, or *accidental* hemorrhage.
2. From detachment of abnormally implanted placenta, before the birth of the child, or *unavoidable* hemorrhage.
3. During and after the third stage, or *post-partum* hemorrhage.

What causes premature detachment of the placenta (accidental hemorrhage)?

External violence and irregular contractions of the womb.

What symptoms does it cause, and why?

Hemorrhage and colicky pains in the abdomen, but either may be absent. The hemorrhage may be concealed, *i. e.*, the blood may dissect up the placenta and membranes without escaping from the womb, or in small quantity only. This will cause distention

of the womb and pain. If there is no external hemorrhage the symptoms of loss of blood internally will be present.

What treatment is indicated?

Prompt delivery, on behalf of the child, which, after all, is usually destroyed by the impairment or total stoppage of the placental circulation; and also on account of the mother, if the hemorrhage is at all extensive.

1. The os uteri should be dilated sufficiently to allow the child to pass.
2. The membranes should be ruptured, and the child at once delivered by forceps or version. The membranes should not be ruptured until we can deliver, for the evacuation of the liquor amnii gives just that much more room for the effusion of blood, without any gain in uterine contraction.
3. The woman's strength must be maintained by whisky or hot milk, and inertia guarded against.

PLACENTA PREVIA.

What is placenta previa?

The implantation of the placenta upon the lower third of the uterine wall; to the part which dilates during labor. The placenta may be centrally placed over the os uteri; its margin may reach to the edge of the dilated os; or any degree between these extremes may be met with. It is, therefore, divided into *central*, *partial* and *marginal* placenta previa.

How and why does placenta previa occur?

The ovum should be, and usually is, arrested as soon as it enters the womb, by a fold of the mucous membrane.

If these folds are not prominent enough, it may advance until it arrives at the os internum, where the placenta will then be found. It is, therefore, found principally in multiparæ, and in those whose organs are in a relaxed condition.

What is the source of hemorrhage in placenta previa?

The blood pours from the openings in the uterine sinuses when the placenta is detached, and not from the placenta itself.

How soon does placenta previa cause trouble, and in what manner?

Rarely before the sixth or seventh month of pregnancy.

About this time the cervical segment, which is smaller than the fundal region of the womb, has nearly reached its limits of growth. The placenta then grows faster than the womb, and its edge is liable to become detached. Later in pregnancy the os uteri becomes patulous, and this again causes some separation of the placenta. As a result, hemorrhage occurs, more or less profusely. Usually, if rest is enjoined, the opened sinuses are closed by a clot, and the hemorrhage is arrested until further separation takes place.

What are the dangers in placenta previa?

Death of the mother from hemorrhage, and of the child from asphyxia. The maternal mortality is one in four; fetal mortality one in two to three.

What treatment is demanded when it occurs before full term?

Rest in bed, with or without a *tampon*, will arrest hemorrhage for the time; the sinuses are closed by thrombi, and the case may go on to term or another hemorrhage. The patient should be allowed cold drinks; opium may be used where pain is present. If the hemorrhage is great, it is safer to induce labor at once than to wait. Occasionally no hemorrhage occurs during pregnancy, nor even in labor.

How should delivery be managed at full term?

1. Introduce one or two fingers within the os (the hand being in the vagina) and dissect the placenta from the uterine wall for about three inches from the os uteri in all directions, pushing it to one side if necessary.
2. Rupture the membranes, and if there is an unfavorable presentation, turn the child and make the breech engage in the os; or, if the head presents, the forceps may be used, if speedy delivery is necessary.

This partial detachment of the placenta will almost inevitably arrest hemorrhage (Barnes). The strength of the woman is then the main point to be cared for, and if in a reasonable time the uterus seems to be incompetent, the child may be delivered by art

What complications may interfere with this procedure?

A rigid and undilatable cervix, which is often present, because of the thickening of the tissues under the placental insertion.

How is this to be overcome?

In premature cases, or when we are not prepared to dilate, the tampon may be applied for some hours. Otherwise the Molesworth or Barnes' dilators may be used to mechanically dilate the os, if the fingers cannot do it.

What is a tampon, and how applied?

A tampon is a plug made of pieces of absorbent cotton, iodoform gauze, soft rags, or similar materials, packed into the vagina so as to restrain hemorrhage.

What after treatment should be used?

Absolute rest—the careful use of antisepsis to guard against puerperal fever. Many authorities advise the use of ergot for a week or so after labor.

1. Place the woman in Sims' position, and introduce a Sims speculum.
2. With a pair of dressing forceps introduce a small wad of cotton batting within the os uteri. Continue to add similar pieces until the whole upper part of the vagina is packed with them.
3. Gradually withdraw the speculum, continuing to add cotton until the whole vagina is packed.
4. Apply a compress and T-bandage over the vulva.

A roller bandage or lamp-wick (recommended by Foster) may be used, and will be easier to withdraw.

How long should a tampon be left in place?

Seldom over twelve hours, and in placenta previa it may be necessary to remove it within an hour or two.

What effect has the tampon besides restraining hemorrhage?

It excites uterine contractions and aids in dilating the os. This should always be considered where these results are not desirable.

What cautions are to be observed with the tampon?

1. The upper pieces should be moistened with a one or two per cent. solution of carbolic acid or other antiseptic.

2. Never introduce it when the membranes have been ruptured, except in the early months of pregnancy, lest bleeding occur above it, distending the uterus.
3. Care should be taken after applying, to see that blood does not flow past or through it. There is no danger if it is properly applied.

What complication may occur in placenta previa after delivery?

The exposed sinuses in the cervical region may not be efficiently sealed, and hemorrhage may continue. The management will be as in post-partum hemorrhages generally.

POST-PARTUM HEMORRHAGE.

What is the cause of hemorrhage post-partum?

An uncontracted or incompletely contracted uterus, whereby the opened sinuses of the placental site are not compressed and bleeding is allowed. It is also favored by the retention of the placenta, clots (incomplete delivery), and by fibroid tumors. In a slight form, may be due to laceration of the cervix, vagina and perineum.

What are the symptoms of post-partum hemorrhage?

1. Usually the blood pours out so freely as to readily attract attention; if concealed or retained in the uterus, it will occasion the symptoms of internal hemorrhage.
2. The hand placed on the abdomen will not find the womb hard and in the hypogastric region, but soft and at a higher level.

What are the indications for treatment?

1. To empty the womb.
2. To make the womb contract.
3. To cause clots in the opened sinuses, if the womb fails to contract.
4. To support the woman's strength.

How is this treatment to be carried out?

1. The hand should be introduced into the womb, and clots or other contents removed.

2. The hand is reintroduced and moved about, stroking the uterine walls, while the other hand is similarly engaged on the abdomen. This will often succeed in arousing contractions, and lead to the expulsion of the hand from the womb. If not,
3. Injections of hot water (105° F.) may be used.
4. A strip of new aseptic gauze may by means of dressing forceps be inserted into the uterus as far as the fundus and loosely packed, another strip being placed in the vagina until it is full.
5. A handkerchief, soaked in vinegar, may be carried into the womb and squeezed out; or a peeled lemon; or a piece of ice.
6. The faradic current may be useful, if at hand.
7. As a last resort, and to cause clots, injections of tincture of iodin, or solution of ferric chlorid, diluted one-third, or even of full strength, may be used.

How may post-partum hemorrhage from inertia be prevented?

By delivering the placenta by the method of Credè.

What internal medication is proper?

Stimulants, hypodermics of strychnin sulph. grs. $\frac{1}{40}$–$\frac{1}{20}$, or ergot ʒ j, repeated, but no dependence is to be placed upon anything but local treatment. Hot milk is both stimulant and rapidly absorbed.

What is the operation of transfusion?

Injecting into the circulation blood, milk, or solution of sodium chlorid, in strength of .6 per cent. (normal salt solution). To inject blood requires special and costly apparatus and great skill. Normal salt solution may be injected with little trouble. Care must be taken to avoid injecting air, and not to inject so rapidly as to distend the right side of the heart.

What is secondary hemorrhage and its cause?

Hemorrhage occurring after an interval of several hours, or even days, after delivery. It is usually preceded by ordinary post-partum hemorrhage, and may be due to a return of uterine inertia; the detachment of thrombi, retention of pieces of membrane, or clots; displacement of the uterus, from a too tight bandage; and impacted rectum; sitting up too soon or depressing mental emotions.

What treatment is indicated?

The same in principle as in immediate hemorrhage, with due attention to the exciting cause.

RUPTURE OF THE UTERUS.

What is rupture of the uterus?

A tear or laceration in the substance of the uterine body, usually permitting the escape of the child into the abdominal cavity.

How frequently does it occur?

About once in 4000 labors.

Under what circumstances does it occur?

Generally during the second stage of labor, the rent beginning in the cervix and extending toward the fundus. Rarely the peritoneal covering escapes laceration; also it occasionally occurs early in the labor, or even in premature labors.

What are the predisposing causes of rupture?

Abnormal presentation, a hydrocephalic head, prolonged parturition, a degeneration of the muscular fibers of the uterus, producing a lack of contractile power; a great difference in proportion between the size of the child and pelvis.

How is the uterus affected?

During labor there is a tendency for the anterior wall of the cervix to be pulled upward, and for the posterior wall to be pushed downward (D. Berry Hart). If the head becomes packed in the inlet early, so as to prevent the anterior wall of the cervix from being pulled up, the anterior wall just above the head becomes greatly thinned, owing to this upward pulling, and rupture almost invariably begins at this point. The thickened ring of fibers just above the point of thinning is known as Bandl's ring.

What are the symptoms of threatened rupture?

A rising of the contraction ring of Bandl; this can be felt, can be seen in some cases, high up near the umbilicus. It is usually higher on the left than on the right side. Above this ring the uterine tissue is thickened, while below it the womb is thin, stretching more and more as labor advances. Intense pain in the pubis or abdominal region.

