Syllabus of the obstetrical lectures in the Medical Department of the University of Pennsylvania / by Richard C. Norris.

SYLLABUS
OF
OBSTETRICAL LECTURES

RICHARD C. NORRIS, M. D.

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SYLLABUS

OF THE

OBSTETRICAL LECTURES

IN THE

MEDICAL DEPARTMENT OF THE UNIVERSITY
OF PENNSYLVANIA.

BY

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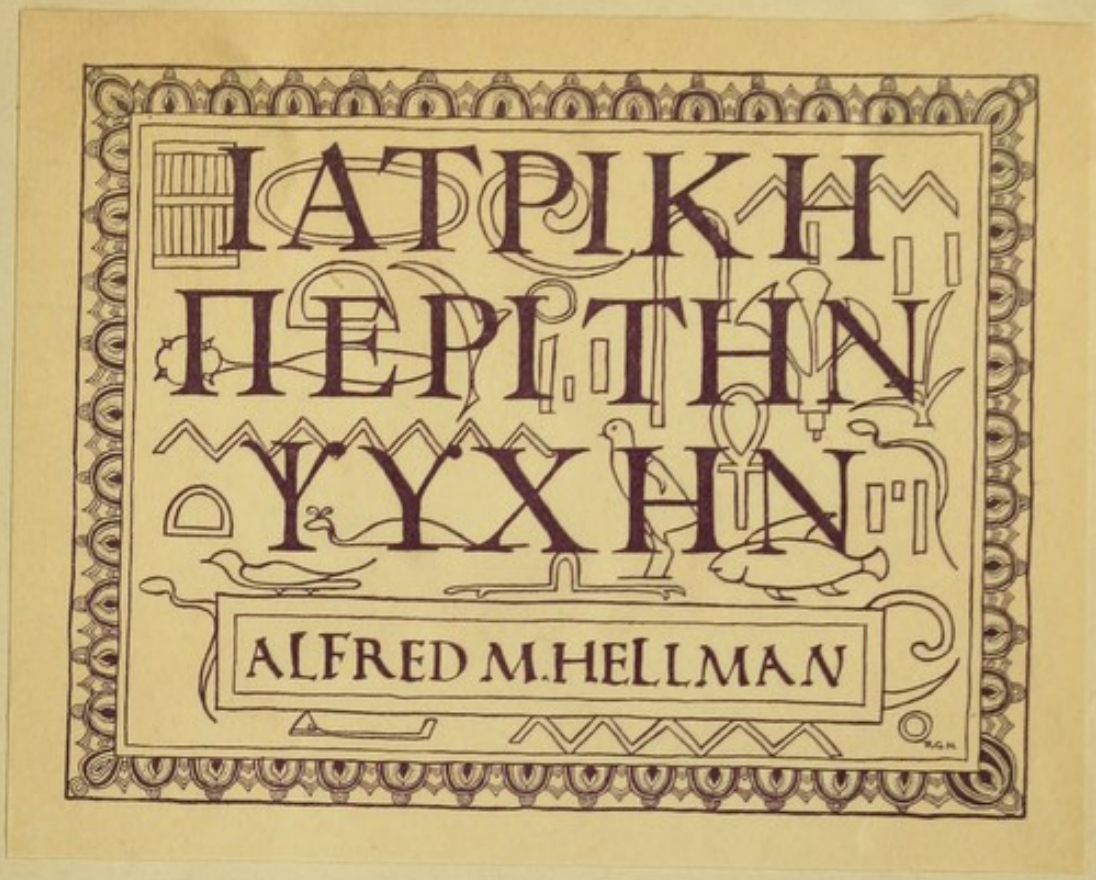

DEDICATED

TO

THE MEDICAL CLASS OF THE UNIVERSITY
OF PENNSYLVANIA.

PREFACE.

WITH the approval of Professor Hirst this syllabus has been prepared to meet the difficulty of accurate note-taking, which most medical students encounter. The subject matter has been so arranged that uninterrupted attendance upon lectures is essential to a full knowledge of the course. The design of the book, therefore, is to secure for the student a logical and consecutive *outline* of his work, and to aid him in classifying the knowledge he acquires in the lecture room. The author desires to express his indebtedness to Professor Hirst for many suggestions and his kindly interest in the preparation of the work, and to indulge the hope that the medical class may find the book of some service to them.

1234 SPRUCE STREET, PHILADELPHIA,
December, 1889.

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PART II.

SYLLABUS OF OBSTETRIC LECTURES.

LECTURES TO GRADUATING CLASS.

PART I.

Menstruation.

Definition.—A periodic discharge of a sanguineous fluid from the uterus and Fallopian tubes, occurring during the time of a woman's sexual activity, from puberty to the menopause.

Time of Occurrence.—In temperate climates, in Teutonic and Anglo-Saxon girls, the first menstruation occurs oftenest in the fifteenth year. It is influenced by (*a*) Race, (*b*) Mode of Life, (*c*) Climate, (*d*) Heredity, (*e*) Genital Sense.

Time of Cessation.—Usually in the 45th year.

Phenomena.

1. *Congestion.*—Manifested in changes in uterine body, mucous membrane, adnexa and peritoneum.

2. *Molimina.*—The clinical and subjective manifestations, as nervous irritability, pigmentation, enlargement of thyroid, changes in voice and circulation, etc.

3. *Rise of Temperature.*—0.5° C.

4. *Character of Flow.*—Alkaline and composed of blood, shreds of mucous membrane, vaginal and uterine secretion. Is darker than ordinary blood and should not clot.

5. *Duration of Flow.*—The average is three days.

6. *Quantity.*—Four to six ounces.

Theories in explanation of its occurrence.

1. *Why it occurs:*—

(*a*) Cleansing. Plethora. The ancients' idea.

(*b*) Pflüger's. The ripening of the ovule within the ovary and the development of the Graafian follicle, producing a nervous irritation culminating at the end of the menstrual month, which leads to congestion and other menstrual phenomena.

(*c*) Result of the death and degeneration of the ovule. If the ovule happens to be impregnated, menstruation is prevented. If conception has not occurred, the congested condition of the mucous membrane, prepared to receive and surround the ovule, results in the menstrual discharge.

(*d*) Comparative anatomy and physiology. Explained by similarity to heat or rut.

(*e*) In obedience to a central nervous influence reflected through the sympathetic nervous system to the ovaries and uterus.

2. *How it occurs :—*

(*a*) Kundrat, Engelmann, Williams : By fatty degeneration of the mucous membrane.

(*b*) Leopold : By diapedesis.

Connection Between Ovulation and Menstruation.—From Leopold's investigations upon 29 pairs of ovaries, examined at varying intervals after the menstrual period, it appears that menstruation and ovulation may occur independently—*i.e.*, neither are dependent upon the other, but both have a common cause.

Ovulation.

The Ovary.—Weight, 5.5 grms. or 78 grains. Diameters, 38 x 19 x 13 mm. or $1\frac{1}{2}$ x $\frac{3}{4}$ x $\frac{1}{2}$ inches. Constituent parts :—stroma, glandular substance, epithelial covering, blood vessels, lymphatics and nerves. The epithelial covering of the ovary differs from the epithelium lining the rest of the peritoneal surface, in that it is columnar and has a special function in the formation of the ovum.

Development of Graafian Follicle.—The specialized columnar epithelium covering the ovary dips down into the ovarian substance, forming "egg-cords," and carries highly specialized cells. A constriction occurs above and below one of these specialized cells and the follicle thus formed is an immature Graafian follicle, containing an immature ovum. These follicles at first lie under the capsule of the ovary, but later are deeper in the ovarian structure.

Anatomy of Fully Developed Graafian Follicle.—From without inward.—1. Theca folliculi, composed of tunica fibrosa and tunica propria. 2. Membrana granulosa. 3. Discus proligerus, surrounding the ovule. 4. Liquor folliculi.

Anatomy of Ovum.—From without inward.—1. Vitelline membrane. 2. Zona pellucida. 3. Internal cell membrane; these three comprising the *cell wall.* 4. Yelk, or cell contents. 5. Germinal vesicle, or nucleus. 6. Germinal spot, or nucleolus.

Maturation of the Ovum and Preparation for its Impregnation.

1st stage. Karyokinesis. Amphi-aster stage.

2d stage. Extrusion of two polar globules.

3d stage. The female pronucleus.

Discharge of Mature Ovum (Ovulation).—Theories to account for its occurrence.

1. Sexual congress.
2. Periodicity.
3. Congestion—increasing the amount of liquor folliculi.
4. Influence of sympathetic nervous system.

Mechanism of Escape of the Ovule.—Tunica propria fails at the part nearest surface of ovary (called *stigma*); tunica fibrosa also gives way after a time, from pressure of the liquor folliculi, which increases in amount as a result of the liquefaction of the cells of the membrana granulosa. At this weakened spot (stigma) the ovule and discus proligerus are situated, and they escape together when the tunica fibrosa ruptures.

Mechanism of Transmission to Tubes and Uterus.—The ciliated epithelium in the tubes, by their lashing movement, start a current in the moisture always present on the peritoneal surface toward the uterus.

Time of Occurrence.—Usually at the height of the menstrual congestion. Intermenstrual ovulation is, however, not infrequent.

The Formation of the Corpus Luteum.—When the tunica propria ruptures, and the ovum escapes, the follicle fills with blood (the hematin of the extravasated blood giving rise to the "yellow" color). The membrana granulosa then enlarges by active multiplication of its cells and projects into the cavity of the follicle in ray-like folds. Shrinking and cicatrization occur, causing the permanent pits or depressions which mark the surface of the adult ovary. The corpus

luteum spurium, or better named, that of menstruation, reaches the highest period of development in from ten to thirty days. The corpus luteum verum, or better, of pregnancy, is simply an exaggeration or further development of the corpus luteum of menstruation, the greater growth due to the increased blood supply to the whole genital apparatus. It grows for thirty or forty days after conception, then remains stationary until after the fourth month, when it begins to atrophy. At term it is only two-thirds its largest size. One month after delivery it is reduced to a small mass of fibrous tissue.

Insemination and Fertilization.

INSEMINATION.—The deposition of seminal fluid within the genital tract of a female during sexual congress.

Seminal Fluid.—A yellowish-white, opaque, sticky fluid, varying in quantity at each emission from one-fourth to two drachms, possessing a very peculiar odor, and neutral or alkaline in reaction.

Constituent Parts:—

(*a*) Chemical examination: Water, 82 per cent.; salts, mainly phosphates, 2 per cent.; proteine matter, fats, spermatin.

(*b*) Microscopical examination: Crystals of phosphates, spermatozoa.

Filtration shows active constituents to be the spermatic particles.

Abnormalities of Spermatic Fluid:—

(*a*) Aspermatism, when no discharge of fluid occurs. May be congenital, acquired or relative. Acquired when resulting from gonorrhœa, prostatic abscess, tuberculosis, neurosis. It is said to be relative when the discharge does not occur at the desired time. This variety may be due to fear (neurosis) or sexual excess.

(*b*) Polyspermism—excessive quantity of fluid.

(*c*) Abnormalities in color: Red when tinged with blood from the mucous membrane; yellow, with pus (gonorrhœa); violet, from the presence of indigo, in consequence of excessive venery; green, when to this last there is added gonorrhœal discharge, and beer color, when jaundice is present.

(*d*) Oligospermism—quantity deficient.

(*e*) Azoöspermism. The particles dead when emitted, or altogether absent from the fluid. A physiological absence is the rule

before puberty and in old age. Gonorrhœa is most frequently the cause of acquired azöospermism. Chronic alcoholism may produce it.

Characteristics of the Spermatic Particle:—

(*a*) Length, $\frac{1}{500}$ inch.

(*b*) Motility: Its own length in one second. Hymen to cervix in 3 hours (Marion Sims). An inch in $7\frac{1}{2}$ minutes (Henle). Can push aside epithelial cells ten times their size.

(*c*) Vitality or longevity: Are destroyed by *heat*, *cold*, *acid solutions*, *mineral poisons*, by *lack of water*. In some cases, as result of chronic disease or alcoholic or sexual excesses, they may be dead when emitted. Solution of bichloride of mercury, 1 to 10,000, will destroy them. Under some circumstances their vitality is remarkable. They have been found alive in criminals three days dead, in a bull six days dead, in a cow six days after insemination. They remain alive for months in the bat, for three years in the queen bee, and in the living female have been found in the cervix eight days after copulation.

Origin:—

(*a*) Of indifferent constituents: Cowper's glands, prostate, vesiculæ seminales.

(*b*) Of seminal particles: By a process similar to that in the female, the spermatoblasts undergo the changes of *karyokinesis* and extrusion of the *seminal globule*, the spermatic particles thus remaining. Their first appearance in the fluid is at the fifteenth or sixteenth year.

Mechanism of Ejection or Emission.—Muscular contraction empties the vesiculæ seminales and accelerates the passage of semen along the urethra.

Mechanism of its Reception.—From observations on the lower animals, confirmed upon the human being, the uterus, during the orgasm, becomes shorter and broader, descends into the vagina, is softer, and the os, alternately opening and closing, is observed to have a suction action, which draws the semen within the uterus.

Exceptions.—When the orgasm in the male does not occur simultaneously with that of the female the alkaline mucus in the cervix protects the spermatic particles from the acid vaginal secretion, and the seminal lake bathing the cervix allows the particles, by their locomotion, to enter the uterus. In cases where conception has fol-

lowed insemination during unconsciousness, or when the semen has been deposited only on the external genitals, the reception of the particles is explained by their wonderful powers of locomotion.

Time at which Insemination is least likely to be followed by Fertilization.—Seventeenth to twenty-third day after the cessation of menstruation. It is most likely to occur the first day after menstruation.

Meeting Place of Particle and Ovule.—The general opinion is that this occurs in the ampullæ of the tubes. A more recent theory is that it takes place in the fundus of the uterus, for the following reasons: By the movement of the epithelial cilia in the tubes, and the vermiform movement of the tubes themselves, the ovule is carried to the fundus in three days. The usual discharge of the ovule is at the height of the menstrual flow; and as fruitful copulation usually occurs four to seven days after menstruation, the ovule has at this time reached the fundus.

Mechanism of Fertilization.

(*a*) *Attraction of Spermatic Particles Toward Ovum.*—The male elements of some plants, as ferns, are attracted by malic acid, which is excreted by the female organs of these plants. Similarly an excretion of the ovule or discus proligerus is thought to attract the spermatozoa.

(*b*) *Penetration of Ovular Coats by Spermatozoa.*—It is probable that normally in the human being but one particle penetrates the cell contents, thus preventing the development of twins, monsters, etc. After its entrance the particle loses its tail, thus forming the *male pronucleus.*

(*c*) *The union of male and female pronucleus.*

The Ovule is now fertilized or impregnated, and the subsequent changes are briefly as follows:—

1. Segmentation of the vitellus or yolk, until completely subdivided, when a mulberry-like mass is formed, called the *muriform body.* The outermost of these spheres resulting from the cleavage are called *epiblastic*, and the innermost, *hypoblastic* spheres.

2. The epiblastic spheres arrange themselves in a layer under the wall of the ovule, thus enclosing the hypoblastic spheres, except at one point, which is called the *blastospore.*

3. The blastospore closes.

4. A fluid forms between the epiblastic and hypoblastic spheres, and the latter collect in a mass which becomes lens-shaped and adheres to the layer of epiblastic spheres at the site of the blastospore. The fluid accumulates until the ovum has the appearance of a thin-walled vesicle, which is called the *blastodermic vesicle.*

5. Extension of the hypoblastic mass.

6. A layer of cells develops between the epiblastic and hypoblastic layers, called the mesoblast, the blastoderm now consisting of three layers, epiblast, mesoblast and hypoblast.

7. A central thickening of the hypoblast forms an opaque circular spot on the blastoderm, called the *embryonic area.*

8. A groove, called the *primitive groove*, appears in the embryonic area.

9. By an arching-over process folds springing from the sides of the primitive groove (*dorsal plates*) join to form the spinal canal, and by a similar process folds springing from the base of the dorsal plates (*abdominal plates*) enclose the abdominal cavity. The cephalic and caudal extremities are formed by folds rising at either end of the groove.

From the epiblast is developed the central nervous system, superficial layer of skin, the organs of special sense; from the mesoblast, bone, muscle, connective tissue, blood vessels and genito-urinary organs.

From the hypoblast, the epithelium of the respiratory and alimentray tracts and glands.

Development of Embryo and Fœtus in the Different Months of Pregnancy.

First Month.—Indistinguishable from ovum of other mammals. Is a flattened vesicle. The embryo is nourished by yelk sac which, even at the end of the first month, is larger than the cephalic extremity of the fœtus. Visceral arches are distinct. Heart, first traces of liver and kidneys, eyes, rudimentary extremities, oral and anal orifices are formed. Spinal canal closes. (Spina-bifida results if this fails to occur at this time.) Length 1 cm., or .4 inch.

Second Month.—Grows to 4 cm. in length, and is about the size of a pigeon's egg. Visceral clefts close, except the first, which forms the external auditory meatus, tympanum and Eustachian tube. At this time arrest of development results in hare-lip, umbilical hernia or exomphalus. Eyes, nose and ears are distinguishable. The first suggestion of hands and feet appear, webbed. External genitals also now develop, but sex is not to be differentiated.

Third Month.—Maternal blood affords nourishment; 9 cm. long and about size of goose egg. Fingers and toes lose their webbed character and nails appear as fine membranes. Points of ossification are found in most of the bones. The neck separates the head from the trunk and sex is determined by the appearance of the uterus. Weight 30 grms. = 460 grains.

Fourth Month.—16 cm. = 6 in. in length. Lanugo is present. Intestines contain meconium. Sex is well defined. Weight 55 grms. = 850 grains.

Fifth Month.—25 cm. = 10 in. Vernix caseosa appears in places. The face is senile and wrinkled. Eyelids begin to open. Quickening occurs. Heart sounds are heard. Weight 273 grms. = 8 oz.

Sixth Month.—30 cm. = 12 in. Hair grows longer. Eyebrows and lashes appear. Testicles approach inguinal rings. Weight 676 grms. = $23\frac{1}{2}$ oz.

Seventh Month.—35 cm. = 14 in. Pupillary membrane disappears. Weight 1170 grms. = $41\frac{1}{4}$ oz.

Eighth Month.—40 cm. = 16 in. Down on the face begins to disappear. Left testicle has descended. Ossification begins in lower epiphysis of femur. Nails do not project beyond finger-tips. Weight 1571 grms. = $3\frac{1}{2}$ lbs.

Ninth Month.—45 cm. = 18 in. Subcutaneous fat increases. Diameters of the head about 1 to $1\frac{1}{2}$ cm. less than at term. Weight 1942 grms. = $4\frac{1}{4}$ lbs.

Mature Fœtus.—50 cm. long. Weight $7\frac{1}{3}$ lbs. Skin is rosy; lanugo has disappeared. Nails are perfect and project beyond finger-tips. Eyes are opened. The centre of ossification in the lower epiphysis of femur is 5 mm. in diameter, while that of the cuboid bone is just beginning to show. Diameters of head are normal.

Lengths and Weights of Fœtus:—

1st month,	1 cm.	.4 in.			
2d "	4	1.25			
3d "	9	3	30 grms.	460 grains.	
4th "	16	6	55	850 "	
5th "	25	10	273	8 oz.	
6th "	30	12	676	23½ "	
7th "	35	14	1170	41½ "	
8th "	40	16	1571	3½ lbs.	
9th "	45	18	1942	4¼ "	
10th "	50	21	3250	7⅓ "	

Amnion and Chorion.

Amnion.

Definition.—The amnion is the innermost of the fœtal membranes, is continuous with the fœtal epidermis at the umbilicus, forming a complete sheath for the umbilical cord and forming a sac or bag in which the fœtus is enclosed.

Development.—The epiblast extends from sides, caudal and cephalic extremities of fœtus, and curving backward approaches behind same until the reduplications meet and thus form two cavities, the True and the False Amniotic Cavities. The *True* contains the liquor amnii. The *False*, the yolk sac and its vessels, which later will be constituents of the umbilical cord.

Anatomy.—Is like that of serous membrane, *i. e.*, a layer of connective tissue and a layer of endothelial cells.

Function.—Chiefly to secrete the liquor amnii.

Liquor Amnii.

Quantity.—One to two pints at term.

Specific Gravity.—1007.

Composition.—Water, albumen, various salts, urea, epithelium.

Reaction.—Alkaline.

Origin.—From fœtus, mother, and from both.

Function.—Distends uterus and protects fœtus, affording an equal temperature for it and receiving its secretions. Does not nourish beyond adding to its supply of water.

Abnormalities of the Amnion.

Its pathology is similar to that of all serous membranes, *i. e.*, inflammation, exudations, serous and plastic.

(A) *Abnormalities of Secretion :—*

(*a*) *Oligohydramnios.*—Rare ; 1 in 3000 or 4000 cases. Is disadvantageous, because walls of uterus not kept apart and fœtus apt to be injured. During pregnancy the mother is likely to suffer pain, and labor is usually difficult.

(*b*) *Hydramnios.*—When two quarts or more of fluid may be present. Occurs about 1 in 250 to 300 cases.

Cause.—Production may be increased ; absorption may be decreased. It may be the fault of fœtus, mother, or both. On the part of the fœtus there may be (*a*) excess of urine ; (*b*) excessive transudation of fœtal serum, from vessels under placental surface, which do not disappear about the third or fourth month when hydramnios exists, or from any condition raising the blood pressure in the umbilical veins, as cirrhosis of the liver (syphilitic), an abdominal tumor, or any abnormality in vascular system of fœtus. (*c*) From fœtal skin. A pathological condition of this is found in some cases, as nævi, elephantiasis congenita cystica. Having its origin in the mother, the hydramnios may be a part of a general dropsy or be due to an exaggerated hydræmia. Very rarely does it arise from both fœtal and maternal causes, and a distinct cause cannot always be found. It is most frequently of fœtal origin.

Diagnosis.—The existence of pregnancy, great movability of the fœtus, and the distention of abdomen greater than the period of duration of the pregnancy would account for, are three important signs. When there is a very large amount of fluid the diagnosis is very difficult. It may be mistaken for ovarian cyst, ascites accompanying pregnancy, distended bladder with retroversion of gravid uterus.

Classes.—Acute. Rare. There is a sudden transudation of fluid, from some traumatism. *Symptoms.*—Pain, difficulty in respiration, at times orthopnœa, fever.

Chronic.—Begins at the third or fourth month and steadily increases, usually causing but little trouble.

Treatment.—Immediate evacuation in the acute variety ; in the

chronic this is, as a rule, not required. If necessary, the life of fœtus is not to be considered, as it will usually be diseased. Aspiration through uterine wall condemned. The membranes are to be punctured at the os, using hand as plug to prevent sudden escape of fluid.

(B) *Plastic Exudation.*—Usually occurs early, when amnion and fœtus are near each other, and thus forms bands of adhesion between them, and even causes amputations of fœtal extremities and premature detachment of the placenta.

(C) *Abnormal Tenuity.*—Rare. The strings thus formed may encircle the fœtus.

(D) *Cysts.*—Of no clinical importance.

(E) *Rupture.*—Abortion may result.

The Chorion.

Definition.—The chorion is the outermost of the fœtal membranes, and is formed from the external layer of the non-germinal epiblast. The fœtus at term is surrounded by three membranes—the deciduæ, reflexa and vera (derived from maternal structures); the other two, chorion and amnion, from fœtal structures. The chorion is the median of the three membranes.

Development.—From the non-germinal epiblast, a single layer of cells springing from the outer layer of the blastodermic membrane.

Chorionic Villi.—The villi of the chorion are hollow at first, and are composed of an external epithelial and an internal mucoid layer. Later they contain blood vessels. Until the third month these projections into the maternal tissue abstract nutriment, oxygen, etc., from the deciduæ, and serve to keep the ovum in the upper portion of the uterus. After the third month hypertrophy of one portion takes place (chorion frondosum) to form the placenta; elsewhere the villi atrophy (chorion leve). The function of the chorion leve is to protect the integrity of the ovum.

Anomalies of the Chorion.

Placenta Membranacea.—The normal atrophy of a portion does not occur, and placental villi are developed over the entire surface of the chorion. Such placentæ are thinner than the normal.

Diseases of the Chorion.

(*a*) *Cystic Degeneration of the Villi.*—This is an hypertrophy and myxomatous degeneration of the villi with the formation of cysts varying in size from that of a millet seed to a hen's egg. The old name of hydatidiform mole is not a good one, as *mole* is a meaningless term.

Frequency.—1 in 2000.

Mortality.—Over 13 per cent.

Causes.—Diseases of endometrium, or uterine wall; circulation of villi cut off by absence of allantois or its vessels.

Symptoms.—Sudden increase in size of uterus at third or fourth month usually, hemorrhage, absence of fœtus, and possibly discharge of cysts.

Causes of Death.—Hemorrhage, sepsis, perforation of uterus.

Treatment.—Is usually incompatible with fœtal life. Hemorrhage controlled by tampon. If diagnosed early, abortion should be performed, as it assumes sometimes a malignant type and spreads to uterine wall, and thus has rarely caused fatal hemorrhage and sepsis. This possible thinning of the uterine wall should contraindicate the use of curette in unskilled hands.

(*b*) *Fibro-myxomatous Degeneration.*—Up to the present time has been found only in the placental portion.

(*c*) *Chronic inflammation.*

The Umbilical Cord.