What symptoms denote its occurrence?

During or just after a labor pain the woman is seized with an acute and *persistent* pain. The form of the uterine tumor is changed and the presentation is retracted. As blood is effused from the rent, symptoms of internal hemorrhage and shock are added. The fingers passed into the vagina readily recognize the rent, and if the child has altogether escaped into the abdominal cavity the intestines will have prolapsed through the rent. The uterine contractions cease.

What treatment is indicated?

1. Preventive; a prompt resort to the forceps when the occurrence is feared.
2. Afterward, if the presentation is not entirely retracted, an attempt may be made to deliver *per vias naturales.*
3. In any case, unless it can be demonstrated that the peritoneum is unbroken, the abdomen should be opened by an incision, the uterine wound closed by sutures, all blood and fluids removed from the abdominal cavity, and strict antiseptic precautions observed.

What is the mortality from rupture?

1. In cases abandoned to nature nearly all die.
2. When the child is delivered without gastrotomy, a few more recover.
3. When gastrotomy is at once performed, 60–70 per cent. recover.

ECLAMPSIA.

What is puerperal eclampsia?

A form of convulsions occurring before, during, or after labor, which resembles epilepsy in clinical appearance and uremic convulsions in cause. The typical form occurs during the second stage of labor.

What is the clinical history of an attack?

1. The patient is suddenly seized with a *tonic spasm*, involving the muscles of the face and thorax, usually of the upper extremities, and occasionally of all the muscles. This tonic spasm lasts for about *one minute* and—

2. Is succeeded by *clonic spasms* or twitchings, lasting for *several minutes*. The convulsions subside and—
3. Are succeeded by *coma*, with stertorous breathing. The patient may become conscious or the convulsions may be renewed in the same order, keeping up until the patient is exhausted or recovers.

The masseter muscles are contracted tonically throughout the seizure. The interference with respiration causes the face to become red or livid. The duration of each seizure and the interval between depend upon the severity of the attack.

What prodromic symptoms warn us of an attack?

1. Severe and persistent headache is often complained of before an attack, frequently associated with disorders of vision, such as flashes of light.
2. Edema of the lower extremities or labia, or both, accompanied by any of the above symptoms, whether associated or not with albumin in the urine, should put us on our guard. A trace of albumin, however, is generally present, and with it there is usually a marked decrease in urea.

What is the cause of puerperal eclampsia?

The cause is complex, the main factors being—

1. During pregnancy the blood becomes deteriorated (hydremic), and the ill-supplied nerve centers become more irritable or convulsable (Barnes).
2. The processes of elimination, especially through the kidneys, become defective, and urea (including other excrementitious matters) is retained in the blood. Therefore the nerve centers are supplied with poisonous or irritating substances, as well as impoverished.
3. Vascular tension is increased during pregnancy, and especially during labor, which intensifies the action of the foregoing factors.
4. During labor the interference with the cephalic circulation (from bearing down, etc.), causes hydremia of the brain and of the nerve centers especially concerned with eclampsia.

Which of these factors is the most important?

The uremia, as shown by the fact that 50 per cent. of eclamptics have albumin in the urine.

Wherein does puerperal differ from uremic eclampsia?

The temperature in the former is high, has been observed as high as 109° F. (Busey); in uremia it may even be subnormal. The clinical history also differs.

Wherein does puerperal eclampsia differ from other forms of convulsions?

1. In hysteria the spasms are altogether irregular and consciousness is never entirely lost.
2. In apoplexy the condition of the coma is permanent, and there is a difference in the size of the pupils. There is not the amount of spasm.
3. In epilepsy, the history will distinguish, except in labor in epileptics, who rarely have convulsions during parturition (Parry). In epilepsy there is the peculiar cry.

What point in the etiology is disputed?

The condition of the brain, as to anemia or hyperemia.

Traube and Rosenstein assert that hydremia causes edema of the brain, which in turn leads to anemia from pressure upon the capillaries from without. Others assert that anemia of the brain is essential in eclampsia, and that the base of the brain is anemic, even when the convulsions are hyperemic.

What effect upon the cerebral circulation have the bearing-down efforts of the second stage, when eclampsia mostly occurs?

The cervical veins are obstructed and blood accumulates in the brain.

Does this occur when eclampsia takes place before or after labor?

Not demonstrably; and in these cases we conclude that other factors exist, notably uremia—or a distinct toxemia, from various poisons generated in increased quantities during pregnancy, the amount of which is too great for elimination; or that the eliminatory power is for a time defective.

What treatment should be employed to prevent eclampsia?

The urine of women in the last weeks of pregnancy should always be examined. Should the symptoms of continued headache, flashes of light, and albuminuria make their appearance, the patient

should be placed on a diet nearly or entirely of milk, the bowels must be opened by saline cathartics or calomel. Hot baths at a temperature of 90 or 100° F. are beneficial; the patient should remain in the water from 10 to 15 minutes, and be well rubbed with a coarse towel afterward. If symptoms continue after a fair trial of the above methods, the uterus must be emptied.

What are the indications for treatment in puerperal eclampsia?

1. To excite elimination by increasing the action of the skin, bowels, and bladder.
2. To relieve the irritability of the nerve centers.
3. To reduce vascular tension.
4. To reduce cerebral hyperemia.

What treatment should be employed during the attack?

1. Ether or chloroform may be given until the chloral, etc., can be administered and take effect. A towel or a piece of wood should be placed between the teeth to prevent the tongue from being bitten.
2. Purgatives may be given, especially after delivery. Of these calomel grs. v, or croton oil gtt. ss, by mouth or rectum, are the best. To be repeated until the bowels are well moved.
3. A warm pack, to promote diaphoresis, may be used.
4. The labor, if in progress, should be terminated as soon as possible, without violence.
5. Venesection, as the quickest and most powerful means of reducing the vascular tension, cerebral hyperemia, and, secondarily, the nerve irritability. The necessity of this is disputed by various authors.

What objections are urged against venesection?

That it is out of fashion, and does not reduce vascular tension in a healthy dog.

Veratrum viride may be used instead, if there is time to wait upon its action.

What drug was especially used before the discovery of chloral and the bromids?

Opium, which relieves the irritability of the nerve centers.

What objections exist to its use?

It allays nerve irritability at the expense of all other indications;

when the kidneys are seriously crippled it may, itself, cause death; it is no better than other less dangerous remedies.

MISCELLANEOUS COMPLICATIONS.

What complications may exist during or after the third stage of labor, besides hemorrhage?

1. Placental dystocia, or difficulties in delivering the placenta. 2. Inversion of the womb. 3. Emphysema of the neck. 4. Laceration of the cervix, vagina, and perineum.

What forms of placental dystocia occur?

1. Adherent placenta. 2. Hour-glass contraction. 3. A placenta too large. 4. Clots behind an inverted placenta. 5. Utero-placental vacuum. 6. Placentæ succenturiæ and other anomalies of form.

What is adherent placenta?

The term is properly applied to one that has contracted firm adhesions to the uterine wall, from inflammation during pregnancy. There is usually a history of fixed pain in the uterus. This is rare, but improper traction upon the cord may delay the separation of an otherwise normal placenta.

How is adherent placenta to be treated?

Pass the hand into the uterus, find a detached edge of the placenta, and by a sawing motion with the fingers, break through the adhesions. When small pieces are adherent, they are best removed by means of the douche curet of Braun, in the way described under "Abortion." The strictest asepsis must be used in these cases.

What is hour-glass contraction?

Irregular or tetanic contraction of a part of the uterine walls, the rest being relaxed, whereby the placenta is grasped and held as if in a sac. It may be complicated, if not caused, by adherence of the placenta.

How may it be recognized?

The hand, introduced into the womb, finds apparently a second os internum high up, caused by the constriction of the muscular fibers of the womb below the placental site.

How is it to be overcome?

The fingers, little by little, and finally the hand, are to be insinuated within the constricting band and its resistance overcome. This may be facilitated by anesthetics or chloral. The best reliance is upon patient and continuous manual efforts.

How may the bulk of the placenta affect its delivery?

A very large placenta which has fallen centrally upon the os, instead of edgewise, may be too bulky to pass without assistance. The same may occur with a placenta of moderate size, if clots have formed behind it to such an extent as to prevent it from being doubled up.

How is such a placenta to be delivered?

It should be perforated centrally by one or two fingers, which will enable us to hook into and drag it down.

What is utero-placental vacuum?

A rare occurrence, in which the placenta being detached, a pull upon the funis makes a vacuum between the placenta and the uterine wall, converting it into a sucker, resembling in action the leather disc by which the small boy raises bricks from the pavement.

How may it be detected and remedied?

It resembles at first the large placenta, or one enlarged by clots, but as soon as perforated, and the vacuum destroyed, it is delivered with great ease, or even spontaneously expelled at once.

What irregular forms of the placenta are met with?

1. The *battledore* placenta, in which the funis is inserted at the margin, instead of centrally.
2. The vessels of the cord may not unite, even at the margin, but ramify over the membranes before uniting to form the funis, known as the *velamentous* insertion of the cord.
3. The subdivision may extend even to the placenta, and result in there being two or more placentæ, situated at different points on the uterine walls, called *placentæ succenturiæ*.

These anomalies are uncommon, but sometimes lead to perplexities in the delivery of the after-birth.

INVERSION OF THE UTERUS.

What is inversion of the uterus ?

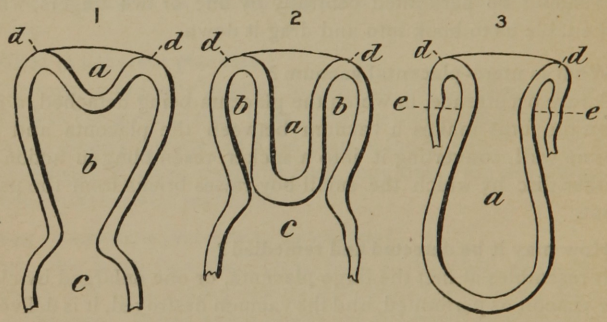
The uterus is turned inside out, upside down (Parvin).

1. There may be a simple depression of the fundus, or it—
2. May present at the os uteri (partial inversion), or—
3. Passes through the os and extends to, or through the vulva (complete inversion).

What is the cause of inversion ?

Partial and irregular contraction of the uterus is the main factor; often aided by traction upon the cord in delivering the placenta. No

FIG. 38.



THREE DEGREES OF INVERSION.

1. Depression. 2. Introversion. 3. Complete inversion. *a*. Fundus uteri. *b*, *b*. Inversion partially filling the uterine cavity. *c*. Vagina. *d*, *d*. Mouth of inverted portion.—*From Parvin's Obstetrics.*

one can invert a healthy womb by traction upon the cord, but if the fibers under the placental site are not contracting, inversion will be very likely to occur. It may happen either before or after the placenta is detached. Violent efforts at bearing down have been ascribed as a cause.

How may inversion be recognized ?

1. The woman usually complains of great pain at the moment of the accident (a sensation as of something tearing loose within her). 2. Hemorrhage and more or less shock follow. 3. The

hand placed upon the abdomen fails to find the womb in its natural place, but instead finds a funnel-shaped depression, and when introduced within the vagina, finds there the mucous membrane of the interior of the uterus (unless external). It can then be mistaken for nothing but a fibroid tumor, which, of course, could not occupy the vagina just after delivery.

What is the prognosis ?

Although a very grave accident, the prognosis is not hopeless. It depends much on the amount of hemorrhage and shock. If remaining long in its displaced condition, inflammation is apt to occur. The more quickly the organ is replaced, the more favorable the prognosis.

How is inversion to be treated ?

1. The placenta, if adherent, is to be detached.
2. The womb should then be squeezed within the hand, to reduce its bulk, and attempts made to replace the fundus, with the hand grasping it, while the other hand presses downward in the hypogastric region, making counter-pressure.
3. If this fails, endeavor to indent the uterine globe with a knuckle or the finger tips and thus reinvert it. The indentation is said to be best effected at the opening of a Fallopian tube. Pressure should be firmly and patiently continued, and if employed just after the accident rarely fails.
4. After the fundus is replaced the hand should remain within the uterus for some time, or until expelled.
5. Continuous pressure may be made by means of a colpeurynter and elastic bands. This method has been considerably used by German obstetricians.

What is to be done in case of failure ?

If called too late, or if replacement cannot be effected without violence, the fundus should be bathed with somewhat diluted tincture of iodin, to restrain hemorrhage, and allowed to remain inverted for one or two months, or until involution has taken place, when the reposition may be attempted by the method of White.

What is emphysema of the neck ?

During the bearing-down efforts of the second stage, it some-

times happens that a few air vesicles in the lungs are ruptured, and air escapes by way of the mediastinal space to the cellular tissues of the neck and face. It is usually limited to one side, the tissues being swollen and crackling under the fingers. It may cause great alarm, but is innocuous if left alone, subsiding in a few days without any ill consequences.

What ill consequences attend laceration of the mother's tissues?

The only immediate consequences are hemorrhage or septic infection.

The remote consequences may be serious, especially when the perineum or cervix is badly torn.

What is to be done when the cervix is lacerated?

Some authorities recommend that sutures should at once be inserted; but the general practice, if the tear does not extend into the vaginal insertion, is to let it alone. If repaired it will very likely only be torn over again at the birth of the next child. If the laceration be large, it is best repaired after involution has taken place.

What is to be done when the perineum is lacerated?

Most authorities recommend that it should at once be united with sutures, unless of very slight extent.

OBSTETRIC OPERATIONS.

What are the capital operations of midwifery?

1. The induction of premature labor. 2. The use of the forceps. 3. Version. 4. Symphysiotomy. 5. The Cesarean section and modifications. 6. Embryotomy in various forms.

What are the obstetric forceps?

Two separate and similar pieces of steel, each fashioned into a blade and handle, intended to cross each other in the middle and be temporarily united at that point by a lock.

What is the object of the forceps?

1. They are used to seize the child's head and to make *traction* upon it.

2. They are used to aid the *rotation* of the head.
3. They are used to *flex* or *extend* the head, as may be required.

Why is a fenestra or open space made in the blades?

To allow the parietal protuberances to project, thereby permitting the forceps to be applied to the head without at all adding to its bulk.

What curves exist in the blades?

1. The *pelvic* curve, so that they can be applied at any point in the pelvic canal with equal ease.
2. The *head* (or *capital*) curve, by which they are bowed outwardly, so as to enable them to grasp and hold the head.

How many forms of lock are in common use?

The mortise, or English lock; the pivot, or French lock, and the button, or German lock.

How are the blades distinguished and named?

The blade to the left is called the left blade, or, when provided with the pivot or button, is sometimes called the *male* blade.

The blade to the right is called the right blade, or, when provided with a slot, is sometimes called the *female* blade.

When should the forceps be applied?

In any case where the head presents, and where *prompt delivery* is necessary (either for mother or child), or to be regarded as preferable to waiting upon the natural efforts.

May they be applied during the first stage?

There are few circumstances which warrant us in applying them before full dilatation of the os. The necessity for prompt delivery should be very clear, since bruising and laceration of the cervical tissues are almost inevitable.

What preliminaries are requisite to their application?

The consent of the woman being obtained, she should be given an anesthetic. She should be placed upon her back at the edge of the bed, her thighs flexed on the abdomen, and her feet supported on chairs or by an assistant. A vaginal douche of some suitable antiseptic should be given. It is necessary that the bladder and bowels should be empty. The forceps should be placed in a warm

solution of creolin (2 per cent. is best, as it is also a lubricant), or carbolic acid, 5 per cent.

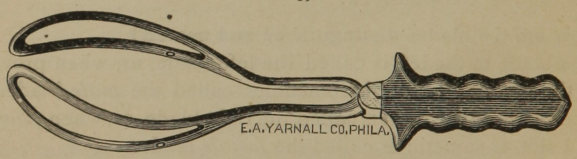
What station should the physician occupy?

Seated upon a chair, directly in front of the vulva, the forceps placed within reach.

How should the forceps be applied to the L. O. A. position at the inlet?

1. The physician should take the left blade in his left hand, holding the handle securely, and having greased both the blade and his right hand, pass the latter into the vagina on the woman's left side high enough to enable him to feel the rim of the os uteri. Two fingers will often suffice, instead of the whole hand.

FIG. 39.



DAVIS FORCEPS—UPPER VIEW.

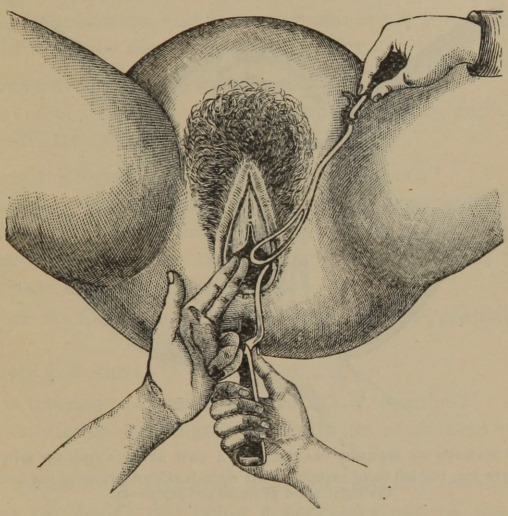
2. Pass the blade along the palmar surface of the right hand or fingers, aiming to place the blade under the left sacro-iliac arch, and, therefore, along the left side of the child's head. This is usually very easy, as there is a free space at that point. Care should be taken to pass it between the cervix and head.
3. When the first blade has been adjusted to the head, its handle should be pressed well against the perineum, so as to keep it out of the way.
4. The right hand is now cleansed and takes up the right blade, which, with the left hand, is anointed, and the fingers of the latter passed into the vagina, to guard the rim of the os uteri.
5. The right blade is then introduced upon the palmar aspect of the fingers, with the view of insinuating it between the child's head and the pelvic walls, behind the obturator foramen, and, therefore, upon the right side of the head.

6. When the second blade is fully introduced, it should lie upon the first blade, with the slot just opposite the pivot, and the handles being now compressed, the instrument is locked and fully applied.

How should the first blade be held at the beginning of introduction?

As the tip of the blade enters the vulva, the handle should be

FIG. 40.



SHOWING THE MANNER OF INSERTING THE BLADES OF THE FORCEPS.

held nearly perpendicular, with the tip above the inner limit of the right groin. The rest of the introduction resembles the passage of the catheter in the male.

How should the second blade be held at the beginning of its introduction?

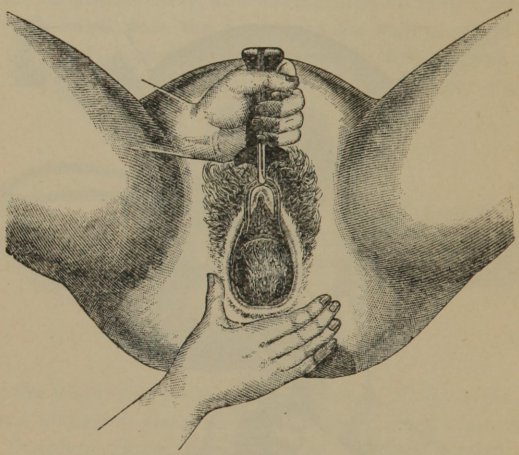
As the tip of the blade enters the vulva, the handle should lie in the line of and almost touching the left groin. The handle is

then brought almost directly to the median line, and the blade pushed onward and upward, as soon as the handle is free from the left leg.