Development.—About the twentieth day after conception a diverticulum from the caudal portion of the intestinal canal is formed. It becomes constricted a short distance from its origin, the one portion to form the bladder; the other (larger) leaves the abdominal cavity with the omphalic or vitelline duct, and as an elongated cyst (allantois) rapidly grows and comes in contact with the entire chorion. Vessels soon develop, two arteries and two veins, which communicate with the villi of the chorion.

One of these veins disappears and the two arteries remain. These three vessels, with the omphalic duct, the remains of the umbilical vesicle and the pedicle of the allantois receive a covering of mucous

tissue (Wharton's jelly) and a layer of the amnion, and compose the umbilical cord. The fully developed cord at term is 20 to 21 inches in length, $\frac{1}{5}$ to $\frac{1}{2}$ inch in diameter, containing three tortuous vessels, one vein and two arteries, which possess valves.

Abnormalities of the Cord.

1. *Length.*—It may be very short (one centimetre), thus preventing descent of the fœtus or giving rise to hemorrhage from premature detachment of the placenta, or it may be very long (70 inches) and be found coiled around the fœtus.

2. *Torsion.*—Eight to ten twists normal. Due to twisting of arteries around veins. Usually has no effect. If extreme the blood vessels may be occluded. Great torsion usually occurs after the death of the fœtus.

3. *The Vessels.*—There may be stenosis; atheroma; hypertrophy of valves; an overgrowth of connective tissue in the substance of the cord, as from syphilis; varicosities.

4. *Coils and Knots.*—Loops and true knots may be formed, which are usually not tight. Intrauterine amputation, not due to these, but to the formation of amniotic bands. The cord is found coiled around the neck, about once in every four cases.

5. *Insertion.*—(*a*) Central is usual. It may be (*b*) marginal, or (*c*) velamentous (when the vessels run between the amnion and chorion before entering the placenta), or (*d*) meso-cord, when a fold of the amnion is arranged analogous to the meso-rectum.

6. *Hernia.*—Due to arrest of development of lateral plates.

7. *Cysts.*—Due to liquefaction of the mucous tissue in the cord, or to apoplexies in the cord.

8. *Calcareous Deposits.*—In the blood vessels, or mucous tissue. Are often associated with syphilis, and of no significance.

The *umbilical vesicle* is the sac containing the nourishment of the embryo until the development of the chorion and placenta.

The Deciduæ.

Development.—After the ovum is impregnated the mucous membrane of the uterus hypertrophies to tenfold its normal thickness, due to proliferation of young connective tissue cells above the

uterine glands. These proliferated cells are called "decidual cells." The ovum, lying in the folds of the hypertrophied mucosa, finally is completely surrounded.

That portion of the mucous membrane reflected over the ovum is the *decidua reflexa*. The portion under the ovum, the *decidua serotina*, and the uterine mucous membrane elsewhere, the *decidua vera*.

Diseases.

1. *Apoplexies.*—These are a common cause of early abortions, and are apt to occur prior to the second or third month. *Causes.*—Bright's disease, repeated congestions from frequent coitus, injuries, blows, etc.

2. *Inflammations, Chronic.* — (*a*) Hyperplastic endometritis gravidarum. The hypertrophy of the mucous membrane is exaggerated, deflects nourishment to itself and gives rise to apoplexy and early abortion of a fleshy mass. It is usually the result of chronic endometritis prior to pregnancy. (*b*) Polypoid endometritis gravidarum. The hypertrophy confined to certain areas. Is very rare. Leads to abortion, second to fourth month. (*c*) Catarrhal endometritis gravidarum. There is an abnormal hypertrophy of the uterine glands, giving rise to the secretion of a few ounces to a pint or more, with periodic discharges of thin mucus, called hydrorrhœa gravidarum. (*d*) Cystic endometritis gravidarum occurs very early. The glands hypertrophy. May be cured by subsequent growth of the deciduæ or may continue to produce hydrorrhœa gravidarum.

3. *Inflammations, Acute.* (*a*) Hemorrhagic endometritis, as occurs in cholera. Causes abortion. (*b*) Exanthematous endometritis, the exanthema developing on the uterine mucous membrane, as on other mucous membranes. In several reported cases of measles complicating pregnancy, abortion has occurred about the time of appearance of the eruption. (*c*) Purulent endometritis. Very rare.

4. *Atrophy.*—May affect either of the deciduæ. Ill-developed placenta may result, or ovum not properly held in place may drop and develop a "*cervical pregnancy.*"

The Placenta.

(*A*) *Development.*—At the third month the chorion villi atrophy, except at the decidua serotina, where they take on an extraordinary growth to form the placenta. Each villus is composed of connective tissue holding capillary blood vessels, is covered with epithelium, and projecting into the maternal tissue is surrounded by a capillary network from the maternal blood vessels. Later, these capillary networks disappear, leaving large sinuses or lacunæ, which receive blood from the little curling arteries rising up through the decidua serotina and into which the villi of the placenta dip.

(*B*) *The Fully Developed Placenta.*—At term the placenta weighs one pound, is one inch thick at its central portion and seven inches in diameter. The fœtal side is covered by the amnion and penetrated by the cord. The maternal surface is dark red, divided by sulci into lobules or cotyledons and covered with a grayish transparent membrane composed of the cells of the upper layer of the decidua serotina. It is normally situated at the fundus, anteriorly or posteriorly.

(*C*) *Functions.*—It absorbs oxygen and nutriment, acting as vicarious lung or gill, and serves as alimentary tract, kidney, liver and bowel.

The epithelium of the villi, in carrying on these functions, have a selective power. Variola germs are readily absorbed, tuberculosis very rarely.

Anomalies.

(*a*) *Position*—as placenta prævia.

(*b*) *Size*—as placenta membranacea.

(*c*) *Shape*—as horse-shoe placenta.

(*d*) *Weight*—may be above or below normal.

(*e*) *Number*—as placenta duplex, tripartita, etc. There may be accessory growths, as placentæ succenturiatæ, placenta spuria, marginata, etc.

Diseases.

(*a*) *Œdema.*—Often accompanies hydramnion and macerated fœtus; stenosis of umbilical vein; general effusions in the mother. The villi may be normal.

(*b*) *Degenerations* :—

1. *Cellular Infiltration.*—Occurs in syphilis. Villi are distended with granulation cells, blood vessels obliterated and fœtal life perishes.

2. *Fibrous and Fatty Degeneration of Villi.*—Causes. Any abnormality, accident or disease of placenta abrogating its function, as hemorrhage from the placenta, chronic interstitial placentitis, diseases of endometrium.

Prognosis.—If extensive, fœtus dies. If small, a corresponding degree of ill-development of fœtus. Primary fatty change only occurs after death of the fœtus.

3. *Phthisical Placenta.*—An exudate from villi into lacunæ, which undergoes a cheesy change.

(4) *Calcareous.*—Very common. Occurs in indifferent places and has no effect on functions of the placenta.

(5) *Myxomatous.*—Similar to the same change in the chorion. Is usually localized.

(*c*) *Apoplexies.*—Very common. Are a frequent cause of abortion.

Causes.—Traumatism, maternal diseases (especially Bright's disease), fœtal diseases.

(*d*) *Syphilis.*—It is disputed whether there be a distinct form of the disease in the placenta which offers a diagnosis of syphilis. Prof. Hirst inclines to the belief that there is this distinctive form of placental disease. The pathological manifestations differ with the time of infection, as follows :—

1. When the spermatic particle is diseased there is cellular infiltration of villi.

2. When the mother is infected during fruitful coitus, there is, in addition to the cell infiltration, an overgrowth of connective tissue over the cotyledons.

3. When the mother is infected before conception, gummata appear in maternal tissue.

4. When the mother is infected after conception, the placenta is ordinarily not diseased (Fränkel).

Prognosis.—For fœtus : the cell infiltration destroys the blood vessels and fœtal life perishes. For the mother : not indifferent. From the connective tissue development adherent placenta likely to occur, increasing the risk of sepsis, hemorrhage, inversion of uterus, etc.

(*e*) *Acute Placentitis.*—Very rare.

(*f*) *Cysts.*—Result from old hemorrhages. Are never large and of no clinical importance.

(*g*) *Tumors.*—1. Fibroid change or Myxoma Fibrosum; 2. Localized Hypertrophies; 3. Organized Thromboses.

Physiology of Mature Fœtus.

Fœtal Circulation.

From the placenta the blood passes through the umbilical vein to under surface of liver. A part enters the liver and is carried to the ascending cava by the hepatic veins, the smaller portion passing direct to ascending cava through the ductus venosus. Joining the blood from the lower extremities, it then passes to the right auricle, and guided by the Eustachian valve enters, through the foramen ovale, the left auricle. Thence to left ventricle, to aorta, the greater part being carried to upper extremities and head. Returned by the descending cava to the right auricle, it passes to the right ventricle, and a small portion being carried to the lungs through the pulmonary artery, the remainder reaches the aorta through the ductus arteriosus. From the aorta it passes through the hypogastric arteries, to the umbilical arteries, to the placenta, a small portion of this mixed blood being carried by the aorta into the lower extremities.

Fœtal Excretions.

Bowels.—Inactive during intrauterine life. Meconium is discharged if fœtal life is threatened, as by an apoplexy, coiled or compressed cord, etc. If it occur during labor should always be a danger signal.

Bladder.—Is evacuated during intrauterine life and urine is always albuminous.

If fœtus has lived a few hours, the kidney will show orange-colored infarcts of urates, which are of medico-legal value.

Multiple Impregnation.

Frequency.—

Twins,	1 in	89	births.
Triplets,	1 "	7,900	"
Quadruplets,	1 "	371,126	"

Two cases have been reported—one in Italy, the other in Texas—of six children at a birth.

Twins.—How it occurs :—

1. Two ovules discharged at once from separate Graafian follicles in same or different ovaries.

2. Two ovules from same follicle.

3. Unioval, *i. e.*, from a single ovule two fœtuses developed by entrance of more than one spermatic particle, or by a division of the layers of the early formed membrane. Unioval twins have single placenta and chorion, but two amnions; otherwise each fœtus has its own placenta and chorion, as well as amnion.

Prognosis.—Mother—Liability is greater to albuminuria and eclampsia, to post-partum hemorrhage from over-distention, and labor is apt to be long and difficult.

Fœtus.—Much graver. If from two ovules one in twenty-three born dead; from a single ovule one in six.

Reasons for gravity of prognosis to fœtus :—

1. Lack of room, hence ill-developed; under weight and size.

2. If one is stronger and better developed it attracts more nutriment, and finally crowds and compresses its fellow, flattening it out (Fœtus Papyraceus).

3. In unioval the anastomoses between fœtal and placental vessels apt to produce monsters.

4. Hydramnios apt to occur.

5. Many complications at birth.

Super-Impregnation.

(*a*) *Super-fœtation.*—The product of conception occupying the uterus a second impregnation follows a subsequent coitus.

(*b*) *Super-fecundation..*—Two or more ovules fecundated at or near the same period of time.

The possibility of its occurrence after a long interval doubted, since there is no proof of ovulation during pregnancy. The limit is within a few days.

Determination of Sex.—At birth the proportion is 106 boys to 100 girls. At puberty it is about equal.

Theories.—None satisfactory. The parent possessing the greater mental, physical and sexual development may have some influence.

When Determined.—Not known. Up to the third month embryo has equally the elements of both sexes.

Diseases of the Fœtus in Utero.

Mortality.—One-fourth of all die before term.

Deformities and Monstrosities.

Every departure from the normal is classified under one of the following :—

1. Hemiteratic.
2. Heterotaxic.
3. Hermaphroditic.
4. Monstrous.

1. *Hemiteratic*, semi-monster—*i.e.*, an approach to monstrosity—include :—

Anomalies of (*a*) *growth* (as dwarfs, giants).
" (*b*) *volume* (as microcephalic head, large breast, etc.).
" (*c*) *form* (as deformity of pelvis).
" (*d*) *color* (as albinism, melanism, mole, etc.).
" (*e*) *structure* (as abnormal ossification of cartilage).
" by (*f*) *displacement of splanchnic organs* (as hernia, spina bifida, encephalocele).
" by (*g*) *displacement of non-splanchnic organs* (as club-foot, scoliosis, bow-legs).
" by (*h*) *change of connection* (as anomalous attachment of muscles, tendons, nerves).
Anomalous (*i*) *openings* (as patulous foramen ovale, rectum opening into urethra).
" (*j*) *imperforations* (as rectum, vagina, œsophagus).
" (*k*) *union of organs* (as horseshoe kidney, webbed fingers).
Anomalies by (*l*) *disjunction* (as hare-lip, cleft-palate).
" (*m*) *numerical diminution* (as absence of one or more fingers).
" (*n*) *augmentation* (as six fingers, three testicles, six toes).

2. *Heterotaxic.*—Anomalous order, reversal of natural position of

organs, as liver on left side, pyloric and cardiac ends of stomach reversed.

3. *Hermaphrodism.*—A vicious conformation of the genital organs comprising elements of both sexes. When called upon to make the diagnosis always exclude an ill-developed male, as cleft scrotum, or rudimentary penis. By this error males have been educated as females.

4. *Monstrosities.*—A living creature so much deformed as to excite wonder or disgust.

(*A*) *Autositic Monsters.*—Those capable of independent existence. These are further subdivided and etymologically named :—

(*a*) Ectromelic (abort-limb). Absence of upper or lower extremity.

(*b*) Symelic (union-limb). Lower limbs fused.

(*c*) Celosomatic (hernia-body). Extreme hernia.

(*d*) Exencephalic. Brain normal, but cranial bones not developed.

(*e*) Pseudencephalic. Bones of cranium lacking and rudimentary brain.

(*f*) Anencephalic. No brain and no development of cranium.

(*g*) Cyclocephalic. The two eyes fused. Reversal of eyes and nose apt to occur (rhinocephalic).

(*h*) Otocephalic. The two ears meet under chin, and lower portion of face not developed.

(*B*) *Omphalositic.*—Possessing an imperfect kind of life, which ceases when the umbilical cord is divided. It only occurs in twin pregnancy, the intimate anastomosis of vessels in unioval sometimes allows one heart a preponderating power, and the other, not used, atrophies. These may be

(*a*) Acardiac.

(*b*) Acephalic.

(*c*) Asomatic.

(*d*) Fœtus amorphous or anideous (a shapeless mass of flesh).

(*C*) *Composite Monsters :*—

(*a*) Double autositic. Named by the portion of the body which unites them, as *xyphopagic* (joined by xyphoid), *synsomatic* (joined by bodies), *syncephalic* (joined by heads), etc.

(*b*) Double parasitic, as an extra pair of legs, extra child hanging from stomach, etc.

(*c*) Triple monsters. Very rare.

Diseases of Fœtus.

Infectious—*Causes.*—Specific microörganisms which in some way pass through maternal blood to fœtus. The conclusion from many conflicting observations is that this is not invariable but possible. Several theories have been advanced to explain how the microörganisms reach the fœtus.

The following are some of the diseases in which the specific microorganisms have been found in the fœtus: smallpox, measles, erysipelas, typhoid, pneumonia, cholera, syphilis, malaria, anthrax. The power of various organisms to transmit themselves is not equal. Smallpox very apt to pass; tuberculosis, but one case reported. If fœtus not inoculated, abortion apt to occur.

Congenital Skin Diseases—as ichthyosis.

Intra-cranial Disease—as sclerosis or tumors of brain, etc.

Inflammation, recent or old, of Serous Membranes—ascites, hydrothorax, hydrocephalus.

Valvular Diseases of Heart.

Overgrowth of Connective Tissue—in intestines, blood vessels, liver, etc. (largely due to syphilis).

Tumors—as distended bladder, congenital goitre, sacral tumors, etc.

Rachitis.—Signs of congenital rachitis. Head square and bent to one side, spine tortuous, joints enlarged, pigeon breast, curved long bones.

Anasarca—usually due to obliteration of umbilical or placental circulation.

Spontaneous Fractures of the Long Bones—most commonly due to rachitis, and then apt to be multiple.

Anchyloses and Luxations.—Anchyloses are very rare, are due to inflammation of the joint membranes and seriously prevent normal mechanism. Luxations are rarely intrauterine but frequently the result of mismanaged breech and arm presentations when much force is used. A rigidity of the muscles due to prolonged pressure may be confounded with the above.

Intrauterine Amputations—caused by amniotic bands.

External Violence—of medico-legal interest.

Maternal Conditions affecting Fœtus:—

1. *Nervous Disturbance in the Mother.*—Maternal impressions; emotions (sometimes fatal).

2. *Abnormalities in Temperature.*—Fœtus not necessarily affected if maternal temperature be raised *slowly* to 105°–107°. It will be, however, if the rise be sudden. Always fatal at 109°.

3. *Defective Nutrition.* — Serious chronic diseases producing anæmia; pernicious vomiting of pregnancy.

Treatment.—Remove cause. Iron, arsenic, good hygiene.

4. *Diseases of the Endometrium, the Womb and its Adnexa.*—Usually cause abortion.

5. *Alterations in the Maternal Blood Pressure.*—Fatal to embryos of animals.

6. *Poisons in the Maternal Blood.* — The infectious diseases; eclampsia; saturnism; bile salts.

7. *Heredity.*—A predisposition to disease acquired in utero.

8. *Maternal Death.*—Fœtus has been found alive as long after death of mother as two hours.

Diagnosis of Fœtal Death:—

1. Absence of heart sounds.
2. Palpation of macerated skull (crepitus).
3. Temperature in cervix (death likely if not 1° above body temperature).
4. Hand in utero to feel for heart pulsation.
5. Peptonuria.
6. Cessation of growth or diminution in size of uterus.
7. Disturbances of renal functions.
8. Disappearance of subjective signs of pregnancy.
9. Appearance of milk secretion.

The effects of fœtal death upon the mother are practically nothing so long as the membranes are unbroken.

Changes in structure of Fœtus after death.—May be any of the following:—

1. Maceration.
2. Putrefaction (only after membranes are broken).
3. Saponification.
4. Mummification.
5. Calcification.
6. Absorption (before third month).

Syphilis of Fœtus.

Infection of fœtus occurs in three ways :—

1. From diseased Ovule.
2. From diseased Spermatic Particle.
3. From Maternal Blood.

The poison can also pass from fœtus to mother, thus explaining several curious phenomena, as the appearance of secondary symptoms in the mother in the latter months of pregnancy.

Manifestations.—Protean and polymorphous, as in the adult. There is an overgrowth of connective tissue in all parts of the body.

(*a*) *Skin.*—Pemphigoid eruption, especially on soles of feet and palms of hands.

(*b*) *Bones.*—An embryonal tissue, a transition stage between cartilage and bone, by a premature attempt at ossification, is not sufficiently nourished, dies and undergoes a fatty change, leaving between diaphysis and epiphysis of all the long bones a *jagged yellow line.*

(*c*) *Liver.*—Normally is $\frac{1}{30}$ of body weight. Syphilis of fœtus shows liver much increased in size and weight.

(*d*) *Spleen.*—Normally $\frac{1}{300}$ of body weight. Much increased in syphilis.

(*e*) *Lungs.*—One of three conditions found:—

1. Overgrowth of connective tissue, constituting fibroid pneumonia or phthisis (most common).

2. Catarrhal or White Pneumonia. By an overgrowth of epithelium in the air vesicles the lung dies, fatty degeneration follows, giving the lungs a dead-white appearance, with imprint of ribs.

3. Gummata—rarest.

Effect of Syphilis upon Life of Fœtus.—"In 83 per cent. of all fœtal deaths the parents are syphilitic. In 657 pregnancies in syphilitic women 35 per cent. ended in abortion, and a large number of the children expelled at term were stillborn (Charpentier). Of 414 pregnant women, with syphilis, only 63 per cent. arrived at term."

Diagnosis.—By history of father or mother, and by an examination of skin, long bones, liver, spleen and lungs.

Treatment.—Syphilitic patients should not be allowed to marry without a prolonged course of treatment (for a year), to be followed

by a mild treatment of the mother throughout pregnancy, and sexual intercourse interdicted, to avoid abortion during the treatment. The time that must elapse after parents are affected before fœtus may be expected to be free from the poison varies. In one case after twelve years the fœtus was syphilitic. If the mother is contaminated at the fruitful coitus, or before, treatment should be begun at once. Both mercury and iodide of potash can pass to the fœtus and modify its syphilitic disease. Chlorate of potash (10–20 gr., t. d.) may be given in any disease interfering with the development of the placenta, to supply oxygen, as recommended by Penrose, Sir J. Y. Simpson, Barker, Bruce and others.

Habitual Death of Fœtus.

Causes in order of frequency :—

1. *Syphilis.*—Eighty-three per cent. of all fœtal deaths.
2. *Metritis, endometritis and uterine displacements.*
3. *Alterations in maternal blood*, as anæmia or plethora.
4. *Chronic diseases of the mother.*—Tuberculosis, cancer, malaria, nephritis. diabetes.
5. *Causes resident in fœtus*, as recurring deformities.
6. *Chronic poisoning.*—Saturnism. Tobacco. (In the Virginia factories such effects not noticed.)
7. *Causes referable to father*, as phthisis, albuminuria, chronic poisoning.
8. *Habit and heredity.*

Treatment.—Ascertain cause, and treat that.

Physiology of Newborn Infant.

Respiration.

Two factors to explain its establishment :—

1. External irritation, resulting from change of environment (from liquid, with temperature of 99°, to air, with temperature of 70°), gives rise to reflex action of all muscles.
2. Maternal supply of oxygen being cut off, there is an accumulation of CO_2, and the primary action of this is stimulant to respiratory apparatus.

Rate of respiration is 44, sinking, after a few months, to 35.

Weight.

7.3 lbs. There is a gradual increase, about one and a half pounds before and one pound after the fourth month, for each month.

Month.	Weight lbs.	Month.	Weight lbs.
1	7.75	7	16
2	9.5	8	17
3	11	9	18
4	12.5	10	19
5	14	11	20
6	15	12	21

Digestion.

Accomplished by digestive juices except pancreatic and salivary secretion.

Partially dependent upon bacteria in stomach and intestines.

Size of Stomach.—Knowledge of this important to avoid overfeeding.

1st week,	46 cub. cent.	3d month,	140 cub. cent.
2d "	78 "	5th "	260 "
3d and 4th month,	85 "	9th "	375 "

Position of Stomach.—Its axis is almost longitudinal, which explains frequent regurgitation and vomiting.

Excretions.

(*a*) *Urine.*—Always albuminous for first few weeks. Quantity has never been estimated. Voided 6–20 times in 24 hours. Does not stain diapers, and mistake may thus be made of supposing none to have been voided. (*b*) *Bowels.*—Meconium for the first 48 hours. Later, it becomes light yellow, is not formed, is sour and acid. The normal frequency of evacuation is four times in 24 hours.

Temperature.

Peculiarities are *irregularity* and *height*, with the variations above 98°. Slight causes will produce great changes.

Eyesight.

Always hypermetropic.

Pulse.

125–160, as shown by heart sounds.

Blood.

Total bulk to body weight 8 per cent. ; six to seven millions red blood corpuscles to the c.c., which are more spherical and do not tend to form rouleaux. Shadow corpuscles abundant. White blood corpuscles more numerous than in adult.

Liver.

Blood supply diminished, capillaries distended, secretion of bile lessened. Lower pressure in hepatic veins. Capsule of Glisson swollen.

Heart.

Exhibits transition from fœtal to infantile circulation by closure of foramen ovale and obliteration of ductus arteriosus.

Cord.

After 24 hours line of demarcation at its base. Necrosis of amniotic covering. Mummification of mucous tissue. Destruction of its vessels. Cord drops off about 4th day, followed by retraction of granulating button within the umbilical ring.

Medico-Legal Points.

Difficult to determine whether child has lived or whether injuries on its body have been inflicted with murderous intent.

Anatomical Points.

To be borne in mind when making autopsies to determine cause of death of newborn infant :—

The normal size of *thymus gland*, the relatively large *heart*. *Lungs* should be inflated and overlap heart. *Liver*, $\frac{1}{30}$ of body weight. *Ductus choledochus*, patulous. The *sigmoid* and *appendix* very large and the *bladder* relatively large.

Abnormalities in the Physiology of Premature Infants.

The two main deviations are—

(*a*) Low temperature—variations below 98°.

(*b*) Inability to ingest and digest food.

Treatment.—Incubation and gavage.

Mortality of this Treatment :—

At 6 months		22	per cent.	saved.
" 7	"	38	"	"
" 8	"	89	"	"
" 8½	"	95	"	"

Sclerema.—A disease only found in these premature infants. Occurs most often in lying-in hospitals. The most prominent symptom is a hardening of the skin, beginning in the legs and spreading, usually sparing breasts and belly. Jaundice or a hemorrhagic condition usually accompanies it. Temperature is very low, 95°. Its pathology is not well understood. The most probable explanation is that the large excess of palmitic acid in infants solidifies at this low temperature. The condition is a grave one and apt to be fatal.

Management of Newborn Infant.

Clothing.

A baby should be clothed in winter as follows: A binder, of flannel or knit wool, twice around stomach, a knit shirt, diaper, knit shoes, and three skirts, the first flannel, the next linen, and finally its dress.

The baby basket should contain at least—

3 day dresses,
3 flannel skirts,
2 vests,
4 pairs of shoes,
1 hair brush,
19 diapers,
3 binders,
4 night dresses.

Feeding.

Human Milk.—Secretion established at the end of forty-eight hours. Derives its origin from an overgrowth of epithelial cells lining the glands, their infiltration with fat and subsequent rupture. Is emulsified by casein. Specific gravity 1024–35.

CHEMICAL CONSTITUTION (A. V. MEIGS).