What should be done if the instrument cannot be locked?

The second blade should be withdrawn, and more carefully reapplied. Locking can often be effected by simply pushing the handles well back upon the perineum.

FIG. 41.



SHOWING MANNER OF MAKING TRACTION IN A LOW APPLICATION OF THE FORCEPS. In the above cut, the left hand instead of the right is shown grasping the forceps, while the right hand protects the perineum.

How should the forceps be held in making traction?

The handles should be grasped with the right hand, and gently compressed; the left hand should be placed over the lock, with a finger upon the top of each blade.

How is traction to be made?

1. The left hand presses or pushes the blades downward and backward (and slightly to the right), while the right hand pulls the handles partly in the reverse direction and partly in the line of the handles.

2. As the head descends, the direction of traction is changed, being made in the curve of the obstetric canal at all times.

How long should traction be made?

For about a minute at a time, with an interval of the same or greater length, during which the handles should be partly unlocked, to remove the compression of the forceps from the child's head.

Should traction be made during a labor pain?

The contractions may be disregarded until the head presses upon the perineum, when traction should be made only in the absence of uterine contractions, and if the operator is not sure of his skill, he should withdraw the forceps at this point.

How may the forceps be withdrawn?

By reversing the motion used in applying them, and with the same deliberate ease.

How are the forceps applied at the inferior strait?

The head having rotated, the blades will be on opposite sides of the pelvis, when on the sides of the head. Therefore, both blades are passed in the same manner, and nearly as the first blade is passed in the high operation.

How are the forceps to be applied to an R. O. P. position at the inlet?

Precisely as in the L. O. A. position.

How is traction to be made in the R. O. P. position?

1. The handles should be grasped firmly, so as to hold the head securely while—
2. The handles are elevated, with scarcely any traction, so as to *flex the head;* this being a necessary part of the natural mechanism.
3. Traction should then be made in the axis of the canal, and with as *little compression* as possible, in order not to interfere with rotation.
4. If the twisting of the handles shows a tendency to rotate, this may be aided; but rotation should not be forced.

How are the forceps to be applied in the R. O. A. and L. O. P. positions?

The position of the head being the reverse of the L. O. A. and

R. O. P. positions, the right side of the head is behind and at a distance, the left side in front, and near. Therefore, the right blade is first applied, under the right sacro-iliac arch, and in the same way as the first blade in the other position. The left blade is then introduced in a manner corresponding to the second blade, in the L. O. A.

What difficulty is then encountered?

The shank of the left blade will lie *over* the right blade, and the instrument cannot be locked.

How is this to be remedied?

Take hold of the handles separately, and bring each handle to the median line and beyond, until the handle of the right blade can be lifted over that of the left blade. They will then be in position for locking.

How are the forceps to be applied on the face presentation?

In the first and third positions, precisely as in the vertex, first and third. In the second and fourth positions, precisely as in the vertex, second and fourth.

May the forceps be used on any part but the head?

They have been used upon the breech, but are of doubtful utility as compared with other procedures, and not free from danger when so applied. The objections do not, however, apply to the *axis traction* forceps.

How are forceps applied in head-last labors?

If rotation has taken place, they should be applied to the side of the face, beneath the child's body. When the chin is in front, pass the forceps under the child's back and raise the handles. In extraction, when the head is flexed, the child's back should be carried toward the mother's back.

How should the forceps be applied when the chin is posterior?

In this case they should be passed under the abdomen, and the handles raised as before. In extraction, the body of the child is raised, its back directed toward the mother's abdomen.

What are the dangers of forceps delivery?

Principally, dangerous laceration of the maternal soft parts, increasing the danger of sepsis by presenting a large absorbing sur-

face; increased shock. Considerable injury to the pelvic bones can be done. In the child harm may result from pressure on the skull; many cases of impaired mental condition may be traced to this source.

What are the indications for the use of the forceps?

1. For *delay* in the second stage of labor, arising from (*a*) uterine inertia; (*b*) any obstruction or disproportion.
2. For delay in the first stage, rarely, as in (*a*) placenta previa; (*b*) organic rigidity; (*c*) absence of natural dilating agents.
3. For rapid delivery, when required, by such complications as (*a*) convulsions; (*b*) prolapse of the funis; (*c*) excessive uterine action menacing rupture.
4. For secondary purposes, as for (*a*) extraction of the child in the Cesarean section; (*b*) after rupture of the uterus; (*c*) for removal of tumors or foreign bodies from the maternal passages.

What is the principal circumstance demanding their use?

Uterine inertia, or insufficiency of the uterine contractions to complete the labor.

How long should the second stage be allowed to continue before resorting to the forceps?

Rarely over one or two hours. It is irrational to subject the woman to long-continued pain and effort when we can harmlessly deliver by art.

What alternatives do we possess to the use of the forceps?

Version and embryotomy—

1. If prompt delivery is indicated in any case, and we do not possess the forceps or the skill to use them, we may employ version.
2. If the forceps fail to extract the child, or the pelvis is so deformed as to render their use impracticable, we may perform version (according to some authorities) or resort to embryotomy.
3. The last generation of physicians used a substitute, the *vectis*, which is simply a single blade of the forceps. It was used to slip over the head to flex it, or by alternately pressing on one side and the other to make traction. It can do nothing which cannot be better done by the forceps.

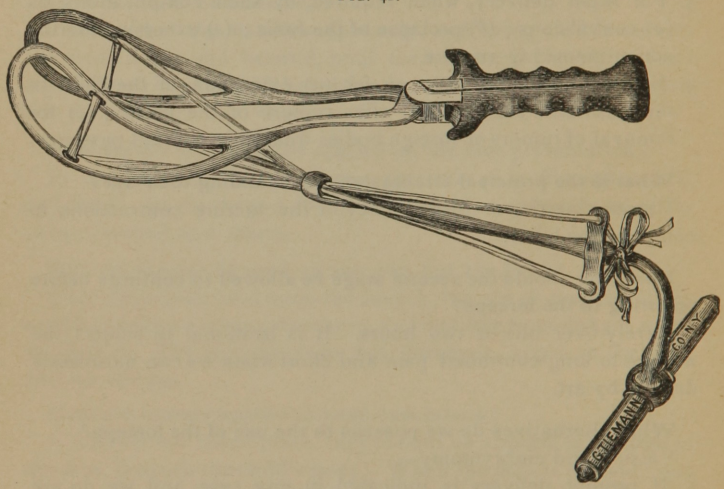
What is axis traction?

When the forceps are applied to the head high up, at the pelvic brim, it will be found that traction made in the usual way will have no effect, but must be made in another direction, *i. e.*, in the axis of the birth canal; that is, downward and backward, upward and forward, as the woman lies in bed.

What is necessary to make this form of traction?

A pulling power must be applied to the blades in such a way

FIG. 42.



SIMPSON FORCEPS WITH POULET TAPES AND AXIS-TRACTION HANDLES.

that traction can be made on them directly in a downward and backward direction; this is nearly at right angles with that exercised normally by the handles, which is upward and forward.

When and for what uses do we apply axis traction?

In cases when the woman's strength fails, the child is large, or a slight degree of pelvic contraction exists, when the head is at or above the pelvic brim, before rotation has occurred, axis traction properly applied aids rotation and tends to flex the head.

How should the blades be applied?

In the same manner as the low application, except that the blades are applied in the oblique diameters so as to grasp the side of the fetal head. The forceps and head may be allowed to rotate together, traction being made only by means of the traction bar or tapes, the handles being simply raised. As soon as the pelvic floor is reached, the traction can be made upward and forward with the handles. No traction must be made by the handles before this time.

VERSION.

What is version?

The operation by which the *presentation* of the child is changed called, also, turning.

How many kinds of version are there?

1. As regards the *choice* of presentation there are two—
   (*a*) *cephalic*, in which the head is made to present, and,
   (*b*) *podalic*, in which the breech is made to present.
2. As regards the *mode* by which it is effected, we have three—
   (*a*) *internal*, in which the hand is passed into the womb to effect the change;
   (*b*) *external*, in which the change is effected by manipulation through the abdominal walls only, and
   (*c*) *bipolar*, in which one hand upon the abdomen and two fingers (or more) internally are used.

What are the indications for version?

1. To convert a transverse presentation into one of the vertex or breech.
2. When rapid delivery is required, and the use of the forceps is not feasible, podalic version is indicated.
3. According to some authorities, to render delivery easier in deformed pelves.

How is internal version performed?

1. The patient lying on her back with hips at the edge of the bed, the hand is cautiously passed into the uterus until a foot is reached and seized. As this foot is pulled down, the child is turned until the breech presents. While this is being done, the

other hand makes counter pressure externally upon the fundus. According to some, version will be easier if we seize the foot which is furthest from us. 2. The head may be seized and brought down in some cases.

What cautions are necessary?

1. To introduce the hand slowly and gently, lest the womb be lacerated. Anesthesia is generally of service in promoting uterine relaxation.
2. Not to mistake a hand for a foot.

What posture assists in version?

When a transverse presentation is impacted, the woman may be placed in the knee-chest posture, which will aid in introducing the hand.

How is external version performed?

1. By careful palpation we ascertain the exact position of the head and breech.
2. One hand placed over the head (on the abdomen) and the other over the breech, push the head and breech in opposite directions until one or the other is brought into the pelvic inlet. This is rarely practicable after the liquor amnii is evacuated.

How is bipolar version effected?