	Human.	Cows'.	Cream.
Water	87.163	87.012	79.122
Fat	4.283	4.209	13.362
Casein	1.046	3.252	2.919
Sugar	7.407	5.000	4.140
Ash	.101	.527	.457

Fat—Tests—(*a*) *Chemical.*—10 c.c. milk, 20 c.c. water, and 20 c.c. ether; agitate violently for five minutes; add 20 c.c. absolute alcohol, agitate, and allow to stand. Ethereal and alcoholic solution of fat rises. The residue is washed with ether, the solution of fat evaporated on hot-water bath, the whole quantity of fat remaining.

(*b*) *Microscopical.*—By counting the number of fat globules, 800,000 to the cubic millimetre normal. Not reliable.

Casein.—Nutritive quality depends more on casein than fat. The quantity of casein varies according to different chemists. From recent investigations, it would appear that there are three groups of albuminoid bodies—one coagulable (casein), two others non-cogulable. The difference between the casein of human milk and cows' milk is not as yet made out. This difference is thought to explain the difficulties of artificial feeding.

Sugar.—Is lactose, and is not so sweetening as cane sugar.

Quantity in Twenty-four Hours.—At the end of the seventh day, 14 ounces; at the end of fourth week, 2 pints. The infant after each meal gains in weight from 3–6 ounces, thus showing the amount of its meal.

Factors Influencing Secretion—(*a*) *Quality.*—If the diet of the nursing mother contains too little albuminous food, or too little fat, the milk is poor in fat. If it contain too much meat, fat or malt

liquor, it will have an excess of fat, which the infant cannot digest. The proper diet does not differ from the ordinary diet. An additional half pint of milk may be advised to be taken at eleven and four o'clock.

(*b*) *Quantity.*—This may be improved by the addition of milk as advised, and to some a half pint of malt liquor may be given at dinner, watching its effect upon the child. Always see that the nurse does not interfere with the diet.

Conditions Interfering with the Mammary Function.—(*a*) *Atrophy of glandular elements and overgrowth of connective tissue*, as from ill-developed physique, pressure of corsets, refusal to nurse, etc.

(*b*) *Diseases.*—Any acute, infectious disease, as the exanthemata, erysipelas, diphtheria, typhoid. In phthisis the quantity is not often affected, but the quality is impaired. There is apt to be less fat and casein, and the milk may contain the tubercle bacillus. A syphilitic mother should not nurse her child, for fear of infecting it, if it be not already infected, but a syphilitic child may be suckled by its mother without danger of her infection (Colles' Law).

(*c*) *Hemorrhage*, as when much blood is lost during the puerperium, or by the early return of menstruation, etc.

(*d*) *Emotions.*—How these affect the milk is not yet explained, possibly by the production of leucomaïnes. When the mother is influenced by profound emotions, her milk may become even poisonous to her child.

If mother cannot nurse child, it should be fed—

1. By wet nurse, and the selection should be governed by the following considerations:—

(*a*) She should have *milk of good quality*, which is best judged by the appearance of her own child.

(*b*) She should be of *suitable age.*

(*c*) Equable disposition and absence of disagreeable qualities.

(*d*) She should not have syphilis.

2. *Artificial feeding.*

Asses' milk is much more like human milk than cows' milk, but as it is not conveniently procurable, the latter is used. Cows' milk differs from human milk mainly in the per cent. of casein and sugar. Used alone, it would produce indigestion, diarrhœa, etc., probably

due to the greater proportion of casein, and to reduce this, dilution is resorted to.

Meigs' Formula for Artificial Food.

Milk, one tablespoonful.
Cream, two tablespoonfuls.
Lime water, two tablespoonfuls.
Sugar water, three tablespoonfuls.

(The sugar water is prepared by dissolving 17¾ drachms of sugar of milk in one pint of water.)

By an analysis of this formula the proportions of water, fat, casein, sugar and ash are practically the same as in human milk. In this formula, however, no account is taken of the non-coagulable albuminoids recently discovered, hence Prof. Hirst recommends that one drachm of Mellins' food be added, which supplies the amount of non-coagulable albuminoids (about 1½ per cent.) required.

Microörganisms and Ptomaïnes in Milk.—A large proportion of artificially-fed children die annually, particularly in the hot summer months, from gastro-intestinal disturbances largely due to the contamination of milk by various microörganisms and ptomaïnes.

Sterilized Milk.—To avoid and destroy such poisons the milk should be sterilized. Boiling the milk makes it less digestible and nutritious. Sterilizing it avoids this and a suitable apparatus or "sterilizer" accomplishes what is desired, if it be used with attention to all details and greatest possible care. The apparatus devised by Prof. Hirst consists of an ordinary egg-holder, containing twelve two-ounce bottles, suspended in a tin bucket. Each morning the bottles are sterilized by baking them until cotton placed in their mouths is browned. The milk and cream is then added, the bottles lightly stoppered with sterilized cotton and steamed for twenty minutes, when they are placed in a refrigerator until used. The lime water and sugar water should be prepared with boiled water and kept air-tight.

The nursing bottle (Starr's) and nipple should be scalded after each meal and kept submerged. The infant should be fed every two hours during the day and twice during the night (at 11 and 5).

Proprietary Foods:—

(*a*) *Milk Foods.*—Dried milk, as Nestle's or Carnrick's. Condensed milk—a part of the water is driven off by evaporation. Matzoon—

is similar to koumiss, *i. e.*, impregnated with CO_2. All of these probably have their digestibility and nutritive value partly destroyed. Condensed milk apparently does not disagree, but the fat which it produces in the child is from the excess of sugar and is not healthy nor stable, and in such children rachitis may develop.

(*b*) *Liebig Foods*—are digesting or semi-digested foods, as Mellins', etc.

(*c*) *Farinaceous Foods*—as Blair's Wheat, Hubbell's Wheat, Imperial Granum, Hood's Food, Ridge's Food, Robinson's Patent Barley, Bethlehem Oat-meal, etc. These are never to be used before the fourth month, as the pancreatic and mouth secretions of the baby cannot convert starch into sugar before that time.

Cleansing.

Daily bath in the middle of the day in the warmest part of the room. Temperature of water 90°. Castile soap and soft sponge.

Airing.

In summer the baby may be taken out after the second month. In winter after the third month, for a few minutes about noon, although each baby is a law unto itself in this respect.

Resting Place.

Preferably a crib.

Pathology of Newborn Infant.

INJURIES TO INFANT DURING LABOR.

Classified according to seat of injury.

1. Brain.

The injury is most frequently the result of faulty use of forceps or extraction of after-coming head. It may be (*a*) an *apoplexy*, varying in extent from rupture of a small vessel to longitudinal sinus. If lesser in degree, the child may live to adult age, but is apt to have paralyses or mental impairment. (*b*) *The brain substance may be crushed.* (*c*) *Injuries not so grave, but affecting intellectual or physical centres.*

2. Peripheral Nerves.

Facial and brachial plexuses most frequently damaged. The majority of cases of facial hemiplegia due to above use of forceps. Recovery usually in the course of a week. The brachial palsies result from unskilled attempts at extracting the shoulders, and are more likely to be permanent.

3. Skull.

(*a*) *Spoon-shaped Depressions of Parietal Bone.*—A prominent promontory or forceps may cause them.

(*b*) *Fractures.*—Require an antiseptic dressing.

(*c*) *Distortion.*—Very common. Result of different presentations and positions. Disappears within the first three days.

4. Scalp.

(*a*) *Caput Succedaneum.*—A serous infiltration of that portion of the presenting part corresponding to external os. Disappears in three days and requires no treatment.

(*b*) *Cephalo-hematomata.*—A more dangerous condition, and to be distinguished from the above. Two or three days *after* birth a swelling develops, rapidly increasing in size, with signs of a cystic tumor, distinctly confined to boundary of one of the cranial bones. It is due to a subpericranial hemorrhage, and is to be treated by non-interference, except when suppuration occurs. It then should be antiseptically laid open and drained.

(*c*) *Contused and lacerated wounds.*

(*d*) *Sloughs.*—The vitality of the scalp may be destroyed by forceps, or prolonged pressure and sloughs appear in a few days. Require ordinary surgical treatment.

5. Face.

Caput succedaneum may form. *Eyes* may be injured by careless examinations or extraction of after-coming head.

6. Neck.

(*a*) *Thrombus of muscles*, most frequently of sterno-cleido-mastoid, with the development of torticollis.

(*b*) *Fracture or decapitation.*

7. Limbs.

Fractures, which are usually a separation of diaphysis and epiphysis, requiring fixation and extension.

8. Trunk.

Perforations of the groin may occur, as result of use of blunt hook or forceps applied to breech.

ASPHYXIA.

Asphyxia of the newborn child results in consequence of an insufficient supply of oxygen.

Physiology of the Institution of Respiration.—The sudden change in its environment (liquid 99° to air 70°) produces an exaggerated stimulation of all muscles to reflex action. Placental respiration is abolished, and the accumulated CO_2 primarily stimulates, finally paralyzes the respiratory centre.

Causes :—

(*a*) *Intrauterine.*

1. Fœtal inspiration.

2. Any interference with placental respiration paralyzing the brain centres, as premature detachment of placenta ; coiling, compression or prolapse of the cord ; diminution of the calibre of the umbilical vessels, as from syphilitic periphlebitis ; excessive and prolonged uterine contraction.

3. Prolonged pressure on fœtal brain by pelvis or forceps, paralyzing brain centres.

4. Grave systemic diseases of the mother, including hemorrhage, uterine or pulmonary.

5. Immature development of the infant.

6. Anomalies or diseases of the fœtus preventing the entrance of air into the respiratory tract, or preventing the proper distribution of blood from right ventricle to lungs, as a patulous foramen ovale or atresia of the pulmonary artery.

(*b*) *Extrauterine.*

1. Placing the infant after birth in a position unfavorable for respiration.

2. Precipitate labor.

3. Interference with the access of air to respiratory, passages, as by a caul, unruptured membranes, or maternal discharges.

Varieties:—

(*a*) *Livida.* Accumulation of CO_2 is excessive, yet circulation and reflexes are preserved.

(*b*) *Pallida.* Usually an advanced stage of the former, characterized by weakness of the heart and slowing of its pulsations to a marked degree and abolition of reflexes.

Treatment.—If possible, should be prevented by removing the cause.

1. Extraction of mucus from throat and fauces by holding the child by the feet and cleaning the mouth with finger.

2. Application of an exaggerated stimulus, as slapping, rubbing, immersing in warm water and pouring ice water on epigastrium; electricity, if at hand, preferably faradic, the poles being placed on epigastrium and at the root of the neck. In the pallid variety only the most powerful of these are useful.

3. Artificial respiration.

(*a*) Sylvester's method. (Not recommended.)

(*b*) Marshall Hall's, modified to suit the requirements of the newborn infant by suspending in a towel, and thus rolling it from side to side.

(*c*) Schultze's. (Probably the best.)

(*d*) Mouth-to-mouth insufflation.

(*e*) Catheterization of larynx with soft catheter.

(*f*) As a last resort tracheotomy and catheterization through the wound. Only required in most exceptional cases.

Risks Attending Artificial Respiration.—Injuries, as apoplexies; Schultze's method may injure the spine; hemorrhagic effusions in the pleuræ and lungs; rupture of the air vesicles in insufflation; trachea and larynx may be injured.

DISEASES OF THE NEWBORN INFANT.

I. Diseases of the Lungs.

1. Atelectasis. 2. Pneumonia. 3. Tuberculosis.

1. *Atelectasis.*

Cause.—Not known.

Diagnosis.—Dullness on percussion on *one* side. Respiration slightly accelerated and imperfect. Absence of fever. These signs present at birth.

Pathological Anatomy.—One lung is found shriveled up, is not crepitant and sinks when placed in water.

Prognosis.—Not grave.

Treatment.—Gentle inflation of lung with catheter.

2. *Pneumonia.*—(*a*) Syphilitic. (*b*) Inspiration.

(*a*) *Syphilitic.*—The diagnosis can be made by a history of syphilis in the parents, by the signs of fœtal syphilis together with the cyanosis and physical signs of pneumonia. Treatment is of no avail, the child usually dying within 24 hours.

Pathological Anatomy.—An enormous overgrowth of connective tissue is found, compressing the blood vessels and diminishing the capacity of the air vesicles. As some air has entered the lung, a cut-off portion never sinks, but does not float buoyantly.

(*b*) *Inspiration Pneumonia.*—May be due to inspiration of maternal discharges, food, or septic matter.

Maternal Discharges.—Pneumonia arising from this cause develops twenty-four hours after birth, in a child apparently healthy, the temperature at this time beginning to rise and respirations growing more rapid. The child is restless, refuses nipple, is cyanotic, at times gasps for breath, and there is dullness over one or both lungs.

Prognosis.—Grave.

Treatment.—$\frac{1}{2}$ to 1 gr. carbonate of ammonium every four hours. Cotton jacket. Turpentine stupes twice a day. Mother's milk, from medicine dropper, every hour, and with this a few drops of brandy every three or four hours.

Pathological Anatomy.—Shows the features of catarrhal pneumonia. A cut-off portion always sinks (thus distinguished from syphilitic). The cause of pneumonia resulting from inspiration of food not yet made out. It may occur any time after birth.

Septic variety is rare since introduction of antisepsis.

3. *Tuberculosis.*—Rare.

Caused by mouth-to-mouth respiration by a tuberculous person.

DIFFERENTIAL DIAGNOSIS.

Atelectasis.	*Inspiration Pneumonia.*
One lung affected.	Usually both.
Exists at birth.	After twenty-four hours.
Temperature not elevated.	Always elevated.

II. Syphilis in Newborn Infant.

Symptoms.—The child is often ill-developed and ill-nurtured, but the characteristic signs do not usually develop before four to six weeks. In order of frequency these signs are—

Coryza syphilitica.
Maculo-papular syphilide.
Roseola.
Cutaneous papules and mucous tubercles.
Rhagades oris et ani.
Pemphigus.
Cutaneous ulcers.
Paronychiæ.
Pseudo-paralyses of extremities.
Hemorrhagic diathesis.
Bone diseases.
Fever.
Disease of testicles.

Treatment.—Best results from internal use of calomel with chalk or soda, $\frac{1}{12}$ grain given twice a day, gradually increasing the dose. Should vomiting or diarrhœa occur, resort to inunction, rubbing a piece of mercurial ointment as large as end of finger on binder every other day. Always carefully watch for poisoning.

This treatment should be kept up for months, replacing it from time to time by tonics or drop doses of the syrup ferri iodidi.

Prognosis.—If the child is well nourished by its mother or wet nurse the prognosis is very good, so long as some important internal organ is not seriously affected. In artificially fed children it is very bad.

III. Mastitis.

Four days after birth the breasts in both sexes contain colostrum, which has disappeared by the twentieth day. During this period there may occur in the breast of the child pathological processes like those in the breast of the puerpera. They can enlarge, become painful, the skin angry red, secretion much increased, and even mammary abscess develop.

Treatment.—Avoid squeezing. Apply cooling lotions, as lead-water and laudanum, and oil the skin to relieve tension. If suppuration supervene, poultice and open early.

IV. Specific or Essential Fevers.

(*a*) Exanthemata.
(*b*) Erysipelas
(*c*) Malaria.
(*d*) Septicæmia.

V. Treatment of Certain Congenital Deformities.

Hare-lip.—The deformity prevents suckling, hence immediate plastic operation in the first few hours of life.

Cleft-palate.—Too serious an operation to be undertaken at this time.

Tongue-tie.—Snip superficially with scissors and tear with fingers.

Umbilical Hernia.—If the exomphalic condition be even the size of an apple an immediate plastic operation is indicated.

Spina Bifida.—Non-interference, or consult with a surgeon.

VI. Nasal Catarrh.

Causes.—When not syphilitic, usually faulty clothing, ventilation or temperature of the room.

VII. Diseases of the Mouth.

(*a*) *Aphthæ.*—Rounded, pearl-colored vesicles seen in mouth and on lips. Washing the mouth daily with a clean linen will prevent them. Boric acid, gr. v–x to the ounce, is curative.

(*b*) *Thrush.*—Coalescence of white spots, with an areola of reddened mucous membrane. Is often seen in hospital practice. Now

thought to be due to the presence of a parasite, the saccharomyces-albicans.

Treatment.—Boric acid, gr. xvj to xx to ℥j of honey. ℥ss of this three or four times a day. The associated symptoms of malnutrition, diarrhœa and vomiting indicate attention to hygienic surroundings and the general health of the child.

VIII. Skin Diseases.

(*a*) *Gum*, due to irritation of atmosphere and clothing. Is a papular eruption resembling acne, but never becoming pustular.

Treatment.—Cleanliness, cosmoline, and proper clothing.

(*b*) *Simple Acute Pemphigus.*—Rare. From the second day to the fourth, fifth or sixth week, vesicles the size of a pea to a quarter- or half-dollar appear indifferently over the whole body except soles and palms, and last for twelve to fourteen days, without manifestation of constitutional disturbance.

Is contagious; may be carried by nurse, and may be communicated to mother or nurse. It disappears without treatment.

(*c*) *Syphilitic Pemphigus.*—Usually occurs *in utero*, and the child is born with vesicles, the soles and palms most often affected. The disease is associated with marked evidences of malnutrition and constitutional disturbance, and yields only to specific treatment.

IX. Ophthalmia Neonatorum.

Symptoms.—Usually after twenty-four to forty-eight hours the eyes are œdematous and puffed out, and there appears a sero-purulent discharge, which is soon greenish pus. If the lids can be separated the conjunctivæ are red and velvet-like in appearance, and later the cornea may lose its epithelium, ulcerate, and be perforated.

Treatment.—(*a*) *Prophylactic.* Crédé method. As soon as head is born warm water is dropped in the eyes. When the delivery is completed the eyes are again cleansed with warm water, followed by one or two drops of a ten-grain solution of nitrate of silver. A vaginal douche of bichloride is not always effective, because the cervix is not reached. There is danger of poisoning or sending air into the uterine veins if the cervix be injected.

(*b*) *Curative.* The eyes are cleansed every hour, alternating with a concentrated solution of boracic acid and bichloride of mercury,

1 to 5000 or 8000. Morning and evening, nitrate of silver, 20, 40 or 60 grains to the ounce, is dropped in the eye. If only one eye be affected, bandage the other carefully with a pledget of lint to protect it.

X. Hemophilia.

A disposition to bleed, which is inherited. The manner of transmission is peculiar; always through mother to male children, who do not transmit it. The female children show no evidences of it, but do transmit it. The cause is not known, and it manifests itself all through life. Treatment is of no avail.

XI. Icterus.

Two classes of cases :—

(*a*) Jaundice very light in degree. Face and breast only affected. Very common.

Cause.—Hepatogenic. Disappears third or fourth day after birth, and requires no treatment.

(*b*) Whole body is jaundiced. Urine and feces discolored and may contain blood. Is rare.

Cause.—Hepatogenic. Is also seen in Buhl's and Winckel's diseases and in septic infection.

Treatment of malignant variety. If from Buhl's or Winckel's diseases or from septic infection, as is commonly the case, is usually fatal.

XII. Cyanosis.

Causes, in order of frequency: Pneumonia (usually syphilitic), premature birth, malformation of heart and blood vessels, interference with nerves of respiration, malformations of respiratory tract, congenital pleurisy, partial occlusion of trachea.

XIII. Diseases of Umbilicus.

(*a*) *Septic Infection.*—The ulcer is covered with a grayish diphtheritic membrane, has a reddened areola, and may lead to general infection.

Treatment.—Prophylactic. The ulcer should be exposed at the daily bath, cleaned with soap and water and dressed with sali-

cylic acid, 1 part; starch, 5 parts. Tape, soaked in an ethereal solution of iodoform or antiseptic Chinese silk, should be used to ligate the cord at birth. *Curative.* The ulcer to be touched with solution of bichloride (1 to 500), and dressed as above.

(*b*) *Umbilical Fungus.*—An overgrowth of granulations. Cauterize with nitrate of silver. In about one-fifth of these cases nitrate of silver fails, the tumor is more solid, and is the remains of the omphalic duct called an enteroteratoma. It should be ligated and cut off.

(*c*) *Omphalitis.*—A peculiar inflammation of the umbilicus, in which the abdomen is conical, skin and subcutaneous connective tissue hard, red and infiltrated. It is always septic in origin, requires disinfection, poultices and early incisions, with stimulants and nourishment. Prognosis is serious.

(*d*) *Disease of Vessels.*—Always due to septic infection, and invariably ends in general septicæmia, which is fatal.

(*e*) *Hemorrhage.*—(1) From the vessels. It may be primary, from careless ligation, or secondary (the vessels of the cord close from placental end, and the hypogastric arteries may be patulous after the cord drops off, when increased blood pressure or handling the ulcer may bring on hemorrhage).

Treatment.—If bleeding vessel seen, ligate. Usually requires Monsel solution and pressure. As last resort, liquid plaster-of-Paris, or better, transfix with hare-lip pins and apply figure-of-eight ligature.

(2) Oozing from ulcer after the cord drops off. Rare. Styptics or cautery will not control it. Requires transfixion and figure-of-eight ligature.

XIV. Tetanus.

Is infectious. Occurs almost exclusively in hospitals, and is usually fatal.

XV. Melæna.

An extravasation of blood into stomach and intestines. Duodenal ulcer, some congenital defect increasing intra-abdominal blood pressure, or hemophilia may be the cause.

XVI. Perforation of Intestines and Intussusception.

XVII. Buhl's Disease.

Acute fatty degeneration of all organs.

Symptoms.—Icterus, cyanosis, diarrhœa, vomiting, etc., are present, but nothing sufficiently characteristic to make a diagnosis before death.

XVIII. Winckel's Disease.

Acute hæmoglobinuria with jaundice, cyanosis and fatty degeneration of all organs.

XIX. Sudden Death of Apparently Well Children.

Causes.—(*a*) Overlying by mothers, accidentally or intentionally.

(*b*) Diseases: most commonly pneumonias, apoplexies, more rarely perforation or intussusception, or other diseases, as above.

(*c*) Occlusion of trachea by enlarged thymus.

Medication

The following are some of the drugs and their doses required in the first four weeks of life. Opium, as paregoric 2–5 gtt., laudanum $\frac{1}{4}$–$\frac{1}{2}$ gtt., mercury, as calomel $\frac{1}{12}$–$\frac{1}{8}$ gr., castor oil 15 gtt. to ℥j, nitrate of silver $\frac{1}{10}$ grain, etc.

Pathology of the Puerperal State.

I. Abnormalities of Involution.

These may be anomalies by (*A*) excess, *superinvolution*, (*B*) by defect, *subinvolution.*

Involution.—The old theory was that by fatty degeneration and absorption the uterus was regenerated from the embryonal muscle cells in the outer layer. This has been disproved. The degeneration is chiefly fatty, but there are other degenerative processes at the same time. Regeneration is not absolute, *i. e.*, the whole muscle cell is not destroyed, but loses its redundant tissue. The process is rather an atrophy, and stops after the muscle fibre reaches its original size. This same process affects the mucous membrane, peritoneum, uterine adnexa, vagina and vulvæ. Below the contraction ring it is an intermediate process, mainly retraction of overstretched tissue.

(*A*) *Superinvolution.*—An exaggeration or abnormal prolongation

of that process by which the parturient uterus regains its normal conditions. Is rare. Its diagnosis and treatment belong to Gynæcology.

(*B*) *Subinvolution.*—A retarded or arrested involution.

Causes.—(*a*) Anything *increasing blood supply*, as hypertrophy of mucous membrane during pregnancy, fibroids, inflammatory conditions resulting from sepsis, mechanical interference with pelvic circulation, leading to its engorgement, as heart disease.

(*b*) Anything *interfering with contraction of uterine muscle*, as retained placenta, polypoid tumors, large masses of decidual tissue, uterine displacements, distended bladder or rectum, dragging adhesions.

Diagnosis.—By abnormalities in the daily diminution in size of the uterus.

1st day, normally, the fundus one finger above umbilicus.

2d day, the fundus level with navel.

3d and 4th day, the fundus a trifle below navel.

5th and 6th day, the fundus two fingers below navel.

7th, 8th and 9th day, the fundus three to four fingers above symphysis.

10th, 11th and 12th day, the fundus a little above, at, or below symphysis.

Involution is not complete for six weeks, and to determine the size of the uterus subsequent to its retraction below the symphysis (12th day), the following intrauterine measurements have been made :—

10th day	10½ cm.	5th week.....	7½ cm.
15th "	9.9 "	6th "	$7\frac{1}{10}$ "
3d week.....	8.8 "	8th "	$6\frac{7}{10}$ "
4th "	8 "	10th and 12th week	6½ "

7 cm. is the normal measurement of the non-pregnant uterus, and this table shows, therefore, a physiological super-involution which is overcome by subsequent engorgement of uterine vessels.

Treatment.—Varies with the cause. If due to hypertrophied deciduæ, polypoids, retention of placenta or placentæ succenturiatæ —curette. Never allow bladder to be distended, nor constipation to exist. Correct displacements, combat septic inflammation, treat any

heart disease, and if fibroids be the cause, give a pill of ergot, strychniæ and quinia, and administer faradism daily. The routine administration of ergot not recommended. It does not secure contraction, and often has ill effect upon the child through the mother's milk.

II. Puerperal Anemia.

A subinvolution of the blood. The physiological hydræmia of pregnancy fails to disappear.

Causes.—Any wasting or depressing disease, loss of blood from post-partum or other hemorrhages, cancer, puerperal chorea, or insanity.

Prognosis.—Yields usually to timely treatment. May progress to pernicious anemia if neglected.

Treatment.—Iron (Blaud's pill). Arsenic seems to be needed in some cases.

III. Repair of Injuries after Labor.

Slight lacerations and tears heal rapidly. Even extensive injuries, as fistulæ, sometimes heal spontaneously. Small sloughs should be touched with nitric acid. Lacerations of the cervix, if productive of serious hemorrhage, should be closed by suture. Always stitch a laceration of the perineum when beyond a half-inch in length, being careful to apply sutures, so that fistulæ may not result. When the perineum has been torn, a douche is given after delivery of the placenta, and absorbent cotton soaked in 10 per cent. solution of cocaine is placed in the vagina, while the doctor prepares his instruments to repair the injury. If the sphincter has been torn, the two edges are united by interrupted catgut sutures. Any tear in the vagina should be repaired by continuous catgut suture. The perineal tear is united by silkworm-gut sutures clamped with shot.

Any of these injuries will produce an immediate elevation of temperature after labor above the normal rise.

IV. Puerperal Hemorrhages.

Hemorrhages occurring during the puerperium, from 24 hours after labor until the completion of involution (6 weeks). Hemorrhage is called post-partum when it occurs within the first 24 hours after labor.

Causes, in Order of Frequency:—

(*a*) Retained Secundines.
(*b*) Displaced Uterus.
(*c*) Displaced Thrombi.
(*d*) Emotion.
(*e*) Relaxation of Uterus.
(*f*) Retained Clots.
(*g*) Fibroids.
(*h*) Hæmatomata.
(*i*) Pelvic Engorgement.
(*j*) Secondary Bleeding.
(*k*) Carcinomata.

Retained Secundines.—Always examine placenta to see if a part has been retained, and remove antiseptically with the finger any fragments left in the uterus. If more than one-third of the membranes are retained they should be similarly removed.

Displaced Uterus.—When lateral, anterior or posterior, hemorrhage is due to the congestion or retention of blood from mechanical obstruction. In the latter clots will be discharged. This congestion, with loss of tonicity, often develops subinvolution. Backward displacement is frequently caused by a (1) sudden effort, especially if patient is out of bed too early (2) misplaced compress, (3) over-distended bladder. Inversion and prolapse considered later. In all cases the bladder should be emptied and uterus replaced.

Displaced Thrombi.—Perfect quiet should be secured to prevent dislodgement of the thrombi formed in the uterine sinuses. The most dangerous is when they are disintegrated by microbes with the development of septicæmia.

Treatment.—As hemorrhage from this cause is usually sudden and alarming, at once apply an intra-uterine tampon of iodoform gauze.

Emotion.—How it produces hemorrhage is not known. Probably by interference with blood pressure or causing relaxation of the uterus.

Relaxation of Uterus.—Rarely occurs. Almost never after the third day and even before this time, only in women of poor physique.

Treatment.—Same as for post-partum hemorrhage.

Retained Clots.—Rarely a primary cause, but often secondary to retained placenta, flexions, etc.

Fibroids.—Always cause excessive lochia and usually produce hemorrhage.

Treatment.—A pill of strychnia, ergot and quinine. If severe, an intrauterine tampon.

Hæmatomata.—Is an interstitial bleeding, submucous or subcutaneous. The resulting tumor, which is usually globular in shape, may be situated on one or both labiæ, in the cervix or broad ligament, etc. The very small ones are more frequent.

Causes.—(*a*) Predisposing.—Pelvic engorgement and straining during labor. Marked anteversion.

(*b*) Exciting.—Rupture of a blood vessel, usually a vein of large size, from straining, a blow or forceps.

Symptoms.—The rupture occurs during the second stage of labor, accompanied by sharp, lancinating pain and painful expulsive efforts, the tumor usually appearing after labor is completed.

Prognosis.—Death may occur from hemorrhage or sepsis, but ought to be exceptional.

Treatment.—Secure absorption if not larger than one's fist, by cleanliness, rest, cooling applications and antiseptic douches. If larger, wait until it ceases to increase in size (except when it appears between the birth of twins or prevents escape of lochia), when it should be incised and turned out. Control hemorrhage when sac ruptures by ligation or iodoform gauze compress. To control the bleeding into the sac when the tumor first appears, resort to cold and pressure with the largest size Barnes' bag. The danger of sepsis contraindicates an ordinary tampon.

Pelvic Engorgement.—May arise from too early sexual intercourse, increased intra-abdominal pressure from liver or heart disease, subinvolution, etc., thus prolonging the bloody lochia.

Secondary Bleeding.—From laceration of vessels along the parturient tract, especially about the meatus, the hemorrhage recurring after the pressure of the child's head is removed.

Carcinomata.—Of the cervix. Rarely may develop suddenly at the placental site and end fatally in a few weeks or months.

V. Anomalies of the Breasts.

Galactorrhœa.—Rarely is the milk supply excessive for the requirements of the child.

Cause.—None satisfactory. Plethora, anemia, phthisis have been reported as causes.

Treatment.—Unsatisfactory. The best, perhaps, is pressure, ergot and potassium iodide. Electricity and local astringents have been recommended.

Anatomical Defects.—1. Congenital absence of or supernumerary glands.

2. Inversion of Nipple.—Rather common in modern girls, from pressure of corsets. Should always be looked for.

Treatment.—Evert with breast pump, only in last month of pregnancy to avoid miscarriage from reflex contraction of uterus. If the pump fails resort to a shield, and finally artificial feeding.

3. Fissured Nipple.—*Causes.*—Maceration and irritation of nipple. Mammary abscess frequently results from it.

Treatment.—(*a*) *Prophylactic.*—During the latter months of pregnancy the nipple should be washed and greased with sweet oil twice a day, and receive a daily bath with a saturated solution of alum. Avoid alcoholic astringents, and keep the nipple clean during lactation.

(*b*) *Curative.*—Apply tinct. benzoin comp.

Inflammations of the Breasts.—(*a*) Of the subcutaneous connective tissue.

(*b*) Of the deeper interstitial tissue.

(*c*) Parenchymatous.

Causes.—Of the first two classes a large proportion are due to sepsis. Parenchymatous inflammation need not be from this cause. Over activity of the gland with retained secretion (the so-called "caked breast") may be the cause.

Treatment.—If parenchymatous and due to over secretion empty with pump or by massage. If of the connective tissue and abscess is threatened, apply leadwater and laudanum and a mammary binder. Suckling had best be intermitted, as the secretion is apt to disagree with the child, and rarely has given rise to septic infection of the intestines.

Abscess.—The pus may be located :—

(*a*) Superficially.
(*b*) In the gland substance.
(*c*) Post-mammary.

Symptoms of Suppuration.—Uncertain. The reddened skin, fever, bogginess, etc., may be due to other causes, and fluctuation rarely detected until late.

Treatment.—Be prompt ; err on safe side by making an early incision, radiating, through skin, and then locate abscess with director. Wash several times a day with antiseptic solution, and apply pressure, to prevent further burrowing. If fistulæ result, resort to firm pressure, drainage and antisepsis.

When the abscess is post-mammary the whole breast is lifted off the chest and there are no signs on the surface.

Treatment.—Incise beyond the periphery of the gland at the more dependent part, pass a drainage tube through a counter-opening, and dress antiseptically.

Galactocele—A milk tumor due to occlusion of one of the lactiferous ducts. Usually of no pathological importance.

VI. Diseases of the Urinary Apparatus.

Cystitis. Pyelitis.—The use of dirty catheters a frequent cause.

VII. Diseases of the Nervous System.

Insanity may occur during pregnancy, labor or lactation. During pregnancy it is apt to be melancholia ; after labor, mania.

Prognosis.—Tolerably good. Two-thirds to three-fourths recover. Death may occur from maniacal exhaustion or septic infection.

Treatment.—Isolation. Rest cure.

VIII. Puerperal Fever.

Puerperal fever is an elevation of temperature during the puerperium.

Classification :—

I. Infectious. II. Non-infectious.

The infectious may be further classified as follows :—

A. *Those in which the infecting poison enters through wounds in the genital canal or immediate neighborhood.*

(*a*) The pathogenic agent a microbe.
(*b*) The pathogenic agent a ptomaïne.

B. *Those in which the poison enters other channels.*

Septicæmia, a name commonly given to the disease resulting from the invasion of the body by microbes and their products, may be due to a very great variety and number of microörganisms. In the appended chart will be found a list of those discovered up to this time:—

Streptococcus pyogenis.
Streptococcus erysipelatis.
Bacillus œdematis maligni.
Staphylococcus pyogenis aureus.
Micrococcus of osteomyelitis,
Staphylococcus pyogenis albus.
Micrococcus pyogenis tenuis.
Staphylococcus pyogenis citreus.
Staphylococcus cereus albus.
Staphylococcus cereus flavus.
Bacillus saprogenis, 1.
Bacillus saprogenis, 2.
Bacillus saprogenis, 3.
Bacillus pyogenis fetidus.
Staphylococcus salivarius septicus.
Coccus salivarius septicus.
Bacillus salivarius septicus.
Bacillus of chicken cholera.
Bacillus of rabbit septicæmia.
Bacillus of pseudo-œdema.
Bacillus of mouse septicæmia.
Mouse-septicæmia-like bacillus.
Diplococcus pneumoniæ.
Bacillus resembling pneumonia bacillus.
Diplococcus intra-cellulosis meningitidis.
Bacillus septicus agrigenus.
Streptococcus pyogenis malignus.
Streptococcus septicus.
Streptococcus septo-pyæmicus.

Streptococcus articulorum.
Bacillus necrophorus.
Brieger's bacillus.
Emerick's bacillus.
Bacterium coli commune.
Bacillus of intestinal diphtheria.
Micrococcus botryogenus.
Micrococcus of progressive lymphomata.
Bacillus of rhinoscleroma.
Tetanus bacillus.
Bacillus of acne contagiosa (Harold Ernst).

I. *Infectious Fevers.*

A. The more common variety of infectious puerperal fever is that due to the absorption of ptomaïnes through wounds in the genital canal. The microbes, which during decomposition generate the absorbed ptomaïnes, may gain access from doctor, nurse, instruments or atmosphere charged with putrescible material, and attack clots, portions of hypertrophied mucous membrane, etc.

Diagnosis.—The symptoms of septic poisoning are—

(*a*) *Local.*—1. Putrid discharge.
2. Œdema of vulvæ.
3. Diphtheritic patches.

(*b*) *General.*—1. Fever, usually preceded by a chill, although a fatal case may occur without fever.

2. Peritonitis—develops with spread of poison, although it may be entirely absent.

3. Other organs infected by the microbes, as kidneys, lungs, spleen, brain, with development of corresponding symptoms. The result of treatment can alone determine whether in any case the symptoms be due to the absorption of microbes or ptomaïnes—*i. e.*, it is impossible to diagnosticate the absorption of ptomaïnes, as such, from the symptoms alone. Elevation of temperature during the puerperium may arise from many causes, but should be treated as septic until proven to be otherwise. In this climate it is most commonly mistaken for malaria.

Treatment.—The indications are (1) to stop the manufacture of these poisonous bodies, which is best accomplished by destroying the

microbes and removing their habitat, and (2) sustain strength to aid the struggle between the body cells and microbes. The first is accomplished by *douches*, vaginal and intra-uterine, the use of the *curette*, *intra-uterine wipers*, *forceps*. In skillful hands the curette is best. Hirst's sharp curette requires some care and skill. Mundé's wire curette is less dangerous, but less effective. Doléris' ecouvillon may be used in an emergency.

The Operation.—

1. The hands and arms washed with bichloride solution, 1 to 1000.

2. Vaginal Douche.—2 per cent. solution of creolin (five drachms to a quart of water).

3. Curette passed to fundus, and whole cavity of uterus gently scraped, using only the force of the thumb and first finger. Remove débris with forceps.

4. Intrauterine Douche.—Fountain syringe, a two-way catheter (Lentz or Bozeman), a quart of 2 per cent. solution creolin, or bichloride solution 1 to 4000. If the latter be used, the uterus should always be immediately washed out with sterilized water. Douches to be given once in twenty-four hours. A heavy dose of quinia should be given for the fever and to eliminate any malarial origin of the elevated temperature. When the symptoms are due to the absorption of ptomaïnes, this treatment will be followed by their speedy disappearance. If they continue, the second indication—in which the treatment is only palliative and symptomatic—is met by a *full diet* of milk, two or more quarts in twenty-four hours, if assimilated; partially digested, if necessary, and *large quantities* of *stimulants*, one pint or more in twenty-four hours, of whisky, wine or brandy.

For the *peritonitis* apply light poultices twice a day, with a stupe while the former are being changed. Sufficient opium to relieve pain is demanded. Bleeding and salines are too debilitating and should be avoided in septic peritonitis. Treat other complications on general principles.

Prognosis.—Large majority recover with appropriate treatment. As a rule, if temperature be high, internal organs involved, if there are repeated chills, the pulse weak and fluttering, the prognosis is more grave, but death may occur without these being present.

Phlegmasia Alba Dolens, or Milk Leg.—There are two classes of cases :—

1. Thrombosis of veins of thigh.
2. Connective tissue of thigh affected.

Symptoms.—From the tenth to thirtieth day there develops a heaviness and stiffness in the leg, soon followed by swelling, occurring in different localities, at the ankle, gradually ascending to the groin (if due to thrombosis of the veins), or at Poupart's ligament extending down the thigh (if due to involvement of the connective tissue). Fever is evanescent, and usually disappears before swelling subsides.

Cause.—Septic infection.

Prognosis.—Grave, death resulting from general septic infection, or embolism.

Treatment.—The condition is asthenic in tendency, hence treatment should be supporting and stimulating. Enjoin absolute quiet and rest in bed to avoid embolism. Elevate the limb, wrapped in cotton, and when convalescent resort to cautious massage.

Preventive Treatment of Puerperal Fever.—Secure absolute cleanliness of doctor, nurse, patient, instruments, atmosphere, etc.

Hands.—Washed with soap and water followed by immersion in alcohol and solution of bichloride 1 to 1000.

Instruments.—2 per cent. solution creolin. In hospital work the bedding should be washed in bichloride solution, and the patient given a bath just before labor.

Atmosphere.—Selection of well ventilated room is important. Use occlusive dressing of corrosive cotton and gauze, which should be changed frequently.

External Genitals.—Cleaned when each pad is applied, never using a sponge, but preferably baked cotton, or corrosive jute.

(*B*) Puerperal fever in which the poison enters other channels (*i. e.*, not through wounds of genital canal, etc.). Includes any of the infectious diseases, as the exanthemata, etc. When these diseases occur during the puerperium, their course is often modified. Incubation is usually shortened and convalescence prolonged. Their diagnosis is always obscure, as it is apt to be confounded with sepsis; the germs of any of them, when introduced through wounds in the genital canal, producing about the same symptoms. Their prognosis is more unfavorable.

II. *Non-infectious Fevers.*

The temperature of women during the puerperium is very variable, and easily influenced by causes which in health would have no effect.

Non-infectious puerperal fever may be due to :—

(*a*) Emotion.
(*b*) Exposure to cold.
(*c*) Constipation.
(*d*) Reflex irritation.
(*e*) Cerebral diseases.
(*f*) Eclampsia.
(*g*) Insolation.
(*h*) Syphilis.
(*i*) Exacerbations of acute or chronic diseases contracted during or before pregnancy.

Influence of child-bearing upon Phthisis.—The laity believe it to be favorable. This is not the fact. Pregnancy, the puerperal state and lactation are a drain on woman's strength, and can cause the development of phthisis in those predisposed to it. If already present the symptoms are exacerbated.

SYLLABUS OF OBSTETRIC LECTURES.

LECTURES TO THE COMBINED CLASSES.

PART II.

Anatomy of the Pelvis Obstetrically Considered.

The *false pelvis* is that expanded portion situated above the ilio-pectineal line.

The *true pelvis* is that part of the cavity beneath the ilio-pectineal line.

I. Position.

The obliquity to the spinal column and trunk in the erect posture is 55° at the superior strait, 10° at the inferior strait.

II. Shape.

The false is irregularly funnel-shaped, exerts no special influence on the course of labor, and is accessory to the true, serving to direct the presenting part into the true. The true is similar to a truncated cylinder, five inches in depth behind, one and a half in front, and three and a half laterally.

The shape of the inlet or superior strait is most frequently cordiform. May be circular or elliptical. The shape of the cavity is chiefly noted for its irregularity, and the outlet or inferior strait is cordiform.

III. Size.

(*a*) *Inlet.*—The *antero-posterior* or *conjugate diameter*, measured from the upper edge of the promontory of the sacrum to a point an eighth of an inch below the upper border of the symphysis, is 11 cm.

The *transverse*, the longest possible transverse distance, is 13½ cm. The *oblique*, from upper edge of one sacro-iliac junction to opposite ilio-pectineal eminence, is 12¾ cm.

(*b*) *Cavity.*—The plane of pelvic expansion perforates the middle of the symphysis, tops of acetabula, and the sacrum between the second and third vertebræ.

Diameters: antero-posterior 12¾ cm.; transverse 12½ cm.

The plane of pelvic contraction passes through tip of sacrum, spines of ischia and under surface of symphysis.

Diameters: antero-posterior 11½ cm.; transverse 10½ cm.

(*c*) *Outlet.*—Antero-posterior 9½ cm.; transverse 11 cm.

IV. Direction of Pelvic Canal.

Represented by a curved line parallel to concave surface of sacrum, and equally distant from sides of pelvis (curve of Carus).

Development of Adult Pelvis.—The fœtal pelvis represents a funnel, and the development of the irregularities and peculiarities of the adult pelvis may be accounted for by three factors, viz.:—

(*a*) Weight of the body, (*b*) counter-pressure of the femora, (*c*) force exerted by the ligaments. The sacral curve and lateral aspects are thus explained.

The Bony Pelvis Filled with Soft Tissues.

(*a*) *Muscles.*—Ilio-psoas, obturator internus, pyriformis, coccygeus, levator ani, retractor ani, sphincter ani, constrictor vaginæ, transverse perinei. The levator ani plays a most important part in the sexual life and physiology of woman. A vigorous contraction of this muscle pulls the rectum and vagina towards the symphysis, and when distended during labor, serves to direct the head out under the symphysis, thus relieving the strain on the perineum. It is active during the orgasm in the female, and directs the male organ toward the cervical canal.

During parturition the function of the muscles of the *pelvic canal* (ilio-psoas, obturator, pyriformis, etc.,) is mechanical. They serve as bumpers or protectors to the bony wall, and deflect the presenting part in the most favorable direction for its expulsion. The situation of the ilio-psoas muscles diminishes the transverse diameter of the inlet, so that in the pelvis during life the diagonal is the greatest

diameter, thus explaining the great frequency of oblique positions of the presenting part.

The muscles of the *pelvic floor* (levator ani, coccygeus, transverse perinei, etc.,) are passive, in one sense, during parturition. They yield only outward and backward, and by resisting the passage of the presenting part, are frequently lacerated, yet the direction of their resistance serves to deflect the head outward and upward under the symphysis.

(*b*) *Ligaments.*—The *obturator membrane* closes the foramen and serves as a cushion to protect the presenting part. The *sacro-sciatic* ligaments close the pelvic wall, afford protection and give direction to the presenting part.

(*c*) *Connective Tissue.*—A knowledge of the distribution of the pelvic fascia is of importance in determining the course of extension of interstitial bleeding or absorbed infecting organisms. From both sides of the uterus the connective tissue extends in three directions. Laterally, it is included in the broad ligament, and, traveling along the round ligament, it reaches the mons veneris and inguinal region. Anteriorly, it skirts the bladder and is continuous with the subcutaneous connective tissue of the abdominal wall. Posteriorly, it skirts the rectum, is included in the meso-rectum, and is continuous with the connective tissue of the posterior abdominal wall. It also follows the three canals which perforate the pelvic floor, the urethra, vagina and rectum, and thus is continuous with the subcutaneous connective tissue of the external genitalia and perineum.

(*d*) *Blood Vessels.*—The *ovarian* arteries, leaving the abdominal aorta, enter the pelvis on either side, and passing between the laminæ of the broad ligament, are distributed to the ovaries and tubes, a branch going to the fundus, another traversing the uterus to anastomose with a branch of the uterine artery. The uterine artery passes downward from the anterior trunk of the internal iliac to the neck of the uterus. Ascending the sides of the uterus, a branch meets the ovarian, and a branch, *the circular artery of the cervix,* supplies the cervix. The latter is sometimes ruptured during labor, or cut during operations upon the cervix, and gives rise to pronounced hemorrhage. The venous supply to the pelvis is very abundant.

(*e*) *Lymphatics.*—Important in their relation to septic absorption.

The lymph spaces of the uterus, lying between connective-tissue bundles, and covered with endothelial cells, empty, by means of their ducts, into the lymphatic glands. These lead to the thoracic duct. The most important glands are the uterine, inguinal, obturator, hypogastric, lumbar and sacral.

(*f*) *Nerves.*—Principally from sympathetic system. The uterine plexus sends off the two hypogastric plexuses, and from these filaments pass to ovaries and uterus.

Deformities of the Pelvis.

(Classification of Schauta.)

A. Anomalies of the Pelvis the Result of Faulty Development.

(1) Simple Flat.
(2) Generally Equally Contracted (justo-minor).
(3) Generally Contracted Flat (non-rachitic).
(4) Narrow Funnel-shaped.
Fœtal or Undeveloped.
(5) Imperfect Development of One Lateral Mass of Sacrum. (Nægele's Pelvis.)
(6) Imperfect Development of Both Lateral Masses. (Roberts' Pelvis.)
(7) Generally Equally Enlarged (justo-major).
(8) Split Pelvis.

B. Anomalies due to Disease of the Pelvic Bones.

(1) Rachitis.
(2) Osteomalacia.
(3) New Growths.
(4) Fractures.
(5) Atrophy, Caries and Necrosis.

C. Anomalies in the Conjunction of the Pelvic Bones.

(*a*) Too firm union (synostosis).
(1) Of symphysis.
(2) Of one or both sacro-iliac synchondroses.
(3) Of sacrum with coccyx.

(*b*) Too loose a union or separation of the joints.

(1) Relaxation and rupture.

(2) Luxation of the coccyx.

D. Anomalies due to Disease of the Superimposed Skeleton.

(1) Spondylolisthesis.

(2) Kyphosis.

(3) Scoliosis.

(4) Kypho-scoliosis.

E. Anomalies due to Disease of Subjacent Skeleton.

(1) Coxalgia.

(2) Luxation of One Femur.

(3) Luxation of Both Femora.

(4) Unilateral or Bilateral Club Foot.

(5) Absence or Bowing of One or Both Lower Extremities.

The *simple flat* pelvis is the most frequent variety in this country. The contraction is at the conjugate diameter of the inlet. The narrow, *funnel-shaped* pelvis occurs in those whose bony development has ceased or in those who never have walked. In the latter the three developmental factors which produce the normal adult pelvis have been inoperative. In the *split* pelvis the deformity is at the symphysis and is associated with extrophy of the bladder. The characteristics of the *rachitic* pelvis are: excessive rotation of the sacrum on its transverse axis, resulting in an abnormal projection of the promontory and increased sacral curve; the curve of the iliac bones is exaggerated and their anterior spines more widely separated. This form is next in frequency to the simple flat in this country. The greatest contraction is in the conjugate at the brim. *Osteomalacia* is very rare in this country. It gives rise to the "beak-like" projection at the symphysis. The *new growths* causing deformity may be any of the tumors that can develop from bone.

When the *pelvic joints* are *too firmly united* the physiological loosening which happens during the latter months of pregnancy cannot occur. *Anchylosis of the sacro-coccygeal* joint is not infrequent in old primiparæ. *Spondylolisthesis* is a slipping down of the last lumbar vertebra into the pelvic cavity. In *kyphosis* the weight of

the body is from above downward and from before backward. The sacrum is thus pushed backward, increasing the diameters of the inlet but diminishing the outlet. The distortion resulting from *scoliosis* is a lateral displacement of the promontory giving rise to an oblique deformity. *Lordosis* is the compensatory curve seen in kyphosis.

Pelvimetry.

Table of Measurements.

Pelvis.

Iliac spines, 26 cm.
Iliac crests, 29 cm.
External conjug., 20¼ cm.
Internal conjug., diagonal, 12¾ cm.
True conjug., estimated, 11 cm.
Right diagonal, 22 cm.
Left diagonal, 22 cm.
Between Trochanters, 31 cm.
Circumference of Pelvis, 90 cm.

An accurate measurement of the pelvis by means of the pelvimeter will disclose any change in shape or size of the pelvis, indicate the degree of the deformity, and thus influence the treatment. The measurements are made externally and internally between certain bony prominences. The varying factors in the external measurements to be taken into consideration are the thickness of the skin, subcutaneous tissue and the bones.

Estimation of the Size of the Inlet.—An approximate idea of the *transverse* diameter is gained by measuring externally between the anterior superior spinous processes of the ilia (26 cm.); between the crests of the ilia where they are most widely separated (29 cm.); between the two trochanters (31 cm.). The transverse diameter may be determined more accurately by an internal measurement called the *internal ascending oblique* (Löhlein). This is measured, by the finger in the vagina, from the centre of the sub-pubic ligament to the upper anterior corner of the great sacro-sciatic foramen. The transverse is 2 cm. longer than this diameter.