1. One hand is introduced into the vagina, and two fingers made to press against the presenting part.
2. The other hand is applied on the abdomen and pressed against the head or breech of the child, while the fingers of the other hand press the presenting part upward and to one side or the other. The hand introduced into the vagina should be the same in name as the side of the pelvis toward which the fetal feet are directed. As soon as the presenting part is brought down, the membranes should be ruptured while a uterine contraction is in progress. The strictest asepsis must be used. This is also known as Braxton Hicks' bipolar method. This method should always be tried before internal version is resorted to.

Under what circumstances is version easy or difficult?

1. When there is much liquor amnii, and the uterus is uncontracted, it is easy of performance.

2. When the liquor amnii has drained away for some hours, when the womb is tonically or tetanically contracted, and when the child has been dead long enough for post-mortem rigidity to supervene, it is difficult and sometimes impossible.

When version fails in a transverse presentation, what alternative operation have we?

Embryotomy.

EMBRYOTOMY.

What is embryotomy?

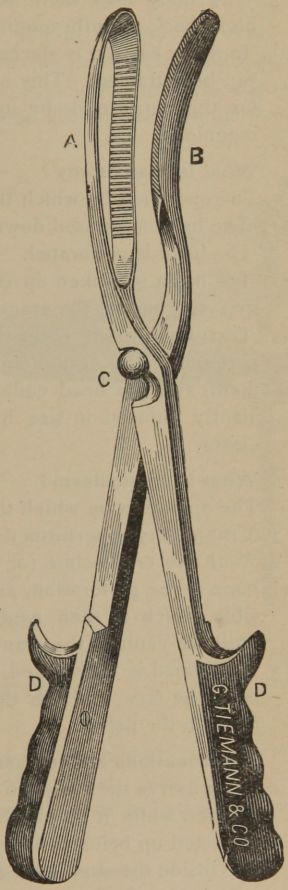
The operation by which the size of the child is reduced by cutting and mutilation. It is now restricted to mutilation of the body; when applied to the head it is called craniotomy.

What are the steps in performing embryotomy on the transverse presentation?

The patient having been put under an anesthetic, and a vaginal douche of 1 : 5000 solution of bichlorid of mercury or other efficient antiseptic—

1. An assistant places his hands on the abdomen and presses the child downward, so as to steady it.
2. A perforator is introduced into the vagina, and made to perforate the chest, and to divide several ribs. Care should be taken to guard the sharp edges of the perforator with two fingers, while introducing and using it.

FIG. 43.



SIMPSON'S CRANIOCLAST.

3. A blunt hook, crotchet, or other instrument, is introduced into

the chest through the perforation, and the viscera broken up and removed piecemeal. This is called evisceration.

4. The body may then be doubled up and drawn down by a blunt hook or embryotomy forceps.
5. In a few cases it is necessary to decapitate the child before it can be extracted. This may be done by instruments invented for the purpose, or by improvised methods, if the operator is ingenious.

What is craniotomy?

The operation by which the head is lessened in size.

1. The head is pressed down and steadied by an assistant.
2. The head is perforated.
3. The brain is broken up completely, and if necessary removed by syringing out the cranial cavity.
4. Traction is made upon the head by a finger hooked into the perforation, by craniotomy forceps, or by any suitable instrument, and the head collapses and is drawn out. If not sufficiently reduced in size by these steps, we proceed to cranioclasm.

What is cranioclasm?

The operation by which the vault of the cranium is removed.

1. Craniotomy is performed as above.
2. With the cranioclast (or craniotomy forceps) seize an edge of bone at the perforation, and wrench off as large a piece as possible, which is then cautiously withdrawn. This is repeated until the vault of the cranium is removed.
3. The head is then tilted, so that the craniotomy forceps can seize the face, and the thin base of the skull is drawn down through the pelvis.

What cautions are necessary?

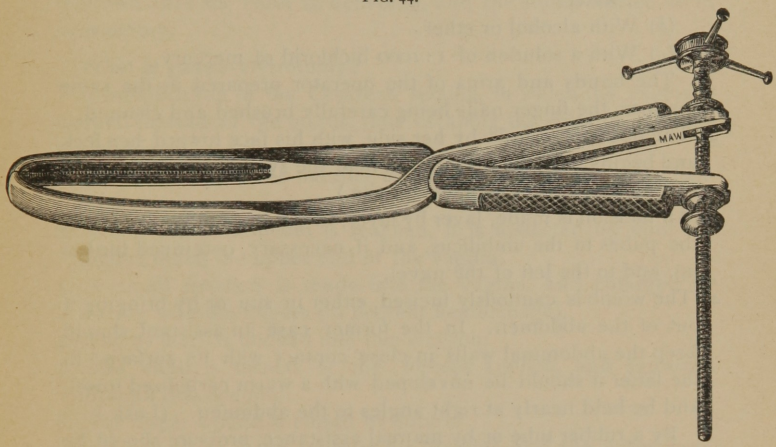
1. To preserve the scalp, so that the sharp edges of bone may be covered while it is withdrawn. Therefore, the scalp is to be dissected up before using the cranioclast, and its blades placed, one inside the skull, and the other between the scalp and outside of the skull.
2. To guard the edges of fragments of bone with two fingers while withdrawing them.

3. To preserve the most strict aseptic cleanliness.

If even the base of the skull is too large to pass, what alternative have we?

Cephalotripsy, in which a powerful pair of forceps (the cephalotribe) is applied, and made to crush the base. Cephalotripsy may also be used before resorting to cranioclasm, but perforation of the cranium should always precede the application of the cephalotribe.

FIG. 44.



HICKS' CEPHALOTRIBE.

CESAREAN SECTION.

What is the Cesarean section?

Gastro-hysterotomy, or the removal of the child through an incision made in the abdominal walls and uterus. It is sometimes incorrectly applied to simple gastrotomy (laparotomy) after rupture of the uterus.

What are the indications for the Cesarean section?

1. A pelvis contracted to two inches in the conjugate, or obstructed by tumors, or other insurmountable obstacles to delivery by the natural way.

2. For the rapid delivery of a supposed living child after the death of the mother. Children have been saved when the mother had been dead for more than an hour.

What are the steps in the Cesarean section?

1. The woman is prepared by anesthesia and the emptying of the bladder.

   The abdomen must be prepared as follows:—

   (*a*) Wash the field of operation thoroughly with soap and water.

   (*b*) With alcohol or ether.

   (*c*) With a solution of 1 : 1000 bichlorid of mercury.

   The hands and arms of the operator prepared in the same manner, the finger nails being carefully brushed and cleaned.

2. The operator stands by her side, with his face toward her feet, and begins to make his incision near the symphysis. (To avoid cutting early into the placental site.)
3. An incision is made, layer by layer, in the linea alba, from near the pubes to the umbilicus, and if necessary, continued further up, and to the left of the navel.
4. The womb is cautiously incised, either in situ or by bringing it out of the abdomen. In the former case an assistant should keep the abdominal walls in close contact with its surface; in the latter it should be enveloped with a warm carbolized towel, and be held nearly at right angles to the abdomen. (Lusk.)

   By a rubber tube or by manual assistance, pressure should be made on the lower segment, to prevent hemorrhage.

5. The child's feet are grasped, or the head seized by forceps, and the child extracted.
6. The after-birth is delivered.
7. The uterine incision is closed by one or two sets of sutures of wire, silk, or catgut. Lusk advises a stronger one of wire, silk or catgut for the muscular structures, and a fine one of silk or catgut for the peritoneal borders.
8. The abdominal cavity is carefully cleansed of all blood and fluids by warm distilled or well boiled water.
9. The abdominal incision is closed by suture.
10. The operation and subsequent treatment should be conducted with strict antiseptic precautions.

What instruments are required for a Cesarean section?

Two scalpels, curved needles and a needle holder, half a dozen hemostatic forceps, a pair of blunt-pointed scissors, a powder blower, a large fountain syringe or glass irrigator, bichlorid gauze for gauze sponges, or natural sponge carefully made aseptic, plenty of boiled water, and aseptic towels.

What is Porro's method?

A modification of the Cesarean section, in which the uterus is removed after the child is delivered, and the stump treated as in ovariotomy.

What is gastro-elytrotomy?

A modification of the Cesarean section, in which the vagina is opened instead of the uterus, thus escaping the risks of opening the abdomen.

1. An incision is made parallel to and just above Poupart's ligament.
2. When the peritoneum is reached, it is dissected up until the fingers reach the upper end of the vagina.
3. A small incision is made into the vagina, and enlarged by tearing with the fingers (to prevent hemorrhage).
4. The os uteri is hooked into this incision.
5. The child is turned, or the forceps applied, and extracted through this opening.
6. The upper wound is closed by suture.

It is difficult to avoid injuring the bladder, and the entire operation demands great skill.

What is symphysiotomy?

A cutting, partially or completely, through the pubic joint in order to facilitate delivery by increasing the size of the pelvic cavity.

When is the operation indicated?

According to most authorities, symphysiotomy is indicated in cases of contracted pelves when the true conjugate is as low as 2¾ inches to 3½ inches. Below 2¾ inches the operation is difficult. Many operators believe that forceps and version should be tried before resorting to symphysiotomy. The operation has also been used in cases in which the birth has been hindered by tumors, etc.

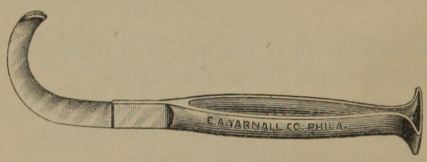
When is Cesarean section preferable to symphysiotomy?

In cases where the conjugata vera is below 2¾ inches. Garrigues recommends that symphysiotomy should be done in cases where the diagonal conjugate is decreased to 3¼ to 3¾ inches (80 to 90 millimeters).

What is the amount of space gained by section of the pubic joint?