An idea of the length of the *antero-posterior* diameter of the inlet

is derived from the *external conjugate*, measured from the depression under the spine of the last lumbar vertebra to the upper edge of the symphysis (20½ cm.). The internal measurement for estimating the antero-posterior diameter is made by the fingers reaching from the middle of the sub-pubic ligament to the top of the promontory, and is called the *internal conjugate diagonal* (12¾ cm.). This diameter is necessarily longer than the true conjugate, and it has been found that by substracting 1¾ cm., the true conjugate is estimated. The possible sources of error in thus estimating the true conjugate are found in the fact that the internal conjugate diagonal does not take into account the height and angle of the symphysis, two factors which obviously influence the length of the true conjugate, while they have no effect upon the diagonal conjugate. Normally the height of the symphysis is 4 cm., and its angle 105° (conjugato-symphyseal angle).

If this were always the case, subtracting 1¾ cm. from the measured internal conjugate diagonal would be absolutely correct. As a matter of fact, both the height and the angle vary, and by the following rules the true conjugate can be accurately determined.

For every .5 cm. increase in the height of the symphysis above the normal, add .3 cm. to 1¾ cm., and subtract the sum from the measured internal conjugate diagonal. The converse of this is applicable to a decrease in height of the symphysis.

For every degree of increase of the conjugato-symphyseal angle above the normal, add half that number of mm. to 1¾ cm., and subtract the sum from the measured internal conjugate diagonal. The converse of this is also true.

The *oblique* or *diagonal* diameters may be measured externally from the posterior superior spinous process of the ilium to the opposite anterior superior spine (22 cm.).

Estimation of the Size of the Cavity.—No external points of measurement. Its general size, or the presence of a tumor, is learned by a vaginal examination.

Estimation of the Size of the Outlet.—As it is increased in many varieties of deformity, and but rarely contracted, external measurements are not required in the vast majority of cases. It is decreased in the kyphotic pelvis. The distance between the tuberosities of the ischia (11 cm.) is ascertained by Chantreuil's method: placing the

two thumbs on the tuberosities, and an assistant measures the distance between them.

Chief diagnostic points of the commoner forms of pelvic deformity.

Simple Flat Pelvis.—The external conjugate will be less than 20¼ (19 or 18), and the internal conjugate diagonal less than 12¾.

Flat Rachitic.—The external conjugate lessened (18 or under). Internal conjug. diagonal lessened (11 or under). Conjugato-symphyseal angle is increased; about 2 cm., not 1¾ cm., is subtracted. The relation of the distances between the spines and crests is disturbed.

Justo-minor.—All the diameters less, but normal relation maintained.

Justo-major.—All diameters increased, but normal relation remains.

In private practice it is by no means necessary to accurately measure the pelvis of every pregnant woman. When, however, there exist evidences of some deformity, as rachitis, kyphosis, coxalgia, a history of grave difficulty in previous labors, etc., a vaginal examination should be made to estimate the conjugata vera, and other measurements taken as may be indicated.

Fœtometry.

Table of Measurements.

Child.

Length	50 cm.
Bisacromial	12 cm.

Head.

Bitemp	8 cm.
Bipariet.	9¼ "
Occip. front	11¾ "
Occip. mental	13½ "
Trachelo-bregm	9½ "
Circumference, occip., front	34½ "

The weight of mature infant is 3250 grm.

In connection with the size of the pelvis, a second important factor

influencing the difficulty of labor, is the size of the fœtus, particularly of its head.

Estimation of the Size of the Fœtus.—An approximate idea of its size can be determined by abdominal palpation.

Abdominal Palpation.—The woman should be placed on her back, with abdomen exposed. The examiner, standing to one side facing her head, by a series of stroking, patting and rubbing motions, determines the height of the fundus, tension of abdominal wall, irritability of the uterus, quantity of liquor amnii, size of the fœtus, its position and presentation.

Position and Presentation.—The palmar surface of the tips of the fingers are carried up the sides of the abdomen, and upon one side (left in the first position) is noticed firm, broad, even resistance, contrasting with the cystic, tumor-like sensation of the other side.

This resistance is produced by the back, and, to confirm this, the extremities are searched for by a rubbing motion on the opposite side. Having located the back and the extremities, the portion of the fœtal ellipse presenting at the superior strait is next ascertained.

The examiner now faces the woman's feet, and, with the middle fingers over the centre of Poupart's ligament, the fingers dip down into the pelvic cavity. If the head is presenting, it is felt as a hard, round mass. At the same time its density, compressibility and approximate size may be learned.

When it has not engaged, its relative size to the inlet, which is of obvious importance, may be discovered by an effort to push it through the superior strait.

Antisepsis.

Mortality of Septic Infection.—In large cities the average death rate of confinement cases is about one per cent., the greater proportion being due to septic infection. In Philadelphia about thirty thousand women are annually confined at term, and of these between two and three hundred die from septic infection.

Functions of Microörganisms.—The widespread distribution of microörganisms is now well known, and investigation has shown their chief function to be disintegrators and destroyers of dead animal and vegetable matter.

Ptomaïnes.—In their work of disintegrating and destroying dead

animal matter, poisonous products are produced, called animal alkaloids or ptomaïnes (πτομα, dead body). When the latter are absorbed, they give rise to various pathological and clinical manifestations, some proving fatal to animal life, others causing a rise of temperature, etc.

Phenomena Resulting from Microbe Invasion.—The cells of living matter resent their invasion and a struggle for supremacy begins. By their higher specialization for greater resistance, the skin and mucous membranes ordinarily serve as barriers to their entrance, but if these are passed, the more delicate and less-resisting cells take up the combat. The result is largely dependent upon the extent of invasion, the virulence of the microbe, and the individual power of resistance of the living cells.

Invasion in Puerpera.—The examining hand may be infected, and through the placental site or lacerations of the parturient canal an entrance into the general system is effected. A fatal result in every case is avoided, in two ways: As a rule, the examining hand is not infected with the particularly virulent varieties, and in many cases the living cells are able to resist the germs that may have gained access. These elements of safety are invalidated, however, by the following facts: The germs that may have been introduced, when at their work of disintegrating the dead animal matter, as clots, shreds of membrane, deciduæ, etc., grow, multiply and increase in virulence, and the power of resistance of the vital cells varies in different individuals. Therefore it is impossible to predict the character of the germ that may be absorbed, whether virulent or otherwise, and in no case can we know an individual's power of resistance. With so much uncertainty surrounding every case, it is obviously necessary to apply our knowledge of germicides and endeavor to prevent the introduction and further development of microörganisms.

TABLE OF COMPARATIVE GERMICIDAL POWER.

Bichloride of Mercury Creolin	100
Thymol Benzoate of Sodium	10
Salicylic Acid	3
Carbolic Acid	1

The bichloride of mercury is effective but dangerous. Creolin is probably as powerful as the bichloride; thus far has been found much less dangerous, and is therefore recommended.

Application of Antisepsis to Obstetrics.—The advantages of antiseptic precautions in obstetric practice have been clearly demonstrated by an enormous reduction of mortality since its employment has become so general. At one time in the Vienna Hospital the mortality was one death in nine cases; now it is .3 per cent. In the Paris Maternité it has been 10 per cent., while recently in the same hospital there were 1000 cases without a death. At the Philadelphia Hospital the mortality has been reduced from 7 per cent. to less than 1 per cent. Semmelweis, the originator of antiseptic practice in obstetrics, accomplished the following striking reduction in mortality in his hospital by requiring students to disinfect themselves before attending the cases :—

Year.	Confinements.	Deaths.	Per Cent.
1846	4010	459	11.4
1847	3490	176	5.
1848	3556	45	1.27

Antisepsis in Hospital Practice.

(*a*) *Disinfection of the Patient.*—When the signs of beginning labor manifest themselves, the patient should receive a bath and be supplied with clean clothes. After labor is completed the vagina should receive one douche of 2 per cent. solution of creolin by means of a fountain syringe, preferably of glass, the vaginal tube also of glass, with lateral perforations. If an intrauterine injection be required, the glass tube, a two-way metal catheter or stiff rubber catheter, may be used, preferably with a fountain syringe.

(*b*) *Disinfection of the Bed.*—The lying-in bed should contain the following: 1, a pad about a yard square, composed of an upper layer of flannel, a piece of blanket and a layer of mackintosh, all to be soaked in bichloride solution, 1 to 2000, before using; 2, a sheet covering, 3, a rubber blanket; 4, a second sheet, and under this, 5, another rubber cloth, to protect the mattress.

(*c*) *Disinfection of the Attendants.*—The hands and wrists of doctor and nurse washed in warm water with soap and brush; nails pared and cleaned; hands and wrists rinsed in alcohol and placed in bichlo-

ride solution, 1 to 1000, for at least one minute, after which they should not be dried on septic towels, etc.

(*d*) *Disinfection of Instruments.*—If not easily corroded, soaked in bichloride solution, 1 to 1000; otherwise, use 5 per cent. solution carbolic acid. This applies to all instruments used in vagina, urethra or rectum.

Protection after Labor.—The pads which receive the lochia should be changed six times in twenty-four hours for three days, and less frequently subsequently as may be needful. Protect the parturient tract from invasion by the *occlusive dressing*, composed of three or four layers of sublimated gauze (boat-shaped) upon waxed paper, and corrosive cotton upon this to protect vulvar opening. This dressing to be changed six, seven or eight times daily for the first three days and less frequently afterward. When changed, the external genitalia should be washed several times daily with baked cotton and bichloride solution 1 to 2000.

Antisepsis in Private Practice.

The patient, nurse, clothing, etc., are usually sufficiently clean. Avoid infecting the patient by thorough personal disinfection of doctor, nurse and instruments. An occlusive dressing should be used to prevent infection from the atmosphere. The lying-in room should not contain a stationary washstand nor be in close proximity to water closet. An open fireplace is desirable.

Diagnosis of Pregnancy.

Subjective Signs.—Arranged in the order of their relative importance.

(*A*) *Cessation of Menstruation.*—Is the most valuable of the subjective signs, but is not always to be depended upon. It may occur independently of pregnancy, in immigrants experiencing a sudden change in climate; in various mental disorders, as hysteria, mania; as the result of old peri-uterine inflammation; it often accompanies phthisis.

In pregnancy the menstrual discharge may occur during the first three months. Sometimes this may be due to failure of union of the deciduæ. Rarely it may continue throughout the whole period of gestation.

(*B*) *Nausea and Vomiting.*—Are reflexly associated with the developing fœtus, and occur usually at the 6th or 7th week. They may occur reflexly from other conditions, as a displaced uterus, an organ which is badly inflamed, congestion or inflammation of the tubes and ovaries, growing tumors within the pelvic cavity, etc. They may be altogether absent, yet rarely in some individuals they appear so early, and with such promptness and regularity, as to constitute a most valuable sign.

(*C*) *Changes due to Increased Blood Supply to the Genitalia and Breasts.*—These are tingling and a sensation of fullness in the breasts, with the development of colostrum; leucorrhœa; increased temperature of the genitalia. Are of comparatively little value.

(*D*) *Quickening.*—Is the sensation experienced by the mother as the result of fœtal movements, and usually first appears between the fourth and fifth months.

(*E*) *Alterations in the Nervous System.*—Changes in disposition, mental peculiarities, perversions of taste.

Objective Signs.—Are of much more importance and value. Are obtained by employing the senses of *sight*, *touch* and *hearing*.

(*A*) *Inspection.*

(*a*) *Face.*—Chloasmata, splotches of irregular pigmentation on brow and cheeks. Development of the dark ring under the eyes. (*b*) *Breasts.*—Enlarged; veins distended and tortuous; nipple prominent; deposition of pigment—widening the areola and developing the secondary areola. Enlargement of the glands of Montgomery; presence of colostrum. All these signs can be manifested independently of pregnancy, and rarely may be absent. (*c*) *Abdomen.*—Is *pear-shaped*, with the narrow end downward; tumor is situated in the median line, spreading with approximate equality to either side. Striæ are present. The *umbilicus* at the sixth month is level with the surface of the abdomen and later pouts. It is surrounded by a ring of pigmentation which spreads above and below along the linea alba.

Fœtal movements can be seen if the pregnancy be far advanced. In the latter months the mucous membrane of vagina and vulva are violet or purple.

(*B*) *Touch.*—(*a*) *Abdominal palpation.* By this method is learned the size and shape of the uterus; in advanced cases, the

position of the fœtal back, head and extremities; the intermittent uterine contractions (Braxton Hicks); fœtal movements.

Braxton Hicks' sign is available by the last of the third month, and although it may be produced by any tumor which sufficiently distends the uterine wall, as a collection of blood, soft fibroma, etc., it is almost a positive sign. Fœtal movements are absolutely diagnostic.

(*b*) *Combined examination.*—(1) *Softened cervix.*—A ready rule of practice is, that "when the cervix is as hard as one's nose, pregnancy does not exist; when soft as one's lips, pregnancy is probable" (Goodell). Rapidly-growing myomata, acute metritis, hæmatometra, can thus simulate pregnancy by softening the cervix. (2) *Hegar's sign.* This is a softening of the lower uterine segment, which is situated between the cervix and the upper uterine segment. Can be elicited by the forefinger in the rectum, thumb in the vagina, and pressure on the fundus above. (3) *Enlargement of the uterus.* In the early months deposition of lymph upon the uterus may lead to an error in diagnosis. (4) *Ballottement.* With one hand over the fundus, and the fingers of the other in the vagina, an impulse is communicated to the contents of the uterus by the vaginal hand, when the fœtus will be felt to strike the fundus, and, returning, will impinge upon the vaginal hand. This is a positive sign, and is available in the fourth month. A small cystic tumor of the ovary, with a long pedicle and an extra-uterine gestation, are possible sources of error.

(*C*) *Hearing.*—(*a*) *Fœtal heart sounds.* Rate, 120 to 160 per minute. Available in the fifth month. The third positive sign. Are to be distinguished from the pulsations of the abdominal aorta. The area of their maximum intensity in anterior positions of the vertex is an inch below the umbilicus, to the left or right; in posterior positions, in the flanks, on a line which passes through the umbilicus. Their absence does not exclude the existence of pregnancy. (*b*) *Dullness on percussion.*

Clinically, the signs of pregnancy may be divided into three trimesters of three months each.

The 1st.—Will manifest the following signs: enlargement and bogginess of the uterine body; soft cervix; enlargement of the breasts; nausea; Hegar's sign; cessation of menstruation.

The 2d.—In addition to above, Braxton Hicks' sign; feeble fœtal movements; ballottement; heart sounds.

The 3d.—All the above present to a greater degree.

Estimation of the Duration of Pregnancy.—Ordinarily the cessation of menstruation is depended upon. A convenient rule for predicting the date of confinement is to "count back three months from the date of *appearance* of the last menstrual flow, and add seven days" (Naegele). An approximate idea may also be gained by noting the height of the fundus:—

4th month, midway between umbilicus and symphysis.

6th month, on a level with the umbilicus.

7th month, midway between umbilicus and xyphoid.

8th month, at the xyphoid.

9th month, descends almost to the depth at which it was at the 7th month.

Diagnosis of Life or Death of the Fœtus.—The fœtal heart sounds are the most valuable sign when heard.

Diagnosis of the Situation of the Developing Ovum.—Whether intra- or extra-uterine (see Extra-uterine Pregnancy).

Diagnosis of a Prior Pregnancy.—Of medico-legal value. (*a*) Cervix lacerated, usually laterally. (*b*) Cervical canal irregularly enlarged, usually admitting first joint of index finger.

Physiology of Pregnancy.

Alterations in organs and tissues in consequence of pregnancy.

(A) Local Changes.

I. Uterus.

(*a*) *Development of Constituent Parts.*—1. Muscle. Fibres hypertrophied eleven times as long, five times as broad as those of the non-pregnant uterus. The theory of an additional hyperplasia of these structures has never been actually demonstrated.

2. Connective tissue. Increased chiefly by absorption of fluid and consequent increase in bulk.

3. Peritoneal covering. Increased by both hypertrophy and hyperplasia of the constituent elements.

4. Blood vessels. Arteries increase in calibre, length and tortuosity. Veins grow to a very large size; their covering is reduced to the intima. They are surrounded by the uterine muscle, which obliterates them after labor.

5. Nerves. Increased more by a development of the connective tissue about them (neurolemma) than by an increase of the nerve elements.

6. Lymphatics. Increased by hypertrophy and hyperplasia. The lymph spaces below the uterine mucous membrane are enormously enlarged, and the lymph tubes leading from them through the uterine muscles reach the size of a goose quill. These lymph tubes or vessels are collected in a plexus beneath the peritoneum, which is continuous with the general lymphatic system.

This arrangement and development explain the remarkably rapid absorption of the uterus after labor, and accounts for the ready absorption of infecting material, with peritonitis oftentimes as an early symptom.

(*b*) *Anatomy of the Uterus at Full Term.*—The muscle fibres of the non-pregnant uterus have a very irregular distribution. In the pregnant womb three layers may be distinguished—an outer, middle and internal layer. The outer is continuous with the muscular fibres in the round ligaments and tubes, and is mainly longitudinal in arrangement. The middle layer is composed of bundles, which pass from their peritoneal attachment obliquely downward and inward to be attached to the submucous tissue. Above the "contraction ring" this oblique arrangement is less marked, while below it is more pronounced. The internal layer is thin and poorly developed, except at definite points. Its arrangement is chiefly circular, and is specially developed at the openings of the tubes and internal os.

(*c*) *Changes in Volume, Capacity and Weight.*—Before impregnation, the length of the uterine cavity is about 2½ inches; at term, it is increased to 12 inches, while its breadth is 9 inches and depth 8 inches. The capacity changes from 1 cubic inch to 400 cubic inches, weight from about 2 ounces to 2 pounds.

(*d*) *Changes in Form, Position and Topographical Relations.*—From flattened pyriform to spherical, and, finally, ovoidal. During the early months the position of the uterus is altered by sinking into the pelvic cavity, as a result of the increased weight. After

the third month it rises until it is almost in contact with the diaphragm, and before term (four weeks in primiparæ, ten days or one week in multiparæ) sinks again into the pelvic cavity, owing to the engagement of the lower portion of the uterus with the contained presenting part of the fœtus within the pelvic canal.

After the third month, the laxity of the abdominal wall allows it to fall forward. In consequence of the position of sigmoid flexure and rectum, it is slightly tilted to the right and rotated on its longitudinal axis. The topographical relation of the intestines is important. They are always situated above and behind the uterus, thus giving no resonance over the anterior abdominal wall.

II. Alterations in the Cervix.

Is softened, but its canal is undilated until the first stage of labor is well advanced.

III. Alterations in Vagina and Vulva.

Changes due to increased blood supply, as noticed in enumerating the signs of pregnancy, as darkened color, increased secretion and over-development in the muscular and mucous walls.

IV. Pelvic Joints.

Loosening of their connections and increase in motility, thus facilitating the passage of the fœtal body.

V. Abdominal Walls.

(*a*) *Stretching of all the constituent parts*, with the formation of striæ, resulting from cracks in the subcutaneous connective tissue and deeper layers of the skin.

(*b*) *Separation of the recti muscles.*—Exceptionally, the abdominal contents may be extruded.

(*c*) *Increased deposition of fat*, as in other parts of the body. This is probably nature's provision for sustaining the woman during the first few days of the puerperium.

VI. Bladder and Rectum.

The growth of the pregnant uterus mechanically interferes with their functions, hence irritability of the bladder and constipation are

frequent. By interfering with their blood supply, hemorrhoids may develop, not only of the anus and rectum, but of the bladder as well, which rarely give rise to hemorrhage.

(B) Changes in the Several Systems of the Body. General Changes.

I. Circulatory System.

(*a*) *Blood.*—Whole quantity increased. Water and fibrin-making elements increased; red corpuscles relatively diminished; hæmoglobin diminished; white corpuscles actually and relatively increased.

(*b*) *Heart.*—Left side said to hypertrophy, and, in consequence of unusual determination of blood to the brain, there is developed on the inner table of the skull new formations of bone, called osteophytes.

II. Urine.

Becomes more watery; specific gravity diminished; quantity of urea normal. The kyesteinic pellicle is no longer regarded of any diagnostic value.

III. Digestive System.

Nausea and vomiting; torpor of intestines and rectum, inducing constipation.

IV. Nervous System.

Alterations in disposition; perversions of taste; disposition to melancholia; severe neuralgias, especially of the face and teeth.

V. Changes in Weight.

An increase of $\frac{1}{13}$ part of the original body weight (Gassner). This estimate is not uniformly correct, as irregularities are frequently met with.

VI. Changes in the Respiratory Apparatus.

Lungs are shorter but broader, leaving the capacity unchanged; alterations in the expired air of no clinical importance.

Pathology of Pregnancy.

I. Diseases of the Genitalia.

1. Displacements of the Pregnant Uterus.—It may be displaced forward, backward, to either side, downward. It may form part of the sac contents in inguinal and ventral hernia, and may be twisted upon the cervix.

(*a*) *Anteflexion.*—Usually the growth of the uterus replaces the organ spontaneously, but when bound down by bands of adhesive inflammation, pain and difficulty in urination result, until finally the uterus expels its contents, or forces its way up into the abdominal cavity.

Treatment.—Massage, and efforts to replace it through the vaginal vault. Late in gestation the whole body of the uterus may fall forward in consequence of greatly relaxed abdominal walls or separation of the recti muscles, producing a pendulous abdomen. Treated by abdominal binder.

(*b*) *Retroflexion or Retroversion.*—Of rather frequent occurrence. Explained almost invariably by the previous existence of such a displacement.

Symptoms.—The earliest and most distinctive is dysuria, which should lead to a vaginal examination to confirm the diagnosis. In neglected cases, or where nature has not corrected the displacement spontaneously, *incarceration* occurs. The symptoms of this manifest themselves after the third month, and are: occlusion of the bowel and urethra, with their associated symptoms; congestion, inflammation and suppuration of the uterus, which may finally slough with the development of peritonitis and septic infection.

Terminations when Artificial Means are not Employed.—Spontaneous replacement; spontaneous abortion; expulsion of the uterus from the body as a whole; rarely by sacculation of the uterus.

Prognosis.—Always satisfactory as regards maternal life when treatment is adopted early.

Treatment.—Replacement. If undertaken early, manual means, pressing fundus in the direction of one or the other sacro-iliac joints, the patient in the lithotomy position. Failing, resort to knee-chest posture and a repositor to press upon the fundus. The cervix

should next be drawn downward with tenaculum, at the same time continuing the efforts to replace the fundus. If successful, a large sized pessary or tampon should be applied until the growth of the organ maintains it in the abdominal cavity. When bound down by strong inflammatory bands, steady and long-continued pressure should be supplied by large tampons in the posterior vaginal vault. Failing, finally, abortion should be induced.

Treatment when Incarcerated.—Attempts at reposition as above. These unavailing, as is usual, induce abortion. If it is impossible to effect an entrance into the cervix for this purpose, it is justifiable to puncture the uterine wall through the vaginal vault, and thus draw off the liquor amnii. The organ may now respond to efforts at replacement, or permit the cervix to be drawn down and its canal dilated, to accomplish the evacuation of its contents. If the bladder is seriously distended it should be emptied by the urethra, or supra-pubic puncture with an aspirating needle may be necessary. As a last resort, vaginal hysterectomy is justifiable.

(*c*) *Displacements to Either Side.*—Include latero-position, latero-version, latero-flexion. Latero-position is usually a congenital defect due to abnormally short broad ligaments, placing the whole uterine body more to one side of the abdominal cavity. Latero-flexion is also congenital, due to imperfect development of one side of the uterine body. These malpositions complicate labor more than pregnancy (see Dystocia).

(*d*) *Prolapse.—Causes.*—Impregnation in an organ already prolapsed, or the consequence of retroversion, relaxed vaginal walls and outlet; the increased weight leads to prolapse in the first few weeks of pregnancy.

Terminations.—(1) Complete spontaneous reposition, which is most frequent. (2) Incomplete reposition, continuing in that state to full term. (3) Failure of retraction, inducing incarceration. (4) Failure of retraction, inducing abortion. Pregnancy will not continue to term in a completely prolapsed organ.

Treatment.—Reposition and application of some variety of ball pessary, retained by a firm T-bandage. When incarcerated, attempts at reposition should be cautious, but if they fail, owing to adhesions and œdema, abortion should be induced and the organ replaced.

(*e*) *The Pregnant Uterus forming a Part of a Hernial Protrusion.*

—Occurs exceptionally, in inguinal and ventral, but never in crural hernia, the uterus getting into the sac before or after impregnation. The ventral variety is most frequent, and may occur between abnormally separated recti muscles, or, more rarely, is seen on the lateral aspect of the abdomen. When it occurs in the very exceptional inguinal variety, the pregnancy is apt to be in one horn of an abnormally developed uterus.

Treatment.—Attempts at reposition. These failing, entering the hand in the uterus, version and extraction are to be considered. The last resort is Cæsarean section or amputation of the pregnant uterus.

(*f*) *Torsion.*—Slight degree of torsion from left to right, physiological and constant. A more exaggerated degree may be due to some abnormal condition, usually inflammatory, near the uterus, which results in twisting it upon its longitudinal axis. An ovary may thus be brought in front and be subjected to traumatism during manipulation of the abdomen.

2. Diseases of the Uterine Muscle.—(*a*) *Rheumatism.*—Most common; occurs in those of rheumatic diathesis.

Symptoms.—Great pain, localized in the uterine walls, lasting throughout the latter months of pregnancy, and increased periodically by the intermittent uterine contractions. The therapeutic test is, perhaps, the most valuable factor in the diagnosis.

Treatment.—Administration of salicylate of sodium.

(*b*) *Metritis.*—Is almost invariably acquired before impregnation, exercises a most deleterious influence upon gestation, and usually results in abortion.

Symptoms.—When pregnancy continues, there is great pain, a feeling of weight and heaviness, and usually distressing and obstinate vomiting, which, in some cases, may indicate the induction of abortion.

Treatment.—Glycerine tampons may be tried, although very likely to induce abortion.

(*c*) *New Growths.*—Complicate labor more than gestation.—1. Fibroids—are the most frequent, grow rapidly, and in exaggerated cases some operative interference is demanded. The same is true of other pelvic tumors to a less degree, as (2) ovarian cysts.

3. Malformations of the Uterus.—Complicate labor more than gestation (see Dystocia).

4. Diseases of the Cervix.—The same may be said of these, except bad cases of laceration and eversion and carcinoma, which very frequently induce abortion or premature labor. Minor complications may arise from inflammatory processes within the cervical canal, giving rise to mucous or even bloody discharges. Supposed menstruation persisting throughout pregnancy is probably thus accounted for.

5. Diseases of the Vagina.—Due to increased blood supply or specific infection. (*a*) *Leucorrhœa: feeling of heat and discomfort.* (*b*) *Specific infection.* Affects rather the newborn infant and mother soon after delivery. Requires energetic treatment to eliminate such complications. Bichloride douche, 1 to 2000 b. d., and a tampon dusted with tannic acid. (*c*) *Hemorrhoids.* Guard the part from traumatism, which can produce alarming hemorrhage.

6. Diseases of the Vulva.—Also largely due to increased blood supply. (*a*) *Hemorrhoids.* (*b*) *Vegetations.* Require no treatment beyond protection. (*c*) *Pruritus vulvæ.* May be a neurosis, or due to the vaginal and cervical discharges. Is oftentimes intractable. Treatment belongs to gynæcology.

7. Peri-uterine Inflammation and Adhesions.—May be benefited by massage. Appropriate treatment during the intervals between pregnancies is required.

8. Loosening of Pelvic Joints.—When pronounced, interferes with locomotion. The diagnosis is made by a vaginal examination, the patient in the erect posture taking a few steps. Treatment: Application of a firm binder about hips and pelvis, or rest in bed if exaggerated.

9. Breasts.—(*a*) *Mammary Abscess.* Its cause, course and treatment same as when it occurs during the puerperium. (*b*) *Eczema of the Nipples.* Is very obstinate and resists treatment. Relief only occurs after delivery.

II. Diseases of the Alimentary Canal.

1. Mouth.—(*a*) *Caries of the Teeth.*—Is of rather common occurrence, particularly in the upper classes. As a rule, it is best not to advise interference, as dental operations might provoke abortion.

(*b*) *Toothache.*—Develops with or without other pathological

changes in the mouth, and resists treatment. Usually subsides when pregnancy has advanced beyond the first half of gestation.

(*c*) *Ptyalism.*—Cause not known. Astringents, etc., may be employed. Disappears usually in the latter months.

2. STOMACH.—*Pernicious Vomiting.*—*Causes.*—(1) Reflexly, from irritation of the uterus and its contained nerve endings by the stretching of the uterine walls. It is thus more common in primiparæ, and when chronic metritis or displacement of the uterus exists. (2) Inflammation of the lining membrane. (3) Engorgement of neighboring organs, as inflamed tubes or ovaries. (4) Some pathological condition of the stomach, as chronic gastritis, gastric ulcer, etc., pregnancy increasing the irritability already present. (5) Rarely some pathological condition of the intestinal tract. (6) Increased indulgence in sexual intercourse. The latter is a not infrequent cause.

Diagnosis.—Of the cause is difficult; of the condition easy. There is fever, great emaciation and loss of strength, which may prove fatal. The worse cases occur between the second and fourth months.

Treatment.—Remove the cause, if ascertainable.

(*a*) *Hygienic.*—Includes regulation of the diet, etc. Advise a light breakfast of tea and bread or milk, taken in bed before getting up, the patient lying flat upon her back. Sexual intercourse should be restrained. Oftentimes there is improvement when the sensation of swallowing is removed by a cocaine spray or œsophageal tube. Rectal alimentation in extreme cases, the enemata being non-irritating, so as not to provoke an exhausting diarrhœa. The "rest cure," combined with other treatment, has proved efficient in some cases. Some tolerance of the stomach may at times be established by allowing apparently unsuitable articles of food when specially desired by the patient.

(*b*) *Medicinal.*—The drugs that have been used are innumerable. Nervous sedatives, as bromides, chloral and opium, are the most reliable. Sodium bromide, gr. x, in aq. camph., ʒiv, four times a day. If necessary, resort to enemata of sodium or potassium bromide, gr. xl, and chloral, gr. xx, two or three times a day, dissolved in water.

(*c*) *Gynæcological.*—Replace a displaced uterus. If the cervix or canal is inflamed, apply with a cylindrical speculum a 20-gr. solution of nitrate of silver. If applications in the canal are used, abortions

may result. When due to metritis, treatment does not accomplish much at this time. Glycerine tampons may be used after simpler plans fail, as they may induce abortion. Empirically, a 15 per cent. solution of cocaine may be applied to cervix and vaginal vault, and, similarly, dilatation of the cervix with the fingers has been successful in certain cases.

(*d*) *Obstetrical.*—Induction of abortion or premature labor; should be done as the last resort, and yet not too late.

3. Intestines.—(*a*) *Constipation.*—Should be guarded against to prevent overwork of the kidneys. Cascara sagrada, the weaker mineral waters and pulv. glycyrrhizæ comp. may be used. Active purges may interrupt the course of gestation.

℞. Ext. cascaræ sagradæ ..... gr. j–ij.
Confection sennæ..... gr. x–xx.

(*b*) *Diarrhœa.*—When the ordinary remedies fail, nerve sedatives may control it, as it is sometimes explained by intestinal irritability, resulting from pressure of the gravid womb.

4. Liver.—Jaundice may result from a mild catarrhal condition of the bile ducts, which may have existed before pregnancy. This class of cases is of little clinical importance. It should be remembered that a serious condition may develop as the result of excessive work thrown upon the liver—namely, an acute degeneration of the whole hepatic structure. Another explanation is that poisons (such as may produce eclampsia) circulating in the blood act upon the liver, producing acute yellow atrophy.

Treatment.—The simple catarrhal jaundice is treated by regulation of diet and bowels, and securing a free discharge of bile.

The graver form is rapidly fatal.

5. Hemorrhoids—Guard against constipation. Astringent applications may be made. Operative interference is likely to interrupt pregnancy.

III. Diseases of the Urinary Apparatus.

1. Kidneys.

(*a*) *Kidney of Pregnancy.—Pathology.*—Anæmia, with fatty infiltration of the epithelial cells, and without any acute or chronic inflammation.

Cause.—Obscure. Has been attributed to pressure on the blood vessels; to the compression of the gravid uterus; serous condition of the blood in pregnancy; influence of the weather, and to spasmodic contraction of the renal arteries. It is most probably due to a diminution of the blood supply.

Symptoms.—Albuminuria. Hyaline and granular casts, with epithelium filled with fat, may be found.

Frequency and Course.—About six per cent. of all pregnant women have albumen in the urine. Occurs most frequently in primiparæ; runs a subacute course, manifesting itself most plainly in the latter months of gestation, and can influence the general health, course of pregnancy, and occurrence of eclampsia, the same as inflammatory renal diseases. Upon the fœtus, also, it exerts practically the same influence in the production of placental apoplexies. The dangers are greatest when the condition develops suddenly. It disappears with the cessation of gestation.

Treatment.—Practically same as for true nephritis.

(*b*) *Acute and Chronic Nephritis.*—These may occur at any time during pregnancy, with their usual symptoms. The extra amount of work thrown upon the kidneys at this time makes the prognosis more grave, and demands the most energetic treatment. Premature expulsion of the ovum and outbursts of eclampsia are frequent. The chronic variety is more frequently a complication, and may be acquired before or during pregnancy.

Differential Diagnosis.—If the kidney disease existed before pregnancy, marked symptoms will develop in the earlier months. If these develop in the later months, the disease has had its origin during pregnancy.

It is often difficult to distinguish between the following:—

Chronic Nephritis.	*Kidney of Pregnancy.*
History may point to its existence before pregnancy.	Kidneys normal at this time.
Urine likely to be increased.	Urine likely to be decreased.
Presence of albuminuric retinitis.	Absence of same.
Symptoms apt to be pronounced in earlier months.	Same in latter months.

Chronic Nephritis.	*Kidney of Pregnancy.*
Autopsy gives evidences of inflammatory changes.	Anemia and fatty degeneration. No inflammatory changes.
Persists after delivery.	Disappears after delivery.

Treatment.—It is always of paramount importance to know in any case of pregnancy what the condition of the kidneys may be, hence in all cases the urine should be repeatedly examined, at least every ten days during the latter weeks. If the quantity of albumen is small, if there are no casts, no history of a previous nephritis, and no symptoms of general systemic disturbance, dietetic and hygienic management may be sufficient so long as the case is kept under careful observation. When considerable quantities of urine, casts and œdema are found, the patient should be put to bed for the greater part of the day, and milk diet and Basham's mixture given. Finally, induction of abortion or premature labor may be necessary. This should not be delayed too long. Serious eye symptoms always indicate it. Eclampsia can occur after the expulsion of the fœtus.

(*c*) *Renal Tumors.*—Rare. Are to be diagnosticated and treated according to the individual features of the case.

(*d*) *Dislocation of the Kidney.*—The right is almost always the one affected. Not infrequently associated with displacements of the gravid womb. Abortion may result if it happens to become twisted upon its pedicle, and from pressure the kidney of pregnancy may develop.

(*e*) *Diseases of the Pelvis of the Kidney.*—(1) Pyelitis. Premature expulsion of fœtus apt to occur. It is met with much more frequently after labor.

(2) Hydronephrosis. A displaced and adherent gravid uterus may occlude the ureters with this result. Requires reposition of the uterus.

(3) Stone. Apt to induce abortion. Renal colic is to be treated in the usual manner.

2. Diseases of the Bladder.

(*a*) *Irritability.*—Is functional, and occurs in hyperæsthetic individuals from pressure of the gravid womb.

Treatment.—Reposition of uterus if displaced. When neurotic, nerve sedatives are indicated.

(*b*) *Incontinence of Retention.*—Is the most common symptom of a backward displacement.

(*c*) *Vesical Hemorrhoids.*—Due to increased blood supply and pressure of womb. Hæmaturia may be a symptom. If extreme, astringents may be injected.

(*d*) *Cystitis.*—More frequent after labor; complicating pregnancy, it may be due to gonorrhœa.

(*e*) *Vesical Calculi.*—Important that it be discovered before labor, and removed through the urethra or by vaginal lithotomy.

(*f*) *Cystocele.*—Complicates labor.

(*g*) *Injuries, Tumors, Extrophy.*—Are very rare, and should be treated as their individual peculiarities may indicate.

3. Anomalies of the Urine.

(*a*) *Polyuria.*—An exaggeration of the physiological alteration.

(*b*) The urine may be diminished in quantity and more concentrated, as the result of errors in diet and inactivity of skin and bowels.

(*c*) *Lipuria.*—Explained by the unusual quantity of fat in the blood of some pregnant women. An oiled catheter may be the source.

(*d*) *Chyluria.*—Is of no pathological import.

(*e*) *Peptonuria.*—Occurs very rarely in pregnancy. Said to be diagnostic of fœtal death.

(*f*) *Hæmaturia.*—Produced by vesical hemorrhoids.

(*g*) *Glycosuria.*—Ranks next in importance to albuminuria. May be found in fifty per cent. of cases. Is probably hepatogenic. Diabetes mellitus occurs more frequently in pregnant than in non-pregnant women, and when it exists before pregnancy, the latter condition increases its severity. In seven out of nineteen cases the disease determined fœtal death, and in four out of fifteen cases the mother died shortly after labor.

IV. Diseases of the Nervous System.

1. Brain.

(*a*) *Inflammatory Diseases.*—Are accidental complications and rare; exert no special influence upon pregnancy, nor do they specially modify the course of gestation, except cerebro-spinal meningitis,

which is infectious, and therefore has the same influence upon and is influenced in the same way by pregnancy as the other infectious fevers.

(*b*) *Anemia and Congestion.*—(See Eclampsia). Apoplexy resulting from congestion has no influence upon the course of pregnancy or labor.

2. Spinal Cord.

Inflammatory Diseases.—Also accidental and without influence upon pregnancy and labor.

3. Peripheral Nerves.

Obstinate neuralgias, which are little benefited by treatment, and disappear after labor.

4. Neuroses.

(*a*) *Chorea.*—Milder grades are not uncommon. Sixty per cent. of cases are in primiparæ. Heredity, chlorosis and rheumatism are predisposing causes. In the graver variety, premature expulsion of the ovum is apt to occur, followed by death of the mother in about thirty-three per cent. of cases.

Treatment.—Fowler's solution, iron, and nutritious diet for the milder cases. The graver cases may require an anæsthetic, and finally induction of premature labor, which is usually followed by spontaneous recovery.

(*b*) *Epilepsy.*—Comparatively rare. Usually does not influence unfavorably the course of gestation. It is most likely to be confused with Eclampsia (see Eclampsia). The infant frequently dies after birth, presenting the symptoms of the maternal disease.

(*c*) *Hysteria.*—Occurs frequently in its minor grades, and, as a rule, does not exert an unfavorable influence.

5. Organs of Special Sense.

(*a*) *Eyes.*—Failing vision should always indicate an examination for advanced kidney disease. Occasionally there occurs complete temporary blindness, associated only with anæmia of the eye-ground, due to reflex contraction of the retinal artery.

(*b*) *Hearing.*—Disturbances of this sense are rare, usually temporary, but may be permanent, and up to the present time are inexplicable.

6. Psychical Alterations.

Melancholia, mania, dementia.

Frequency.—Of all cases of insanity in women, about eight per cent. have their origin in child-bearing. About one in four hundred confined become insane.

Causes.—(*a*) *Predisposing.*—Strain of gestation in those predisposed by hereditary influence; temporary causes of mental disturbance; great reduction in physical strength.

(*b*) *Exciting.*—Exaggerated anæmia, as from prolonged lactation; septicæmia; albuminuria; profound emotions, as exaggerated fear of impending danger; dystocia, as hemorrhage after labor; great exhaustion, etc. Chorea results rather from the same predisposing causes, and should not be considered an exciting cause.

Symptoms.—May be maniacal, melancholic or demented, *i. e.*, exaggerated stupidity, fatuity and mental confusion.

Time of Occurrence.—Most frequently during puerperium, next in lactation, and least during pregnancy. Mania is the most frequent form, melancholia next, dementia last.

Diagnosis.—Easy. Important to distinguish puerperal insanity from (1) the temporary delirium of labor, (2) delirium tremens, (3) the delirium of fever, especially septicæmia, and (4) preëxisting insanity.

Temporary Delirium of Labor.—Exceedingly common. Is usually momentary, and varies in degree from hilarity to exaggerated mania.

Delirium Tremens.—Labor, like an accident or surgical operation, can precipitate an attack in hard drinkers.

Delirium of Fever.—Most commonly due to septic infection. Oftentimes it is necessary to wait until the fever subsides to determine whether it be the cause of the mental symptoms.

Preëxisting Insanity.—Determined by the previous history.

Prognosis.—About two-thirds recover their reason; of the other third, from two to ten per cent. die of septic infection or exhaustion; the rest remain permanently insane.

Treatment.—Rest cure, combined with administration of iron, arsenic and nutritious diet, together with careful supervision to prevent any injury to themselves or attendants.

V. Diseases of the Circulatory Apparatus.

1. Endocardium.

Valvular disease of the heart usually has its origin prior to pregnancy. It may originate from septic infection.

Prognosis.—Abortion is induced in about twenty-five per cent. of cases as the result of placental apoplexies, or stimulation of the uterus to contraction by the accumulation of CO_2. Pregnancy also increases the danger of the heart lesion. In fifty-eight serious cases twenty-three died after premature delivery of the child. In milder cases the prognosis is not so grave, yet the danger is increased. Complications to be dreaded during gestation are: (*a*) a fresh outbreak of endocarditis, fatty degeneration of the papillary muscles, and especially congestion of the lungs. If the disease be of long standing and advanced degree, about half the cases will die. If recent and limited the symptoms may only be aggravated.

Treatment.—Same as under other circumstances. If maternal life is threatened induce abortion or premature labor, guarding against a fatal result after the expulsion of the contents of the uterus by venesection should other organs become engorged, and by the application of pad and binder to prevent the ill effects of sudden diminution of intra-abdominal pressure.

2. Heart Muscle.

(*a*) Suppurative myocarditis, only seen in connection with septic infection; (*b*) brown atrophy; (*c*) fatty degeneration which may occur acutely in consequence of septic infection, or the accumulation of poisons in the blood when the kidneys are inactive.

3. Graves' Disease and Goitre

Are unfavorably influenced by pregnancy.

4. Blood Vessels.

The only disease of clinical interest is varicose veins, in rectum, anus, pelvis, bladder, external genitalia and lower extremities.

Causes.—Changes in the investing muscular sheath of the veins, increased quantity of blood, and mechanical disturbances by the growing uterus.

Complications.—Rupture with possibly fatal hemorrhage, or extensive extravasation of blood under the skin. Thromboses and phlebitis with suppuration and septic infection may occur. As the result of itching and scratching, eczema or even erysipelas may develop.

Treatment.—Elastic bandage or stocking when in the legs. Small doses of heart tonics may be given and constipation avoided. Absolute rest in cases of thromboses, to prevent embolism. Lead water and laudanum when there is any inflammation. Abscesses should be opened. A mechanical protection should be applied to affected part to prevent the development of eczema or erysipelas, and itching may be relieved by weak solutions of carbolic acid or cocaine.

5. Blood.

Pregnancy very often has a direct influence in producing those blood diseases which are characterized by a marked alteration in its constituent parts. Pernicious anæmia and leucocythæmia can have their origin in gestation, and should they already exist their prognosis is rendered more serious. The anæmia of pregnancy may be so exaggerated as to simulate these, yet arsenic, iron and nutritious diet after delivery will usually effect a cure.

VI. Diseases of the Respiratory Apparatus.

1. Nose.

The sense of smell is more acute, and peculiarities in this sense are developed, as abhorrence for certain odors, which may excite nausea and vomiting in neurotic individuals.

More important is the disposition to epistaxis, which may be so severe as to threaten life. More frequently, however, this complication occurs during labor. It can only be relieved by the rapid termination of labor.

2. Larynx.

If a tumor, tubercular or syphilitic disease be present, there is a constant danger of œdema of the glottis which will require tracheotomy.

3. Bronchi and Lungs.

(*a*) *Bronchial Catarrh* ordinarily is not harmful, but constant coughing can cause abortion, and the hydræmic condition of the blood predisposes to pulmonary œdema.

(*b*) *Pneumonia.*—Symptoms are much aggravated, mortality increased, and in the vast majority of cases the fœtus is expelled prematurely. (See Pathology of Puerperium.)

(*c*) *Emphysema.*—Quite common. Symptoms aggravated and abortion apt to occur. Inhalations of oxygen may be given to counteract the accumulation of CO_2.

(*d*) *Phthisis.*—The influence of pregnancy upon this disease is most unfavorable, and in those predisposed gestation may be the determining factor which brings on an attack.

Treatment.—Cod-liver oil, iron and nutritious diet. After labor forbid nursing the child, as lactation is a drain on the mother's strength and the infant may be infected.

(*e*) *Miliary Tuberculosis* is rapidly fatal and may be mistaken for septic infection.

(*f*) *Pulmonary Embolism* is a possible accident.

(*g*) *Pleurisy.*—Exerts no deleterious influence upon, nor is it affected by pregnancy.

VII. Infectious Fevers

Are always more serious when complicating pregnancy, their symptoms being more severe and mortality greater. Even *measles* at this time may become a deadly disorder.

Upon pregnancy their influence is, as a rule, unfavorable. Sixty-five per cent. of *typhoid* cases are complicated by abortion.

Syphilis rather exerts its influence upon the fœtus. If the mother is diseased before impregnation the fœtus and appendages exhibit characteristic pathological alterations. If the mother acquires the disease from the fœtus she may exhibit all the secondary signs without the appearance of a primary lesion. If she be infected during gestation, as a rule, the mother is affected, the fœtus escaping, although the latter is not so absolutely exempt from infection as at one time claimed. Should infection occur at the time of impregnation the primary sore may become almost malignant,

ulcerate into the vagina, resist treatment and complicate the puerperal state.

Treatment.—All the infectious diseases are to be managed with little reference to pregnancy. If abortion is threatened it should not be combated, as it is an effort on the part of nature to improve the maternal condition.

VIII. Skin Diseases.

The following are said to have their origin in pregnancy :—

1. Impetigo Herpetiformis.

The favorite seat of the eruption is in the groin, around the umbilicus, on the breasts, in the axilla. The small pustules become crusts, around which new pustules develop until the entire surface of the skin in the course of three or four months becomes covered. Rigors, high intermittent fever, great prostration, delirium and vomiting accompany the eruption.

The disease appears, as a rule, during the second half of gestation. Modern observation has shown that it is not absolutely confined to pregnancy. Of twelve cases ten terminated fatally, but they exercised no influence upon the course of gestation.

2. Herpes Gestationis

Is characterized by a pemphigoid efflorescence, exhibiting erythema, papules, vesicles and bullæ. It appears early in pregnancy, continues during gestation, and disappears during the puerperal state. Neurotic symptoms are associated with it, showing its probable nervous origin.

3. Pruritus.

Its usual seat is the external genitalia. It may be general. *Causes.*—Neurosis ; irritating discharges ; parasites. Rarely in the general variety it may be necessary to induce premature labor.

IX. Injuries and Accidents.

Severe injuries usually result in abortion. The most serious accidents are those which cause *rupture* of some of the *large blood-vessels* of the external genitalia or lower extremities. One of the

rarest accidents is spontaneous rupture of the uterus. It may occur in consequence of a previous Cæsarean section ; chronic inflammation of the uterine walls, reducing them to little more than connective tissue ; traumatism.

X. Surgical Operations.

When life or health are seriously threatened by delay until recovery from the puerperal state, surgical operations upon pregnant women are justifiable, and permission may be given for their performance without very great fear of inducing thereby an abortion.

XI. Abortion, Miscarriage and Premature Labor.

Abortion.—Expulsion of ovum before the fourth month.

Miscarriage.—Expulsion from the fourth to the sixth month.

Premature Labor.—Delivery of a fœtus that has become viable.

Frequency.—Correct estimate difficult. One to four or five pregnancies.

Causes.—(1) Death of the fœtus ; (2) abnormalities and diseases of the membranes including the deciduæ ; (3) pathological conditions of the placenta and apoplexies of the ovum ; (4) traumatism ; (5) certain diseases of the mother directly affecting the product of conception (see Diseases of the Membranes and Fœtus) ; (6) conditions of the mother causing contraction of the uterine muscle and premature expulsion of the normal ovum.

The last cause includes the following :—

(*a*) *Irritable Uterus.*—The expulsion, in such cases, results from a trivial cause, as, a long walk, purgatives, jolting, congestion of the pelvic organs, chronic constipation, reflex irritation as from suckling, extraction of a tooth, pruritus, ovarian disease. At the menstrual epoch these causes are most liable to produce abortion.

(*b*) *Spasmodic muscular action in the mother.*

1. *Chorea.*—Less than half the cases go to term. The premature expulsion of the ovum explained by physical exhaustion, blood stasis and excess of CO_2 in the uterine muscle stimulating to contraction or by choreic movements of the uterus. 2. *Eclampsia.* More than one-half the cases abort as the result of asphyxia of the uterus, accumulation of urea, carbonate of ammonium or ptomaines, or

due to the convulsive action being shared by the uterus. 3. *Uncontrollable vomiting and coughing.* Of 51 cases 20 were delivered before term. 4. *Epileptic, hysterical, cholæmic and tetanoid convulsions.*

(*c*) *Conditions of the maternal blood which stimulate the uterus to expulsive efforts.*

1. *Poisons of all the infectious fevers.* It is yet undecided whether the abortion is due to irritative action of microörganisms, leucomaïnes, or to a diminution of the oxygenating power of the blood. When there is an accumulation of CO_2, as in pneumonia, heart disease, emphysema, etc., inhalations of oxygen may be given with some hope of success. 2. *Fever.*

(*d*) *Local conditions.*

1. *Tubal or ovarian diseases, with perimetritis and adhesions.* 2. *Fibroids, polyps.* 3. *Uterine displacements.* 4. *Laceration of the cervix in irritable uteri.* 5. *Over-distention from hydramnion or multiple pregnancy.*

(*e*) *Placenta prævia, obesity, contagious abortion.* These are rare causes, and the last are really cases of septic infection.

Clinical Phenomena.—1. Hemorrhage. 2. Pain. 3. Expulsion of some portion of the ovum. All three are rarely typically manifested in every case. Their duration varies from almost instantaneously to days or weeks. In early abortions hemorrhage is more pronounced than pain, and the blood is extruded in coagula. The appearance of the substance expelled varies with the period of pregnancy and entirety of the product of conception. The chorional coat may be entire, the deciduæ alone may surround the embryo, or it may be surrounded by the amnion. Most frequently the decidua vera remains behind, and hence the danger of sepsis.

Mortality.—In 926 cases there were 13 deaths, a mortality of 1.4 per cent.

Diagnosis.—(*a*) *Threatened abortion.* Hemorrhage, and more or less pain in a patient with signs of early pregnancy.