The amount of increase is principally in the transverse diameter, although there is some enlargement of the obliques and antero-posterior diameters. The gain in space, is 2 millimeters ($\frac{2}{25}$ of an inch) for every centimeter ($\frac{2}{5}$ of an inch) of separation of the divided ends of the pubic joint. With a separation of 6–7 centimeters (2¾ inches), the increase is about 14 millimeters or ½ an inch.

FIG. 45.



GALBIATI'S FALCETTA.

How far can the pubic joint be safely separated?

Not more than 2¾ inches (Garrigues). A greater separation than this endangers the sacro-iliac joint.

How is the operation done?

A symphysiotomy is best begun at the time of complete dilatation. The patient lying on her back with thighs flexed on abdomen and under the influence of an anesthetic, the pubic region should be shaved, and washed with soap and water, alcohol and bichlorid of mercury 1 : 2000. An incision 3 or 4 inches long should be made, beginning at the upper end of the symphysis and ending at the root of the clitoris. The subcutaneous tissue should be cut through, bleeding being checked by pads of iodoform gauze, unless severe, when the wounded arteries must be found and ligated. A metal catheter should now be inserted into the blad-

der and the urethra drawn strongly to the right; the bladder must be empty. The symphysis having been uncovered, a probe-pointed bistoury, or, better, the Galbiati symphysiotomy knife (falcetta) is introduced, guarded by the left index finger, with its edge against the posterior surface of the symphysis. The joint is severed by passing the knife in a direction from behind, forward, and upward. Should the joint be ossified, a chain saw will be found of use. An assistant should now make moderate pressure on each trochanter, to prevent injury of the sacro-iliac joints. As to the delivery of the child, authors are divided, many believing that forceps should be used until the head reaches the pelvic floor, when the actual birth should be left to nature. Delivery of the placenta should be accomplished as speedily as possible. If the child be asphyxiated, it should be treated in the usual way (see asphyxia). Firm pressure should now be made on the trochanters, thus bringing the severed ends of the joint together; care should be taken, while this is being done, to hold the bladder and urethra, so that they will not be caught between the ends of bone. Sutures of silver wire, silk, or silk-worm gut should be inserted through the cartilage, or, as some recommend, through the fibrous tissue in front of the bone; one or two stitches of silk or catgut are enough to close the wound. Drainage may or may not be used. After the operation a copious vaginal douche of some antiseptic fluid should be given, the field of operation being dusted over with iodoform powder and covered with an aseptic dressing. A firm bandage should be placed around the hips and should be removed as seldom as possible. It is best that the patient lie with legs outstretched, and on her back.

What is the after-treatment of symphysiotomy?

The same as in any other obstetrical case in which an operation has been done. The strictest asepsis must be maintained; the bowels should be opened every day and the urine withdrawn every six hours by means of a catheter. A light and nutritious diet should be given her.

What is the prognosis of symphysiotomy?

As to the mortality of symphysiotomy authors differ; but in summing up the results of a number of operators, the maternal

death-rate will range from 4.1 per cent. to 7.5 per cent.; the fetal from 16.5 per cent. to 24.6 per cent.

What is ischio-pubiotomy?

It consists of severing the horizontal ramus of the pubes from the symphysis. It is said to have been used with success in cases of obliquely contracted pelves.

INDUCTION OF LABOR.

What is the induction of premature labor?

The operation by which labor is brought on at any time before full term.

What are the indications for its performance?

1. In deformed pelves, a child may be delivered alive if labor is induced at seven or eight months of pregnancy, which would have to be sacrificed by craniotomy, if allowed to develop until full term.
2. If the mother's life is endangered by vomiting, convulsions, or other causes, the operation is sometimes performed.

How is the operation conducted?

(Barnes' method.) 1. Pass an elastic bougie six or seven inches into the uterus; coil up the remainder of the instrument in the vagina, to keep it in place. Do this in the evening.

2. Next morning proceed to dilate the cervix by Barnes' (or Molesworth's) dilators, until it will admit several fingers.
3. Rupture the membranes and reapply the dilator.
4. Allow the natural efforts to complete delivery, or use the forceps or version.
5. (Thomas'.) Pack the *child* in cotton or wool as soon as born, and maintain a suitable temperature by artificial heat, applied in various ways.

THE PERIOD AFTER DELIVERY.

What is the period after delivery called?

The *lying in* period, the *puerperal state*, or the *period of involution*, because after labor the uterus undergoes the process of involution.

What is involution?

The process by which the womb returns to its original size and condition. The tissues of the womb undergo a form of fatty degeneration. As the products of this change are partly absorbed and partly transuded and discharged from the body, the structure of the uterus becomes condensed until it has become nearly of the same size and condition as before pregnancy. The same change takes place in all the structures (ligaments, etc.) enlarged by pregnancy.

How long a time is required for this process?

By the tenth day the womb is so diminished as to be entirely within the pelvis, and the fundus is not to be felt above the inlet. After this, involution continues at a slower rate, being completed in about twelve weeks.

What irregularities are met with?

1. *Sub-involution;* it may be protracted by inflammation or other concurrent disease, and remain enlarged permanently, or for a long time.
2. *Super-involution;* it may be rapid and excessive, leading to atrophy of the womb; but this is very rare.

What outward or clinical manifestation of involution exists?

The lochia (plural), or lochial flow; or, popularly, the flow, or cleansings.

What are the lochia?

The "flow" is the discharge from the uterus and vagina which occurs after labor, and, to some extent, until the womb is completely involuted.

What are its properties?

It is a rather thick albuminous fluid, containing oil globules, epithelial cells, blood corpuscles, and granular débris from the uterus. During the first day after labor it is of a *red* color, from the presence of blood in excess (or it may be blood alone immediately after labor). This may continue for several days, especially if any clots have been retained in the uterus, after which it becomes straw-colored, and finally clear and colorless. In health it has no odor, or nearly none.

What is the nature of the lochial fluid?

It is an excrementitious product, and readily decomposes at the temperature of the body or a little higher.

What is the amount of the lochia?

At first it varies from one-half ounce to several ounces per diem. It is gradually diminished, and after the tenth day is usually scarcely perceptible, being little more than the natural secretion of the parts. In some women it is very scanty and ceases after a few hours or a day or two, while in others it may continue for weeks.

What is the normal condition as to health after labor?

The majority of women feel in good health, being only a little tired and sore, and in a few days feel competent to arise and resume their avocations.

Should they be permitted to do so?

No. Rest and quiet are essential, to guard against the dangers incident to this period.

How long should the woman be kept in bed and at rest?

Until the womb has retreated within the pelvis, and not allowed to work until involution is complete. Before this, the womb is enlarged and softened, and is subject to displacements and flexions.

What physical peculiarities are noted in this period?

1. The pulse becomes slow, falling to 60 beats per minute, or less.
2. The temperature is elevated from .5° to 1° Fahr.
3. The skin is more active and perspiration more free.
4. The urine is increased in amount, in specific gravity, and urates.
5. The bowels are constipated.
6. The breasts secrete milk.

What general care should be given a patient during the puerperal state?

The woman should, as far as possible, be kept from disturbing influences. On the second or third day, if the bowels have not been moved, the patient should be given some gentle laxative, such as castor oil, Hunyadi water, sulphate of magnesia, etc. Care should be taken of the breasts. Great care should be exercised by both physician and nurse to keep the patient clean. Although, according to many authorities, antiseptic douches are not required during

the normal puerperal period, the external genitals should be washed carefully with corrosive sublimate 1 : 5000, and kept covered with an aseptic pad and bandage. Should, however, the patient be infected with any form of specific disease, or endometritis before labor, or should any rise of temperature take place accompanied by a disagreeable odor to the lochia, injections of any of the usual antiseptics are required at least four times in the 24 hours, and the bowels freely opened.

How should a puerperal woman be fed?

During the first 24 hours a light diet of broth, milk toast, milk or other easily digested articles. It is well to feed the patient once in every four to six hours. From the third day the limit of diet can be enlarged; all pastry and indigestible articles, however, must be prohibited. During the period of lactation her diet should be directed in such a way as to produce as much milk as possible, and at the same time nourish the mother.

How soon after labor is milk secreted?

To a slight extent during pregnancy, and some is to be found in the breasts just after labor. But the secretion is not fully established for from thirty-six to seventy-two hours, beginning suddenly in some and gradually in others.

What is the nature of milk?

It is an emulsion of oil globules in an albuminous fluid, containing salts in solution. When of good quality it is rather thick (a drop adhering to the finger nail when inverted), of a bluish tinge and sweetish taste. The milk found in the breasts just after labor differs from the subsequent secretion, in being richer in fatty matters and slightly purgative to the child. It is called colostrum.

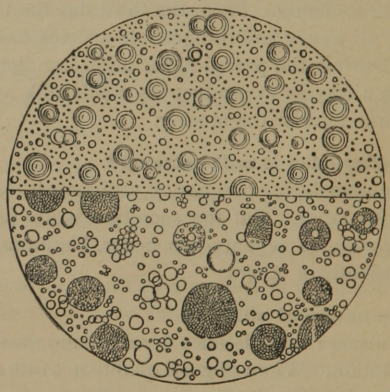
What is weid, or milk fever?

An irritative fever, lasting from several hours to one or two days, and occurring in women in whom the secretion of milk is suddenly established. It is due to reflex irritation, from the sudden development of secretory changes in the breasts. Clinically, it is distinguished by a sudden rise in temperature, preceded by a slight rigor and followed by free diaphoresis, and cannot be distinguished from an attack of intermittent fever, except by its non-recurrence.

What rules should be observed concerning lactation?

1. During the first month the baby should nurse REGULARLY, every two hours during the day and once or twice at night; during the next month the intervals may be lengthened to three hours, and afterward to four hours. Observance of this rule will save much trouble.
2. The nipple should be clean, drawn out and erect, when offered to the child, especially at first.
3. After nursing, the nipple should be washed, dried, and anointed with cocoa butter or other unguent.