(*b*) *Inevitable abortion.* Persistent hemorrhage; dilatation of os; ovum presenting; considerable pain; portions of ovum expelled: effacement of the angle between the upper and lower uterine segment (Tarnier). Exceptionally one or more of these may be present and the case go to term.

(*c*) *Incomplete abortion.* Examination of fragments discharged by floating them in water. Digital examination will usually find the os patulous, and detect shreds of deciduæ, the placenta or fœtal membranes in the uterine cavity.

(*d*) *Complete abortion.* Uterus is firmly contracted; os retracted and digital examination of the uterine cavity difficult or impossible. The diagnosis must depend upon the history; the examination of the discharge; the enlarged uterus; lochial discharge, and possibly the establishment of milk secretion, which is more marked the later the date of pregnancy. Finally, the disappearance of the presumptive signs of pregnancy which had previously existed

Diagnosis of Miscarriage.—Escape of liquor amnii indicates rupture of the membranes. As the result of the death of the fœtus, there is a cessation of fœtal movements and growth of the uterus, a disappearance of the reflex and psychical disturbances characteristic of pregnancy, and possibly the appearance of the milk secretion. The pain is greater than in abortion and is more like labor pain. At this stage of pregnancy the placenta is intimately adherent to the uterine wall, and often fails to become detached. For this reason the hemorrhage is apt to be serious and the danger of sepsis great.

Prognosis of Abortion and Miscarriage.—The ovum is inevitably destroyed. The dangers to the woman are hemorrhage, particularly its secondary effects, and sepsis. Retained fragments may develop into polypi.

Treatment.—(*a*) Preventive. Includes the treatment of the causes that may exist in any given case. Enjoin rest at menstrual epoch, and restrain sexual intercourse where there is an irritable uterus. Replace a displaced uterus; repair a lacerated cervix; treat any inflammatory condition about the uterus. If it be due to any of the general diseases, do not attempt to interfere and prevent the occurrence of the abortion.

(*b*) Threatened Abortion. Absolute rest in bed. Drugs to diminish nervous sensibility and muscular action, as opium, potassium bromide, chloral. Opium should be given in full doses by the mouth, hypodermatically, or by the rectum. The fluid extract of viburnum prunifolium in drachm doses is very efficient. It may be combined with opium, administering the latter by suppository.

(*c*) Inevitable Abortion. If the hemorrhage is profuse before dilatation of the os occurs, control the bleeding by vaginal tampons of antiseptic wool or baked cotton. Remove in eight hours and reapply if required. Often when the first one is removed, the ovum or fœtus may be found extruded, when the urgent symptoms may subside. Intrauterine tampons of little balls of iodoform cotton or strips of iodoform gauze may be used if required. Deciduous membrane in the earlier months, the placenta in the later, are apt to remain behind. The best method to employ for their removal is a disputed question. The *expectant plan* combines the use of ergot, tampon, and great care to avoid rupturing the membranes. If the abortion be incomplete, rest in bed, small doses of ergot, vaginal, and, if possible, intrauterine, antiseptic douches. At the first indication of sepsis the uterine cavity should be cleared out.

The *active treatment*, which is the better plan, involves the use of the tampon to control bleeding, and as soon as the os is sufficiently dilated, the removal of the uterine contents by one of the following plans: The finger; the *curette* in experienced hands; the method of expression (Hoening); the ecouvillon (Doléris); after which an intrauterine douche of a two per cent. solution of creolin should be given. If needed, Hegar's dilators may be used to stretch a retracted os.

After-Treatment.—Very little required after active treatment, beyond confinement to bed until involution is complete. When the expectant plan has been followed, antiseptic douches are to be used, and the earliest sign of sepsis looked for.

XII. Extrauterine Pregnancy.

Frequency.—The exact proportion to intrauterine gestations is difficult to determine. In the larger cities a large number occur annually. Many cases are never diagnosticated.

Classification based upon the Situation of the Developing Ovum.

1. Tubal.
   - (*a*) Tubo-uterine or interstitial.
   - (*b*) Tubal proper.
   - (*c*) Tubo-ovarian.
2. Ovarian.
3. Abdominal.

Cause.—Obscure. Any disease of the mucous membrane of the tube depriving it of cilia, forming mucous polyps or otherwise obstructing its calibre predisposes to its occurrence.

Clinical History.—In each of the situations noted above, the course of gestation is somewhat different, and presents a different clinical picture on account of the difference in the surrounding anatomical structures which are involved.

Changes in Uterus and Vagina.—In all forms these changes are rather constant. Most of the alterations characteristic of intrauterine pregnancy are found, *i. e.*, hypertrophy of the vaginal mucous membrane, with increased blood supply (purple tinge) and increased secretion ; cervix softened and os patulous ; uterus enlarged, and, in the vast majority of cases, deciduous membrane developed, which undergoes the same change as in intrauterine gestation preparatory to its separation and extrusion, which occurs in extrauterine gestation between the eighth and twelfth week.

The other changes in the maternal organism vary with the situation of the developing ovule.

Clinical History of Tubal Pregnancies.—The most frequent situation of an extrauterine gestation is about the median portion or outer third of the tube. In this position it may grow upward into the abdominal cavity distending the tube walls to the point of rupture, or it may grow downward between the layers of the broad ligament. The tubal walls grow thicker from the development of their muscle fibres, except at spots, especially on upper and posterior surfaces, where rupture may occur, the individual, perhaps, experiencing severe cramp-like pain followed by symptoms of profound shock and death in a few hours. Exceptionally, the gestation may proceed to full term, which is more common when the ovule has grown downward. When rupture occurs it usually takes place between the eighth and twelfth week. If upon the upper or posterior aspect of the sac the contents are extruded into the peritoneal cavity with an intraperitoneal hemorrhage. If rupture occurs on the lower aspect, the contents and hemorrhage find their way between the layers of the broad ligament and pelvic fascia, giving rise to an extra-peritoneal hæmatocele. The first variety is usually fatal ; the last is not always directly dangerous to life.

Clinical History of Interstitial Pregnancy.—The ovule develops in the uterine wall, the inner side of the sac often projecting into the uterine cavity, and having on the outer side the round ligament and the greater part of the tube. The usual termination is rupture into the peritoneal cavity. Rupture into the uterine cavity and expulsion of the ovum through the cervix is possible.

Clinical History of Tubo-ovarian Pregnancy.—The ovum develops between fimbriæ of tube and ovary. The sac may rupture with the usual consequences of such accident. It is possible, however, to see a development of the ovule to maturity.

Clinical History of Ovarian Pregnancy.—The ovule, impregnated while it is still within the Graafian follicle, reaches some degree of growth and development in this situation. Is exceedingly rare. At least one undoubted case on record.

Clinical History of Abdominal Pregnancy.—Also rare. Two authenticated cases. Is likely to go to full period of gestation and mature development of fœtus.

Terminations of Extrauterine Pregnancy.

(*a*) *Rupture of the Sac and Profuse Hemorrhage.*—Occurs most commonly in the tubal variety, where the growth is upward toward abdominal cavity. May occur when the ovule grows down between layers of broad ligament ; also in tubo-uterine, tubo-ovarian, ovarian and abdominal. Up to second month the extruded embryo may be absorbed.

(*b*) *Rupture of sac with extrusion of contents, and interstitial hemorrhage into sac walls without escape of blood into peritoneal cavity or between layers of broad ligament.*—This is followed by atrophy of ovum and sac.

(*c*) *Death of the Fœtus after its Maturity.*—Occurs most often in abdominal or tubo-ovarian, though possible in pure tubal. 1. The fœtus may be converted into a lithopædion. 2. The soft parts may macerate, leaving the bones, which may remain as an abdominal tumor or ulcerate into bladder or intestines. 3. The fœtal body may putrefy from contiguity of the intestines and their contained microörganisms and access of germs. (*d*) *In the case of ovarian pregnancy*, arrest of development of the ovum at an early period occurred, and the small cystic tumor containing the fœtal bones was

retained. (*e*) In *tubo-uterine*, the ovum and embryo may be discharged into the uterine cavity and evacuated by the natural passages. (*f*) In one case of so-called *tubal abortion* there was an internal rupture of the ovum, and blood was poured through the fimbriated extremity of the tube into the abdominal cavity. (*g*) It is asserted that a tubal pregnancy may rupture in its early stages, the embryo be expelled into the abdominal cavity, retaining its connection with the tube by the cord and placenta, and the fœtus continue to full development. This is called a *secondary abdominal pregnancy.* Rupture in these cases has probably not occurred, and the sac wall carefully examined would probably show enormous dilatation of the tubal wall. (*h*) Growth and development of the placenta after fœtal death has been asserted. This does not occur.

Symptoms.—(*a*) Subjective. In the early months may be indistinguishable from those of intra-uterine gestation. In the tubal variety, which is more common, there is usually no indication of any abnormality until rupture occurs. In some cases this may be preceded by severe cramp-like pain, accompanied or followed by the discharge of deciduous membrane. When advanced development occurs, as in abdominal and some cases of tubal, no symptoms may arise until the time for labor has passed, when pain and other complications may arise.

(*b*) Objective. 1. Tubal. Tumor felt to one side of the uterus, which is smaller than would be expected from the duration of the pregnancy. The uterus is usually displaced forward, backward, or to the side opposite the tumor.

2. Interstitial. Diagnosis difficult or impossible. The uterus enlarges to a greater degree than in any other variety, and it may be impossible to determine whether or not it is symmetrically enlarged.

3. Abdominal. When the ovum occupies Douglas' pouch, the fœtal parts may be made out. A sacculated uterus may be mistaken for this.

Diagnosis.—In spite of a most careful history and physical examination, the diagnosis is occasionally impossible. Usually it is not made until rupture has occurred. At this time a history of early pregnancy, sudden collapse and symptoms of internal hemorrhage, with a vaginal examination showing effusion into peritoneal cavity, makes the diagnosis and indicates immediate laparotomy to prevent

further hemorrhage and peritonitis. Should the cramp-like pain cause a patient to consult a physician, and should she give a clear history of impregnation—all the earlier signs of pregnancy, the discharge of blood and membrane, which the microscope shows to be decidual, with the detection of a tumor in the neighborhood of the uterus, on which ballottement may perhaps be practiced· and the uterus not very much enlarged—the diagnosis is justified, and treatment also, even if it involve a serious operation. Among the conditions in the pelvis that may make the diagnosis impossible are abortion, in consequence of, or coincident with, some growth near the uterus ; pyosalpinx, with an indistinct or untrustworthy history of pregnancy ; intrauterine pregnancy, with rapid development of a fibroid on one side of the uterus ; development of an impregnated ovule in one horn of a two-horned uterus or on one side of a double uterus.

Treatment.—Differs as it is met with in its early stages, or after rupture ; whether interstitial, tubal, ovarian or abdominal ; whether the fœtus has reached advanced development, as in abdominal ; whether the conditions following fœtal death require the treatment.

If the diagnosis has been made early, electricity or laparotomy and removal of the fœtal sac. The ordinary practitioner should first try electricity. The faradic current seems to be the most efficient. One electrode in rectum, the other over Poupart's ligament, on the side occupied by the sac. The full strength of a single-celled battery may be passed through the sac, and if the growing contents of the sac are destroyed, the whole ovum may ultimately disappear. A galvanic current of 10 milliampères may be employed. Electricity fails in a certain proportion of cases, and laparotomy is the only resource, which, in these cases, is almost always a difficult operation, not to be undertaken by an unskilled operator.

After rupture the indication is for immediate laparotomy, evacuation of the blood from peritoneal cavity, ligature of the sac, and its entire removal. Rupture followed by hemorrhage is, however, not invariably fatal.

In *interstitial* little can be done until rupture and hemorrhage have occurred, when laparotomy may be performed, ligating the bleeding point, and, if possible, clearing the sac of its contents, along with the placenta. Where this is impossible, supra-vaginal

amputation of the uterus is indicated. It might be well, the diagnosis being established, to try to effect evacuation of the fœtal sac into the uterine cavity after thorough dilatation of the cervical canal. A mistaken diagnosis, however, would lead to a premature termination of a normal intrauterine pregnancy.

Tubal and ovarian are to be treated as outlined above, when discussing the treatment of early extrauterine gestation and after rupture.

In the *abdominal* variety, always delay until just before the natural duration of normal pregnancy, when the fœtus and *fœtal sac* should be extracted by abdominal section. Five such operations have been done, with five maternal recoveries. In *advanced cases, in which death of the fœtus has occurred*, it is best not to subject the woman to the danger of the several possible terminations, but to perform laparotomy and remove the fœtus and its entire surrounding sac. If the exsection of the sac is found to be too difficult or dangerous, it is permissible, some weeks after fœtal death, to cut off the cord short, leave behind the atrophied remains of the placenta, stitch the sac wall to the abdominal wall, and thus drain the sac externally.

Labor.

Physiology.

Labor occurs usually 280 days after the appearance of the last menstrual period.

Causes of Occurrence at this Time.

(*a*) *Periodicity.*—The muscular action at the periods is especially marked at the tenth.

(*b*) *Over-distention of Uterus, followed by Retraction.*

(*c*) *Maturity of Ovum* (fatty change of attachment).

(*d*) *Heredity*, or *Body Habit*, which is perhaps the most powerful. At this time slight causes, as exercise, purges, excitement, may begin the process.

Signs of Beginning Labor.

(*a*) *Subsidence of Uterus.*—This is a premonitory sign. Occurs about four weeks before term in primiparæ, two weeks or less in multiparæ.

Cause.—Over-distention of abdominal muscles. It may occur suddenly, and be followed by relief of pressure symptoms above, while those below may be increased, as excessive vaginal secretion, œdema, etc. If it does not occur, it indicates a malposition of the fœtus, or some obstruction, as contracted pelvis.

(*b*) *Pains.*—Are colicky, intermittent; felt over the sacrum, or beginning in front and passing back to sacrum.

(*c*) *Blood-tinged Mucus.*—Due to expulsion of the mucous plug in cervix and torn cervical vessels.

(*d*) *Dilatation of Os.*—The most important.

Clinical Signs of Labor.

(*a*) *Contractions of Uterine Muscle.*—At each contraction the uterus drives the liquor amnii through the cervix, diminishes the area of intrauterine space, and produces an expansion of the birth canal. The contraction lasts about a minute, recurring at intervals of ten to fifteen minutes, which decrease as labor advances.

(*b*) *Behavior of the Patient.*—For about the first ten hours the sacral pains are increasing in frequency and severity. During the second stage the voluntary muscles are brought into play, as shown by her straining and bearing-down efforts, the pains increase in frequency and strength, and there is a desire to empty bladder and rectum.

(*c*) *Phenomena of Birth of Head and Shoulders.*—The head retracts after each pain, and there is an intense pain and outcry as the head passes the perineum. Restitution is followed by birth of anterior shoulder.

A condition of contentment and happiness succeeds the birth of the child.

Phenomena of Placental Separation and Expulsion.—Theories of its separation :—

(*a*) Placental area diminished.

(*b*) Placenta pushed off.

(*c*) Separated by retro-placental clot.

The first probably correct.

Theories of Expulsion :—

(*a*) Edgewise (Matthew Duncan).

(*b*) Like inverted umbrella (Schultze).

The last probably correct.

The pouch-like dilated lower uterine segment often contains the placenta, hence artificial aid in its complete expulsion often required.

A slight elevation of temperature is normal after labor.

Management of Labor.

Summons to an obstetric case should receive immediate attention.

(*a*) *Armamentarium.*—Ether, brandy, vinegar, a large new sponge, pads, clothing for mother and child, should be provided before confinement. The obstetric bag should contain : soap, nail-brush, tablets of bichloride, iodoform tape, or antiseptic Chinese silk, pocket-case with sutures and needles, ergot, hypodermic syringe, iodoform gauze, absorbent cotton, a ten per cent. solution of cocaine, forceps.

(*b*) *The Examination.*—Abdominal palpation and auscultation should determine the position and presentation, touch should ascertain the state of the perineum, dilatability of vagina, and its secretions, roominess of pelvis, condition of cervix, effectiveness of pains, and should confirm diagnosis of presentation.

(*c*) *Treatment of the First Stage.*—The bowels should be evacuated by an enema, urine voided, patient allowed to remain out of bed, examinations to be made at intervals of an hour or hour and a half, and when the os is the size of a silver dollar the patient should be put to bed, lying on that side toward which the back of the fœtus looks.

(*d*) *Anæsthesia.*—Cocaine and belladonna are not effective. Chloroform is not dangerous. Ether is preferable, except in eclampsia. By giving it only in the second stage its administration for too long a time is avoided, and by producing only analgesia an excessive amount is not employed.

(*e*) *Rupture of the Membranes.*—In a primipara the membranes should never be ruptured, and in multiparæ only in the second stage. Finger, match, hairpin, etc., may be used to break them, the operation being performed in the absence of a pain, with the assurance that membranes are present, and not the lower uterine segment, thin from pressure of the head.

(*f*) *Treatment of the Second Stage.*—Examinations should now be made every five or ten minutes. A puller may be employed to increase the abdominal force.

The Perineum.—Bad lacerations of the perineum are avoidable. In primiparæ the fourchette is torn in 61 per cent. of cases, the perineum in 34 per cent.; in multiparæ, the perineum in 9 per cent.

Causes:—

(*a*) Relative disproportion between the size of the head and outlet.

(*b*) Precipitate expulsion.

(*c*) Faulty mechanism.

Preventive Treatment.—Depends largely upon the cause. If the disproportion be great, episeotomy may be required; if expulsion precipitate, retard the head by hand or forceps; in some faulty mechanisms the forceps can be used to correct them, as by elevating the handles when the head is overflexed, etc. A routine treatment, based upon the most frequent cause, is to *retard expulsion* by resisting the head and pressing it toward the pubes, restraining voluntary efforts and using them during the absence of pains.

The Head.—When the head is born avoid traction, support it, and if the cord be coiled around the neck, loosen and slip it over the head, allow the shoulders to pass through it or cut it between two ligatures.

The Shoulders.—Avoid increasing any tear the head may have made.

Treatment of the Third Stage.—Indications are, (1) prevent hemorrhage, and (2) deliver the placenta. Secure contraction and retraction of the uterus by external and internal stimuli: externally, by frictions through abdomen, continued for fifteen minutes and followed by the application of a pad and binder; internally, by administering ʒj of the fld. extract of ergot.

The binder should be 12 in. by 1¼ yds., preferably many-tailed, and the pad should be placed *over the umbilicus.*

The placenta is separated by a diminution of the placental area, and its delivery should be accomplished by resorting to the Credé method fifteen minutes after the birth of the child. Remember that the movement of "expression" should be *with a pain.*

The Infant.—After pulsations in the cord cease, apply two ligatures, for cleanliness, and cut between them across the palm of the hand. The ligature should be tied with the surgeon's knot, followed

by an ordinary bow-knot, to permit tightening after the child has had its warm bath. Before the cord is dressed it should be stripped. The vernix caseosa should be removed by some oily substance, followed by soap and water. Salicylated cotton should be used to dress the cord, and the binder then applied.

Puerperium.

Physiology.

The child-bearing process is divided into four periods, viz.: Pregnancy, Labor, Puerperium and Lactation. The puerperium is the period from birth to the time when the uterus has regained its normal size, which is six weeks. Dimensions of uterus at 9th month, 2 lbs., $12 \times 9 \times 8\frac{1}{2}$ in., 400 cu. in. Dimensions of uterus 6 weeks after labor, 2 oz., 1 cu. in. These changes in the uterus, its lining and adnexa result from the process known as Involution.

Anatomical Development of the Pregnant Uterus.—Subsequent to impregnation the muscle cells take on a new growth, and in their development hypertrophy into muscular fibres four times as broad and eleven times as long. There is a similar increase in blood vessels, connective tissue, lymphatics and nerves.

Anatomical Changes During Involution.—As a result of the decrease in blood supply, which normally repairs tissue waste, the superabundant uterine tissue undergoes degeneration, chiefly fatty, and is carried away by the blood vessels and in the discharges, in part as peptones. The process is really an atrophy, which ceases after the enlarged muscle cells have been reduced to their original size. From the anatomical arrangement of its fibres the parturient uterus is composed of two segments, the upper muscular, with its fibres arranged crosswise, the lower largely fibrous, arranged longitudinally. In the process of involution the upper undergoes the greatest change, while the lower, including the vagina, is mainly a retraction of overstretched tissue, which never completely regains its tone. The lining membrane of the uterus, or decidua, is composed of an upper cellular and lower glandular layers. The upper is partly removed when the ovum is delivered, and the remainder disintegrates as the blood supply diminishes, until the epithelial struc-

tures of the glandular layer are exposed, and from these epithelial cells in the glandular layer the mucous membrane is renewed.

Lochia.—(*a*) Lochia Rubra. Bloody, last four to five days. (*b*) Serosa. Composed of disintegrating tissue, pus cells, mucus and water. (*c*) Alba. Composed of healthy pus.

Quantity.—First four days, 1 kilo., or 2.2 lbs. Next two days, 280 grams, or 15 oz. Until the ninth day, 205 grams, or 7 oz. —3¼ lbs in all.

Quantity is estimated by the number of napkins soiled. In the first twenty-four hours the pads should be changed six times, during the next four days three times a day, and after the fifth day twice a day. A personal examination by the physician should always ascertain their odor, which is at first bloody, later like that of the genitalia. A putrid odor is the danger signal of decomposition and sepsis.

Conditions modifying the force and frequency of pains which secure involution :—

(*a*) Individuality.
(*b*) Always greater in primiparæ.
(*c*) Over-distention of the uterus.

After-pains.—Uterine action is excited by retained blood clots. They occur most frequently in multiparæ, and may be distinguished from periuterine inflammation by being cramp-like, intermittent and not increased by pressure, the pulse and temperature not influenced. Paregoric ℥j with ergot ℥ss, every 2 or 3 hours, will usually control them.

The Circulation.—The pulse, which is accelerated during labor to 80 or 90, falls to 60 or lower, as a result of the diminished arterial tension after labor. The heart is found to be hypertrophied and dilated, the result of the increased demands made on the circulation during pregnancy.

Secretions and Excretions.—All are more active to diminish the hydræmic condition of the blood, get rid of effete material and prevent rise of temperature.

(*a*) *Urinary Function.*—The urine is increased in amount, is more watery, all the solids except the chlorides being decreased. Sugar is found in 50 per cent. of cases. Peptonuria. The kidneys are hypertrophied. There is frequently difficulty in emptying the bladder, which may be due to the following causes :—

(1) During pregnancy the bladder can only expand upward, and this habit is acquired at that time. After labor it expands in all directions and admits of greater distention before the walls respond and contract.

(2) The abdominal walls are relaxed, and this factor in emptying fails.

(3) Œdema and over-stretching of the soft parts from pressure of the head may diminish the calibre of the urethra and make its course tortuous. The difficulty in such cases often passes away when the catheter is used once.

(*b*) *Skin.*—Sweat is increased.

(*c*) *Lungs.*—Capacity increased. The expired air contains more water and effete products.

(*d*) *Bowel.*—Sluggish, from pressure.

(*e*) *Thirst.*—Increased by the large amount of liquid lost.

(*f*) *Appetite.*—Diminished. Two pounds of muscle (uterus) and the subcutaneous fat developed during pregnancy are being absorbed.

(*g*) *Weight.*—There is a loss in weight ($\frac{1}{8}$ to $\frac{1}{13}$ of the body weight).

(*h*) *Temperature.*—No rise of any consequence.

Developmental Changes.

Mammary Function.—Each mammary gland is divided into 15 or 20 lobes, and these are further subdivided into lobules and vesicles. Each lobe has a duct, dilated before reaching but contracted when entering the skin. Forty-eight hours after labor the breasts enlarge, the veins engorge and become painful and tender. At this time the secretion changes from colostrum to milk. Colostrum is the secretion which appears after the fourth month of pregnancy. It contains no casein, albumen taking its place, which is a laxative to the fœtus.

Diagnosis of the Puerperal State.—Some of the more important signs are: (*a*) the presence of milk in the breasts, (*b*) the enlarged uterus, (*c*) lacerations along the birth canal and (*d*) the lochial discharge containing decidual cells.

Management of the Puerperium.

1. *Avoidance of Septic Infection.*—Accomplished by securing (*a*) chemical cleanliness of patient, doctor and nurse, and (*b*) removal of all bloody cloths, excretions and food; (*c*) secure ventilation, and look for possible insanitary plumbing.

2. *Visits.*—If the labor has occurred in the morning, the patient should be visited in the afternoon, and daily for one week, subsequently every other day. At each visit examination should be made of the temperature, pulse, nipples and breasts, and the lochia. The uterus should be palpated, and the passage of urine inquired for. The child's umbilicus should be examined for any bleeding and passage of its urine and fæces noted. The nurse should receive directions as to diet, catheter and the recording of temperature three times a day.

3. *Secure Rest and Quiet.*—The patient should lie on her back for three days, and without a pillow for the first six hours, to avoid syncope. She can be made more comfortable by moving her from side to side and alcohol rubbings. She should be kept in bed until the fundus is at or below the symphysis, usually in ten days, when restricted exercise should be enjoined, to prevent uterine disorders, as flexions, etc. In the better classes, until the fourteenth day, and restricted to room for four weeks. Involution is best hastened by promoting the natural process and a suitable diet. The prolonged use of ergot is rather unfavorable, because of its effect upon the milk secretion and stomach of mother and child. The degree of quiet should be absolute, and the mother and husband the only visitors admitted while the patient is in bed.