FIG. 46.



APPEARANCE OF MILK UNDER THE MICROSCOPE.

Above transverse line can be seen the fat globules of the milk, below, the colostrum corpuscles.

4. If the breasts are large and pendulous, they should be supported by a bandage whenever the woman is in the upright posture.

What attention does the urine require after labor?

Retention is apt to occur after long labors, from temporary paralysis of the bladder and urethra, from pressure. The catheter should then be passed, within twelve to twenty-four hours after labor, and, if necessary, twice daily thereafter, until recovery. Hot cloths are also useful when the retention is due to local swelling and spasm.

How should the catheter be passed in the female?

1. Place the woman on her back, with the knees drawn up.
2. Introduce the finger into the vagina, passing it from below, upward, over the perineum and posterior commissure into the vulva.
3. Partially withdraw the finger, pressing slightly on the anterior wall until its tip arrives at the orifice of the vagina.
4. With the other hand pass the catheter along the finger to the tip, immediately above which is the meatus.

If this fails, the meatus must be sought for by the tip of the finger, which is to be depressed as soon as the catheter arrives at the vestibule.

Do not try to pass the catheter by the sense of touch alone, if not promptly successful, but remove the bedclothes, and *look* for the meatus.

What attentions do the bowels require after labor?

Owing to the constipation, it is usually necessary to give a purgative on the third or fourth day after labor. This will not be needed if the bowels move spontaneously, and if there seems to be a slight inclination to a movement, an enema will be preferable.

What rectal difficulty is common at this time?

Hemorrhoids. These should be carefully replaced if extruded, after labor, and during convalescence an attempt may be made to cure them by medication (Barker's pills).

What diseases are especially liable to occur in this period?

The lying-in woman is liable to septicemia, peritonitis, and pelvic inflammations, thrombosis, phlebitis, pyemia, and mastitis.

What is puerperal septicemia?

1. A fever produced by the absorption of septic matter into the system (Playfair).
2. It may occur in a severe and acute form, or in a mild and subacute form.
3. It is often associated with inflammations, by which its course is greatly modified.
4. The various conditions resulting from the union of septicemia and inflammations are grouped by some under the name of puerperal fever.

What are the causes of septicemia?

1. Puerperal septicemia is believed to be due to a specific microbe, which enters the body through a traumatic surface.
2. The poison is contagious, and, under favorable circumstances, multiplies with great rapidity in the body.
3. It is heterogenetic, never autogenetic, and may be conveyed to the abraded surface either by—
   (*a*) the atmosphere;
   (*b*) towels or sponges which have been used in other cases or to cleanse suppurating wounds, and have not been antisepticized;
   (*c*) the doctor or nurse, who has been attending patients with septicemia, suppurating wounds, erysipelas, diphtheria, or other zymotic diseases.
4. The poison can only enter through an abraded surface.
5. The retention and decomposition of fragments of the placenta or membranes, clots in the uterus or retained lochia, will not produce the disease, but will favor its development by forming a suitable nidus for the microörganisms on which the disease depends.

What are the symptoms and course of acute septicemia?

1. Slight chilliness; no rigor, unless complicated by inflammation.
2. High fever, usually developed rapidly. { Temperature 103° to 109° F. Pulse 120 to 150.
3. The pain varies much with the seat of the maximum of inflammation; when this is near the peritoneum it is most intense, in other cases it may vary from a slight tenderness in the hypogastrium to scarcely any pain at all.
4. Suppression of the lochia or a fetid discharge in some cases.
5. Mind usually unimpaired, and the patient either cheerful or indifferent.
6. Face anxious.
7. The typhoid state usually precedes a fatal termination, which occurs within a week, unless recovery takes place.

What are the symptoms of chronic septicemia?

1. The patient remains weak, and has little appetite.

2. The tongue is pale and flabby, and lightly coated, if at all.
3. Slight fever, of intermittent type, is present.
4. The urine is high-colored, and constipation exists.

How is septicemia influenced by peritonitis and other inflammations?

1. The symptoms of peritonitis, and other inflammations (metritis, cellulitis, etc.), are but little different in the puerperal period and at other times, and in all, except peritonitis, a mere mixture of symptoms is present when occurring with septicemia.
2. In peritonitis with septicemia, the septic symptoms predominate, and a remarkable difference between the pulse and temperature rate is observed.

The pulse is frequent, 120 to 150, while the temperature is *slightly* elevated, or even *subnormal.*

The abdomen is tympanitic, yet the patient complains little of pain.

What are the indications for treatment in acute septicemia?

1. Antiseptic injections. These should be made into the uterus, and any retained fragments of placenta, etc., removed by means of a curet.
2. Whisky administered with a free hand.
3. The salicylate of soda or potassa, and quinine, are also useful in full doses.
4. The bowels should be thoroughly opened by calomel, grs. ij to v, with soda bicarb., followed by a saline or enema.

How are antiseptic injections to be given?

1. The material to be injected may be (*a*) a two per cent. solution of carbolic acid; (*b*) tinct. iodin one-fourth, to water three-fourths; (*c*) corrosive sublimate one part to 3000 or 5000 of water, or (*d*) solution of creolin, two per cent. Corrosive sublimate is generally considered dangerous for intra-uterine application, as symptoms of poisoning have resulted from its use. Each of these has its advocates, and there are others less used.
2. A tube attached to a fountain syringe is to be carried into the uterus. (A flexible catheter without its stylet will do very well.)
3. The fluid is then to be injected without force, and care taken that the os uteri is kept open, so that fluid can get out as rapidly

as it gets in. According to many authorities one copious intra-uterine douche is enough; future injections, which should be given four times or more in twenty-four hours, should be confined to the vagina and external genitals. These injections should be at a temperature of 80 to 100° F.

4. Continue the stream until it comes away clear. All injured surfaces should be dusted with iodoform powder or washed with hydrogen peroxid.

What are the indications for treatment in chronic septicemia?

1. Antiseptic injections, if there is any reason to suspect the retention of putrescible materials in the uterus.
2. To improve the action of the excretory apparatus by such agents as calomel, ipecac, and saline laxatives.
3. The salicylates or quinine, in small doses; the main dependence is to be placed on alcohol.

What are the indications for treatment in inflammations, complicated with septicemia?

The septicemia is to be regarded as the chief trouble, and the inflammation combated as a secondary matter.

What is uterine thrombosis?

The formation of clots in the uterine sinuses, due to imperfect contraction of the womb after delivery.

What results may follow from thrombosis?

1. Detachment of fragments, and formation of emboli in other structures, as in the lungs, brain, etc., leading to inflammations in the obstructed organs and metastatic abscesses.
2. Purulent liquefaction of the thrombus and subsequent escape of pus into the circulation, causing pyemia.
3. Extension of the thrombus into consecutive veins, causing phlebitis.

What is phlegmasia alba dolens?

Also called "milk leg," is an inflammation of the cellular tissue of the thigh and leg, usually associated with femoral or crural phlebitis. Thrombosis of the vein may precede or coexist, but is not always present.

What are the symptoms of "milk-leg"?

It begins usually in the second week with—

1. Irregular chilliness and malaise for several days.
2. Pain in the leg and abdomen, of a dragging character.
3. A distinct rigor, and swelling of the leg.
4. Fever of a remittent type, changing to intermittent as recovery advances, or becoming continuous in grave cases.

What peculiarities attend the swelling?

1. The skin is white and tense.
2. A red streak marks the line of the vein when phlebitis is present.
3. Later, the vein feels like a hard cord when palpated.

What are the results of "milk-leg"?

1. It may end in complete resolution.
2. An abscess is formed along the vein, and discharges.
3. Gangrene and septicemia may be developed.
4. If thrombosis is present, emboli and pyemia may occur.

In all cases recovery is slow, and the leg is apt to remain weak and become edematous, from permanent obstruction of the vein.

What is the treatment indicated in "milk-leg"?

1. To control inflammation.
2. To relieve pain.
3. To support the patient's strength.

The first can be best effected by the use of atropia, in a one per cent. solution, applied to the parts with a cloth, or by belladonna ointment. Warm fomentations are also useful, and a lotion of lead water and laudanum, applied warm, is also useful in relieving pain. Anodynes may be given as needed. Absolute rest is essential. If an abscess forms it may be evacuated, and applications of tinct. iodinii are useful in promoting resolution.

What is mastitis?

Inflammation of the breast. It is divided into: 1. Glandular, 2. Interstitial, and 3. Sub-glandular. In the first the lobules of the gland are inflamed. In the second the connective tissue is inflamed. In the third the connective tissue beneath the gland is involved.

What are the symptoms of mastitis?

1. In interstitial and sub-glandular mastitis, the symptoms are those of abscess in the cellular tissue anywhere; slight constitutional disturbance, except in large sub-glandular abscess, and the pain is *not increased* by suckling the child.
2. In glandular mastitis there is a rigor and high fever, preceded by a hard lump in the breast, and suckling causes severe pain.

What is the treatment of mastitis?

1. When the connective tissue is involved suppuration is almost inevitable, and is to be treated on general surgical principles, poultices, early incision and antiseptic treatment being usually indicated.
2. In glandular mastitis various measures have been employed; massage or stroking, rubbing and kneading the breast; endeavoring to empty engorged milk sinuses, and to remedy the blood stasis. An ice-bag is strongly recommended; also, compression by strapping with adhesive plaster, or with a plaster-of-Paris dressing. To directly affect the blood supply and functional activity of the gland, belladonna is used, internally and externally. The sulphid of calcium internally, and iodid of lead externally are used, and many other remedies have advocates.

In all cases the breast should be suspended in a sling. When incisions are necessary, they should be made in a line radiating from the nipple, to avoid severing milk ducts, the abscess cavity should be washed out thoroughly with an antiseptic solution and dressed antiseptically, and quinine should be given with a good diet, and stimulants if necessary.

What are the chief causes of mastitis?

Cold, obstruction of milk ducts, septicemia and sore nipples.

What affections of the nipple are met with?

The nipples may be simply tender, or inflamed, with resulting abrasions, excoriations and fissures. The inflammation may be simple, aphthous, or eczematous.

How are sore nipples to be treated?

1. Stop suckling, and have the milk removed by a pump or massage.

2. Apply astringent remedies, or such as act by excluding the air—the best applications are tannin and glycerin, compound tincture of benzoin, collodion—or wash the nipple with a saturated solution of sodium biborate and water and apply aristol ʒij, in cocoa butter ℥j, three or four times a day. All treatment is, however, uncertain if the child is allowed to nurse while the nipple is sore.

What are agalactia and galactorrhea?

1. Agalactia is a suppression or greatly diminished flow of milk. The secretion of milk may be augmented by the free use of fluids, especially milk, and by persisting in applying the child to the breast. Attention to the general health is important.
2. Galactorrhea is an excessive secretion of milk. This may be remedied by the use of coffee and belladonna, and by a diet consisting of very little liquid and more solid food. The name is sometimes used to denote incontinence of milk from want of muscular tone in the nipples. This is to be treated with astringents.

What are the principal congenital defects in the child which require attention?

Hare-lip; imperforate anus or urethra; spina bifida; club-foot; cephalhematoma; patulous foramen ovale.

What general rules are applicable to these affections?

1. Hare-lip is to be operated on at once, if it interferes with suckling; otherwise we may wait a few months, until the child is stronger.
2. Imperforate anus and urethra are to be operated on at once.
3. The treatment of other malformations should be begun as soon as practicable.

What is a patulous foramen ovale?

A failure of the foramen in the auricular septum to close after birth. Hence the blood is diverted from the lungs. The child is subject to spells of partial asphyxia (rarely continuous) and the face becomes dusky or livid; hence the name a "blue child."

What is to be done?

Treatment by posture; the child is to be kept on its *right* side,

that the action of gravitation may hinder the escape of the blood through the foramen.

What is spina bifida?

It is a tumor situated usually in the sacral region, although it may occur in any part of the spine. It contains cerebro-spinal fluid which is covered in the same manner as the rest of the spinal cord. The disease is caused by a non-development of the vertebral arches. It is usually associated with hydrocephalus. Most cases prove fatal.

What is cephalhematoma?

The term is applied to an extravasation of blood either externally, between the cranial periosteum and the bone, or internally between the dura mater and the interior of the skull. It may appear on any of the cranial bones, but is most common in the parietal region. It never passes a suture.

Symptoms.—When first appearing, the tumor is tense and resisting, presenting somewhat the appearance of a caput succedaneum; in a few days, however, the borders become harder than the rest of the swelling, and soon become as hard as bone, which in fact they are. A slight internal cephalhematoma is frequently found at the same time. The latter, in some cases where much blood is extravasated, is an extremely dangerous complication.

Cause.—In many cases somewhat obscure, as it frequently appears upon parts of the head not pressed on during labor. The *immediate* cause is small subperiosteal hemorrhages due to the extremely fragile vessels, the great mobility of the periosteum accompanied by a somewhat hyperemic condition of the cranium.

Diagnosis.—Limitation to one bone, never jumping a suture; its gradual increase after birth; caput succedaneum decreasing at the same period. The mobility of the skin. The prognosis in external cephalhematoma is good.

Treatment.—A compress containing some evaporating lotion and bandage is generally all that is necessary. When the tumor is large and persists, it is sometimes well to incise under strict antiseptic precautions and wash out carefully. Moderate pressure should afterward be made.

CONJUNCTIVITIS OF THE NEWBORN.

What is conjunctivitis or ophthalmia neonatorum?

This is a disease affecting the eyes of newborn children, and is generally the result of specific infection from the eyes of the child coming in contact with the vaginal secretions of the mother, who, in most cases, has had either purulent endometritis, or gonorrhea.

What are the symptoms?

Appear about the second to the fifth day. The eyelids become slightly red and swollen, with a purulent secretion. As the disease progresses this swelling increases, the secretion becoming of a thick yellow or green color, while the conjunctiva is greatly infiltrated, swollen, and roughened. The cornea soon becomes affected. After six to eight weeks the patient may recover, although chronic blennorrhea is by no means rare.

What is the prognosis of ophthalmia neonatorum?

Prognosis depends on the severity of the disease, and the time at which the patient comes under treatment. With the careful execution of prescribed treatment, the disease when taken in the earliest stages, generally responds quickly to treatment. When the cornea is affected, the danger of blindness is great.

Describe the treatment of ophthalmia.

The danger of ophthalmia is much decreased when the mother receives an antiseptic vaginal douche immediately before or during labor. As prophylaxis, the eyes of the child as soon as it is born should be washed with distilled water, and gtt. j of a two per cent. solution of silver nitrate injected by means of a dropper, the lids being held apart. When the disease is already in progress, the eyes must be carefully washed out, and one to three drops of a solution of silver nitrate, as above, instilled. In severe cases, ice cloths, with strong solutions of boracic acid or bichlorid of mercury, 1 : 10,000 or 12,000, can be used.

THE UMBILICUS.

To what diseases may the umbilicus be subject?

The umbilicus is subject to various diseases and accidents after

detachment of the cord. Among these are hernia, infection, hemorrhage, and vegetations.

How is umbilical hernia caused?

By the non-closing of the umbilical ring or the lack of tone in the parts. It appears usually in the first few weeks of extra-uterine life, as a small tumor, which increases when the child cries or coughs, and varies somewhat with respiration.

Describe the treatment of umbilical hernia.

The treatment consists of replacing it and covering with a large button covered with some soft material and fastened with strips of adhesive plaster. If persistent, a truss should be fitted carefully over the umbilicus.

Describe the cause, symptoms, and treatment of septic infection of the umbilicus.

This appears when proper cleanliness has not been used in the care of the stump of the cord, the seat of its recent attachment, which presents a surface open to the absorption of septic material. Having become infected, the borders of the point of attachment are red and swollen, and the adherent remains of the cord black, or brownish-black, and moist. On inspection some pus will be found in the folds of the ring.

Treatment.—The greatest care must be exercised in these cases; for if neglected the septic process will proceed inward, producing general septic infection and death. The umbilicus should be washed with a saturated solution of borax in water, salicylic acid and starch 1 : 3 (Winckel), or hydrogen peroxid. A very good dressing is aristol. A small antiseptic pad and bandage should hold the dressing in place.

What can be said of umbilical hemorrhage?

This is a serious, generally fatal accident, occurring about the period of detachment of the cord, from the fifth to the eighth day after birth. It is caused generally by a poor condition of the tissues or hemophilia. It is sometimes ascribed to syphilis. It appears as a continuous oozing from the umbilicus, and persists in spite of all efforts at cure. It is sometimes accompanied by purpuric spots on the skin. Hemorrhages often occur into the stomach and intestines. The blood is often found to be deficient in quality, and the corpus-

cles more or less abnormal. Treatment should be directed to improving the condition of the blood, and the administration of styptics, principally some of the preparations of iron.

What can be said of vegetations of the umbilicus?

Vegetations of the umbilicus frequently are seen around the insertion of the cord after it has become detached. They should be treated by silver nitrate or acetic acid. Care must be taken not to mistake this condition for hernia.

Describe mastitis neonatorum.

Inflammation of the breasts occurs sometimes in the newborn. The cases are divided about equally among boys and girls. A fluid resembling colostrum can be squeezed out of the nipple. In rare cases suppuration occurs. The nipples are generally retracted, the breast appearing hard and inflamed. As treatment, careful washing with a mild antiseptic solution, accompanied by the application of lead water and laudanum. Should the swelling progress to suppuration, it should be opened, washed out with an antiseptic solution, and covered with compress and bandage.

JAUNDICE OF THE NEWBORN.

What is icterus neonatorum?

A certain amount of yellowness appears on the skin of many newborn children, and usually disappears about the eighth or ninth day.

In some cases the skin is of a deep yellow hue, the color being general, showing even in the conjunctivæ. Such a condition constitutes a distinct disease, and may be serious. Feeble, prematurely born children, or those who have suffered, for any reason, traction or pressure on the funis during labor, are chiefly predisposed to jaundice (Winckel). Malformations of the bile ducts, syphilis, and inflammations of the gastro-intestinal tract are also causes.

Treatment.—In simple cases a regulated diet is sufficient. In all cases the jaundice appears chiefly as a symptom, and the cause must be sought and removed if possible.

TETANUS, OR LOCKJAW, IN THE NEWBORN.

Describe the causes, symptoms, and treatment of tetanus neonatorum.

This is most apt to be secondary to infection of the umbilical ring, and is distinctly a microbic disease.

The symptoms appear as restlessness and tremor of the lower jaw; soon the mouth becomes closed and cannot be opened. In a short time spasms make their appearance, the attacks being distinctly tetanic in character. The temperature is high, reaching 107–109° F. The termination is fatal, the cause of death being exhaustion or asphyxia. The treatment consists of nourishment by enema, and potassium bromid or chloral in suitable doses.

What is thrush?

This is a disease attacking the mucous membrane of the tongue and mouth, and is characterized by the appearance of patches somewhat resembling curd. It is more common in bottle-fed babies than in those fed from the breast. The disease is caused by a fungus belonging to the general class of molds.

Treatment.—The best local application is borax, either in a solution of grs. xx to the f℥j of water, and applied to the buccal mucous membrane by means of a camel-hair brush. A very good treatment consists in mixing the borax grs. xx to ʒj of honey or syrup, and giving one to three times a day.

The names Muguet and Sprue are also given to this disease.

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