4. *Secure Emptying of the Bladder.*—Never trust *anybody's* statement of the passage of urine. After twelve hours, if needed, the meatus should be cleansed with cotton dipped in bichloride solution and a soft and antiseptically clean catheter passed at least three times a day.

5. *Diet.*—Opinion differs. A light, easily-digested diet gives least disturbance, and is preferable.

6. *Bowels.*—On the third day castor oil. Compound licorice powder may be used, and if the inflammatory changes during the milk formation be great, an active saline should be given.

7. *Breasts.*—For threatened inflammation during the development of lactation give a brisk saline, and if the breasts are too full, empty by the infant, pump or massage. If the pain and inflammation continue, apply lead-water and laudanum and mammary binder. Mammary abscess is always septic in origin, and should be considered in every case. To prevent it, the nipple, after each nursing, should be washed with soap and water, and sweet oil applied. In some cases astringents may be used. The mammary binder is preferably T-shaped, one arm passing around the back, one-half of the remaining arm above, the other below, the breasts, and the two halves brought together between the breasts.

8. *The Child.*—Sleep, cleanliness and regularity in feeding should be secured. For the first two days it may be fed every three hours, then every two hours during the day, and from one to three times at night. A daily bath, 90° F., should be given at noon.

Directions to Nurse.

Before Labor

I. Have ready towels; ether ½ lb.; brandy (2 oz.); vinegar (4 oz.); hot water; a bottle of antiseptic tablets; a large new sponge; a roll of narrow tape; a fountain syringe; bed-pan; new, soft rubber catheter; 4 dozen pads, small package of salicylated cotton, absorbent cotten.

II. Give a rectal injection as soon as labor pains are well established.

After Labor.

III. No vaginal injection to be given unless ordered.

IV. Take the temperature three times a day—morning, noon and evening.

V. Place pad *under* patient. No occlusive bandage to be used unless specially directed.

VI. The external genitals to be washed off four or five times a day with a warm corrosive sublimate solution 1–2000. Use absorbent cotton for this purpose.

VII. If, at the end of 12 hours, the bladder cannot be emptied naturally, use a catheter. Afterward, if necessary, catheterize patient three times a day.

VIII. The patient is to lie on her back; she may be moved from one side of the bed to the other several times a day: her limbs may be rubbed with alcohol and water or bathing whiskey once a day.

IX. *The Nurse's hands are to be washed in a 1-3000 sublimate solution* before catheterizing the patient, cleansing the genitals or breasts.

Diet.—First 48 hours.—Milk (1½-2 pints a day), gruel, soup, one cup of tea a day, toast and butter.

Second 48 hours.—Milk toast, poached eggs, porridge, soup, corn starch, tapioca, wine jelly, small raw oysters, one cup of coffee or tea a day.

Third 48 hours.—Soup, white meat of fowl, mashed potatoes, beets in addition to above.

After sixth day, return cautiously to ordinary diet.

Child.—I. After being well rubbed with sweet oil, the child is to be bathed in water of 90°; this should be the temperature of the daily bath.

II. The cord is to be dressed with salicylated cotton. Observe carefully for bleeding.

III. It should be bathed daily, about mid-day, in the warmest part of the room. Use castile soap and a soft sponge; avoid the eyes.

IV. The bowels of a healthy infant are moved 4 times a day; the diapers must be changed at least this often. Note the color of stools.

Nursing.—The child is to be put to the breast every four hours for the first two days. *No other food is to be given it.* After the second day it should be nursed every two hours, from 7 A. M. to 9 P. M., and twice during the night (1 A. M. and 5 A. M.). After every nursing the nipples are to be carefully washed with a piece of absorbent cotton, warm water and castile soap, and then smeared with a little sweet oil.

Mechanism of Labor.

Definition.—The manner in which a fœtus traverses the birth canal and is expelled. It takes into account the complicated structure of the maternal and fœtal parts, considering their movements and the mechanisms of their motions.

Presentation.—That part of the fœtal body which presents itself to the examining finger in the centre of the plane of the superior strait.

Position.—May be applied to the position of the child in utero, whether longitudinal or transverse; or, in another sense, it is the varying relations which the presenting part bears to the surrounding maternal structures at the plane of the superior strait.

Presentation and position are determined by abdominal palpation, auscultation, and vaginal examination. Palpation and auscultation have been referred to. By vaginal examination the finger detects the varying portions of the fœtal body which may present at the superior strait, as cranium, face, shoulder, buttocks, knees, feet, and, exceptionally, elbow or hand.

The position of the fœtus in utero is longitudinal in 99½ per cent. of all cases. The cephalic extremity presents in about 95½ per cent., 95 per cent. being vertex cases. In about ½ of 1 per cent. the face presents; the brow very rarely. In about 3 per cent. of all cases the breech presents, and in about ½ of 1 per cent. the fœtus will be transverse.

Explanation of the Great Frequency of Cephalic Presentations.—Assumption of that position by the fœtus, because it affords it the greatest degree of comfort and the best opportunity for growth and development.

Explanation of the Great Frequency of Presentation of the Vertex.—Mechanical arrangement of fœtal head and body, diagrammatically represented by two bars attached to one another; that representing the head joined to that representing the spinal column, not at its middle, but at a point nearer one end of the bar (⊤). An equal force exerted upon this mechanical arrangement will result in the greater flexion of the longer bar, which represents that portion of the fœtal skull in front of spinal column.

Positions of Vertex Presentations.—There are four: 1. L. O. A., left occipito-anterior, the occiput looking to left acetabulum. 2. R. O. A. 3. R. O. P., right occipito-posterior, the occiput looking to right sacro-iliac joint. 4. L. O. P. Of all vertex cases 70 per cent. are L. O. A., 30 per cent. R. O. P.

Explanation of Frequency of L. O. A. and R. O. P.—The position of the rectum shortening the left oblique diameter and the

projection of the spinal column to which the fœtus adapts its anterior concave surface, the back thus looking forward and turned a little toward the right because of the right lateral version of the pregnant uterus.

Forces Involved in the Mechanism of Labor.

1. *Forces of Expulsion:—*
   - Uterine muscle.
   - Abdominal muscles.
2. *Forces of Resistance:—*
   - Lower uterine segment, cervix, vulva, vagina.
   - Pelvis.
   - Fœtal body.

The forces of expulsion are furnished by a great part of the uterine muscle (upper uterine segment) and muscular action of the abdominal walls. (That portion of the uterine canal which must be dilated to allow the escape of the fœtus is called the *lower uterine segment;* that portion above the point at which the dilatation ceases, *i. e.*, the contracting muscle, is called the *upper uterine segment;* the boundary line between these, often marked by a perceptible ridge, is called the *contraction ring*).

The Manner in which the Uterine Muscle Exerts its Force upon the Fœtal Body.—By a diminution of the intrauterine area. The abdominal muscles diminish the area of intra-abdominal space. The degree of force exerted by their combined action has been given as from 17 to 55 pounds. The forces of resistance are furnished by that portion of the parturient tract which must be dilated, *i. e.*, from contraction ring to vulva, including (*a*) *the lower uterine segment, cervix, vagina and vulva.* The dilatation of lower uterine segment and cervix is not simply mechanical, the serous infiltration of lymph spaces lessening the tendency to contraction and retraction. The dilatation of cervical canal is also assisted by the longitudinal fibres drawing the cervix up over the presenting part. Below the cervix, dilatation is effected mainly by the mechanical stretching of its walls.

(*b*) *The bony walls of the pelvis.*—Only offer sufficient resistance to so delay the progress of presenting part as to insure gradual dilatation of the soft resisting structures.

(*c*) *Fœtal body.*—Head most important. The fœtal head may be

divided into yielding and unyielding portions. The yielding consists of the cranium, composed of the frontal (2), temporal (2), parietal (2), and occipital bones. These are separated from one another as follows: The two frontals by the frontal suture; the frontal from parietal by coronal suture; the two parietal by sagittal suture; the two parietal from occipital by the lambdoidal suture. At junction of lambdoidal and sagittal sutures there is a membranous space called the posterior fontanelle, triangular in shape. At junction of frontal, coronal and sagittal sutures there is also a membranous space called anterior fontanelle, kite-shaped, larger than the former. This portion of the skull yields by overlapping of the bones.

The unyielding portion comprises face and base of skull. The bones here are fixed.

A transverse vertical section of the skull is wedge-shaped, tapering toward the neck.

Possible Presentations of the Head.—Vertex. That conical portion with apex at smaller fontanelle and base at the plane of the biparietal and trachelo-bregmatic diameters. *Face. Brow. Larger Fontanelle. Parietal Eminence.*

Mechanism of the Several Presentations and Positions.

L. O. A.

Diagnosis.—By abdominal palpation, auscultation and vaginal examination, the back is found to the left, extremities to the right above, head below, heart sounds one inch below and to the left of umbilicus; the examining finger detects vertex presenting, occiput toward left acetabulum and sagittal suture in right oblique diameter of pelvis, and smaller fontanelle, recognized by the junction of lambdoid and sagittal sutures, the top of occipital bone overlapped by parietal bones.

1st Step.—Accommodation of size of fœtal skull to pelvis by flexion, and accommodation of shape of fœtal skull to shape of pelvic inlet by moulding. (Occurs before the onset of labor.)

2d Step.—Further flexion and moulding. (Occurs at the beginning of labor.)

3d Step.—Lateral flexion of the head, the right parietal bone presenting.

4th Step.—Dilatation of lower uterine cavity and cervical canal.

5th Step.—Descent of head to pelvic floor.

6th Step.—Anterior rotation of occiput. *Cause.*—The head driven through the funnel-shaped parturient canal and meeting the resisting pelvic floor moves in the direction of least resistance, *i. e.*, anteriorly toward median line.

7th Step.—Extension and propulsion of the head.

8th Step.—Restitution.

9th Step.—External rotation.

10th Step.—Descent, rotation and birth of shoulders.

11th Step.—Delivery of remainder of the body.

Abnormalities.

(*a*) *Flexion at Inlet.—Imperfect vertical flexion in flat pelvis.* Conservative on the part of nature to bring bitemporal diameter (8 cm.) in relation with contracted conjugate. Associated with this we find anomalies of position and lateral flexion, *i. e.*, the occiput situated transversely, the sagittal suture in transverse diameter of the pelvis and the lateral flexion exaggerated as the result of the increased obliquity of pelvis to trunk and increase of conjugato-symphyseal angle. This is accompanied by overlapping of the right (anterior) parietal bone.

(*b*) *Direction.*—In anterior displacements of the pregnant uterus, there is an abnormal backward direction of the presenting part.

(*c*) *Rotation.*—Abnormal weakness in resistance or propulsion result in incomplete rotation.

(*d*) *Vertical Flexion at Outlet.*—Incomplete when head does not encounter normal resistance in pelvic cavity.

(*e*) *Extension.*—Failure of extension of the head occurs as the result of weakness or destruction of the levatores ani muscles.

(*f*) *Restitution.*—Fails when neck is a long time twisted or tightly gripped by the vulva.

(*g*) *External Rotation.*—Due to failure of rotation of shoulders. Is of frequent occurrence.

(*h*) *Anomalous Descent and Rotation of Shoulders.*

R. O. A

Diagnosis.—Palpation reveals back to the right anteriorly; extremities to the left above; head below. Heart sounds near median line below umbilicus. Digital examination shows small fontanelle toward right acetabulum; sagittal suture in left oblique diameter.

Mechanism.—Does not differ from the mechanism of L. O. A., except the occiput being directed toward the right acetabulum, rotation of head and face occurs in the opposite direction.

R. O. P., AND L. O. P.

Posterior positions of the occiput are *primary* or *acquired.* Primary when head enters inlet with occiput posterior (common); acquired when head rotates from anterior position at the beginning of labor to a posterior position at its close (rare).

Diagnosis.—Palpation reveals back in the flank (right, in R. O. P.; left, in L. O. P.); extremities to the opposite side in front; head below. Heart sounds in the flank below a transverse line through umbilicus. Digital examination shows small fontanelle toward right or left sacro-iliac joint; sagittal suture in an oblique diameter.

Mechanism.—Similar to mechanism of anterior positions including anterior rotation of the occiput to symphysis. As a consequence of this prolonged rotation a peculiarity is the rotation of the shoulders at the superior strait through a quarter of a circle, a movement not seen in anterior positions, and in consequence of the greater distance which the occiput has to traverse the clinical manifestations of this stage are different, *i. e.*, there is greater pain and labor is more prolonged. After rotation has occurred the shoulders descend and rotate on the pelvic floor, as in anterior positions. The further mechanism is identical with that of anterior positions.

Cause of Forward Rotation of Occiput.—Same as in anterior positions, *i. e.*, *whatever portion of the fœtal head first strikes the pelvic floor, whether it encounters this structure behind or in front of the median transverse line, will be directed forward under the symphysis pubis.*

Abnormalities in Mechanism.

Backward Rotation of the Occiput complicates labor by protracting its course, increasing the danger of fœtal death, and subjecting the mother to increased risk of injury.

Causes.—1. *Anomalies of Force.*—Anterior rotation is the resultant of the forces of expulsion and resistance, hence any condition disturbing the normal relation of these forces will interfere with the normal rotation. Thus backward rotation occurs when there is diminished expulsion, increased resistance, or decrease in resistance as occurs in cases of very large pelves, relaxed pelvic floors, small and yielding heads.

2. *Anomalies of Flexion.*—When flexion is imperfect the anterior vault of the cranium (as in those rare cases of presentation of the large fontanelle), the brow, or chin *first strikes the pelvic floor* and is therefore directed forward, and the occiput thus directed backward.

3. *Insuperable Hindrances to Forward Rotation.*—In some cases when flexion is only partially disturbed and the *occiput* first strikes the pelvic floor, the occiput will rotate backward, because the large diameter of the head (fronto-occip. $11\frac{3}{4}$ cm.) engages and rotation from one oblique diameter of the pelvis, through the smaller transverse to the other oblique, is impossible. The occiput will also be directed backward for the same reason when the fœtal head is over size, or accompanied by a prolapsed extremity; when the pelvis is deformed, particularly kyphotic, generally contracted and Naegele's; when there is an abnormal projection of the lumbar and sacral vertebræ interfering with rotation of shoulder.

Mechanism when Occiput Rotates into Hollow of Sacrum.—The occiput is propelled forward over perineum by increased flexion until the face is finally born under the symphysis by partial extension. This mechanism subjects the cranium of the fœtus to dangerous pressure, and increases the danger of perineal rupture.

Abnormalities in Mechanism just Described.—Abnormal resistance to descent of occiput, resulting in conversion into presentation of large fontanelle, brow, or face.

Causes.—Projecting ischiac spines, central tear of perineum.

Treatment of Posterior Positions of Vertex Presentations.

Bear in mind the causes of rotation backward, and try to prevent its occurrence. (*a*) Secure perfect flexion of the head by placing patient on that side toward which the fœtal back is looking. (*b*) Secure normal action of expelling and resisting forces. If the pelvic floor is weakened and does not supply sufficient resistance, reinforce it by two fingers in the vagina or single blade of forceps. If expulsion is faulty administer a single large dose of quinine, or forceps may be resorted to. If backward rotation occurs in spite of preventive treatment, extra precautions should be made to protect vaginal walls and perineum from laceration, and to avoid a protracted second stage. These can usually be accomplished by judicious use of forceps. It may be necessary rarely to first convert into a face presentation.

Prognosis.—Not so favorable as in anterior positions of occiput. Forceps often required. Laceration of soft parts more frequent. The mortality of the fœtus increased from 5 per cent. (normal vertex), to over 9 per cent. Luckily backward rotation occurs in only about 1½ per cent. of all labor cases.

Face.

The head is extremely extended. The chin is the most dependent part presenting, hence the classification by its situation, left mento-anterior, right mento-anterior, etc.

Frequency.—Occurs about once in 250 labor cases.

Diagnosis.—Bulk of cranial vault felt to one side of hypogastric region ; a deep groove between occiput and the child's back may sometimes be made out. Heart sounds loudest over anterior surface of fœtus, *i. e.*, on that side of abdomen upon which the extremities are felt. The diagnosis, however, must usually rest on digital examination, which shows before onset of labor high situation of presenting part ; flattening of anterior vaginal vault ; the contrast between the smooth outline of fœtal forehead and irregular contour of the face. As soon as the os is dilated the characteristic features of the face can be felt. Has been mistaken for the breech. Should be considered an abnormality and entails greater danger upon mother and child.

Causes.—Conditions preventing flexion, as tumors of the neck; increased size of thorax; constriction of cervix about the neck; coiling of cord around neck.

Conditions favoring extension, as mobility of fœtus; oblique position of child and uterus, especially when abdominal surface of child is directed downward and pelvis is flat: altered shape of head. After the head has reached the pelvic cavity it may be due to the conversion of an occipito-posterior position into that of the face, as already described.

Mechanism.—Comprises the following steps:—

1. Extension.
2. Moulding.
3. Descent.
4. Anterior rotation of chin.
5. Its engagement under symphysis pubis.
6. Delivery of head by flexion.
7. Restitution.
8. External rotation.
9. Delivery of body as in vertex presentation.

Abnormalities in Mechanism.—The most common is delay in forward rotation of chin under symphysis. This is due to the difference between the lateral depth of the pelvis ($3\frac{1}{2}$ inches), and the length of the fœtal neck ($1\frac{1}{2}$ inches), *i. e.*, the chin does not meet with sufficient resistance. Should the chin be directed posteriorly, where the depth of the pelvis is even greater, the delay is absolute, and such cases can only be terminated by artificial assistance. If left to nature the upper portion of thorax (9 cm.) is forced into the pelvic cavity, along with the posterior half of the child's skull ($9\frac{1}{2}$ cm.), and it is impossible for these two diameters to pass through the pelvis.

Prognosis.—Fœtal mortality 13 to 15 per cent. Maternal, from less than 1 to 6 per cent.

Treatment.—Before labor begins, convert into vertex by the method of Schatz. If this fails and labor is in progress, guard against rupturing the membranes, that the os may be more thoroughly dilated and the liquor amnii not drained away. If anterior rotation of the chin is delayed, it may be hastened by two fingers pressing on the cheek and chin; or, if necessary, pressure may be applied with a

single blade of the forceps. These failing, straight forceps may be used to effect rotation, and if the chin is directed anteriorly traction may be made. If the chin is directed backward traction should *not* be employed. Finally, craniotomy may be necessary. When the case progresses with or without assistance care must be exercised in the final delivery of the head, not to push the neck too forcibly against symphysis when trying to prevent laceration of the perineum.

Brow.

Head midway between complete extension and complete flexion. The largest diameter of the head presents. Of all presentations of the head it is the most unfavorable for mother and child. The four positions are classified according to the direction of the chin.

Diagnosis.—Is made by a digital examination.

Mechanism.—The steps are similar to those of face presentation. When the chin is directed posteriorly the case is an impossible one for the same reason as in the posterior position of the face.

Prognosis.—Fœtal mortality, 30 per cent. ; maternal, 10 per cent.

Treatment.—Before labor convert into vertex. This can sometimes be accomplished by external pressure on the occiput to secure flexion. If this fails, insert hand in the vagina and pull occiput down. Next, try to convert into face if the chin is anterior. If this fails, version should be tried. It should not be resorted to if the waters are drained off, or the presenting part is fixed in the superior strait. Finally, if the chin is anterior, apply forceps ; if posterior, craniotomy is indicated. In face and brow presentations the cardinal rule is, not to use forceps except as rotators ; if traction is resorted to at all, it should be employed with the greatest caution and gentleness. *Very rarely* the head may be brought down far enough to meet with resistance, and thus be rotated anteriorly, but unless the head yields to moderate traction, embryotomy is preferable.

Breech.

Presentation of any part of the pelvic extremity of the fœtal ellipse. The classification is according to the direction of the sacrum, left sacro-anterior, right sacro-anterior, etc.

Frequency.—Occurs in 3 to 4 per cent. of all cases.

Causes.—1. Abnormalities in shape of fœtus or uterine cavity. Includes reversal of uterine ovoid (the lower uterine segment larger than upper); fœtal monstrosities; twin pregnancy (in 25 per cent. of cases the breech presents). 2. Increased mobility of the fœtus.

Diagnosis.—Head above, breech below. Heart sounds are heard on a transverse line above umbilicus. Digital examination shows high position of the presenting part; absence of dome-like projection of vaginal vault which is found in presentation of head; the bag of waters projects as a pouch-like protrusion; by pressure on the fundus with the other hand the characteristic features of the breech may be detected, *i. e.*, the nates and sulcus between them, tip of sacral bone and coccyx, the thighs, external genitalia and anus, evacuation of meconium, which in breech cases is not of serious import.

Mechanism.—Comprises the following steps:—

1. Descent of breech to pelvic floor. Occurs very slowly because the soft breech is an ineffectual dilator of the cervix and ineffectual irritator of reflex uterine contraction, hence many hours may be required.

2. Rotation forward of anterior hip. The anterior hip first strikes the pelvic floor, but owing to the insufficient resistance which the soft breech encounters the rotation is imperfect.

3. Birth of anterior hip, posterior hip, thighs and trunk.

4. Engagement and descent of shoulders in oblique diameter.

5. Rotation forward of anterior shoulder.

6. Birth of anterior followed by posterior shoulder.

7. Descent of head in oblique diameter.

8. Rotation forward of occiput, which is always the part to first strike the pelvic floor.

9. Delivery of head in the following order: Chin, face, forehead, anterior fontanelle.

Prognosis.—Fœtal mortality 30 per cent., including badly managed cases.

Treatment.—Before labor, external version. After labor has begun, inaction until body is born to umbilicus, unless maternal or fœtal life threatened. At this time interfere and deliver by pressing upon fundus with one hand, the other hand in the vagina to

favor anterior rotation of the shoulder, flexion of the head, and to direct the head through the vagina.

Abnormalities in Mechanism.—The most frequent and important are (1) backward rotation of the occiput and (2) excessive rotation of the breech. Backward rotation of the occiput is very exceptional, and the mechanism now differs as the head remains flexed or becomes extended. When flexed, the chin, face, forehead, anterior fontanelle slip out under symphysis in the order named, and the head is delivered. When extended, the chin catches upon the symphysis, the head is extremely extended and is born by the occipital protuberance, small fontanelle, cranial vault and face slipping over the perineum. The following rules for managing these cases should be remembered : If flexed, the body of the child should be carried downward. If extended, the body should be carried upward over the mother's abdomen. Excessive rotation of the breech occurs as the result of prolapse of posterior extremity, and is of no great practical importance.

Shoulder.

Transverse position of the child in utero resolves itself into a shoulder presentation as the result of uterine contraction when labor begins. Shoulder presentations are classified according to the position of the back and head. When the head is to the right, the back can be in front or behind. The same is true when the head is to the left. The back is directed anteriorly twice as often as posteriorly, and the head more than twice as often is found toward the left.

Diagnosis.—Abdominal palpation reveals the fœtus in a transverse position. The heart-sounds are more distinct at a point corresponding to the interscapular region of the child, and sometimes cannot be heard. Digital examination shows the characteristics of the shoulder, viz., axilla, clavicle, spine of scapula, acromion process, head of the humerus, ribs.

Causes.—1. Abnormalities in the shape and position of the uterus, as pendulous abdomen ; uterus bicornis ; kyphotic spine ; uterine fibroid and other abdominal tumors ; multiple pregnancy (in twin pregnancies the shoulder presents once in 22 cases).

2. Conditions preventing engagement of cephalic or pelvic extremity, as deformity of the pelvis; abnormally large child; monstrosities; placenta prævia.

3. Abnormal mobility of the fœtus, as occurs in hydramnion, after fœtal death, or in premature birth.

Mechanism.—Strictly speaking, there is no mechanism of shoulder presentations. The course of these cases is impaction of the shoulder, ascension of contraction ring, death of the mother by rupture of the uterus or exhaustion, and destruction of the fœtus by prolonged pressure. As a matter of fact, however, nature can in exceptional cases effect delivery in one of three methods:—

1. Spontaneous version. The transverse position converted into a longitudinal by uterine contraction.

2. Spontaneous evolution. The breech slips past the shoulder and is delivered.

3. Body doubled up (corpore reduplicato).

Treatment.—Version.

Obstetric Operations.

Induction of Premature Labor and Abortion.

Abortion.

When performed before viability of child (180th day).

Indications.—When the patient is a subject of disease originating in or aggravated by pregnancy, and life endangered thereby, viz.:—

1. *Pathological Vomiting.*—Only after all known remedies and rectal alimentation fail.

2. *Grave Albuminuria.*—As when œdema, headache, casts, etc., threaten eclampsia.

3. *Certain Nervous Diseases.*—As acute mania, melancholia, or associated inflammatory changes in the brain. Rarely chorea.

4. *Certain Blood Diseases.*—Pathological hydræmia (pernicious anæmia), leucocythemia.

5. *Displacements of Gravid Uterus.*—Retroflexion, prolapse, hernia, resisting other treatment.

Always secure consultation and share responsibility.

Methods.—Many have been resorted to, but have been found either too dangerous, slow, or ineffectual. Such are the use of ergot, cotton-root, injections upon cervix or between membranes, inflated rubber bags in vagina or uterus, rapid or gradual dilatation of the cervix, perforation of the membranes.

The method recommended is a combination of the good features of some of those mentioned, and is as follows :—

1st. Disinfect canal by antiseptic douche and pledget of mercurialized cotton in cervix.

2d. Dilate cervix to size of thumb with Hegar's dilators.

3d. Antiseptic wool tampon in cervix and lower uterine segment, and a similar tampon in vagina. Remove at the end of 8 hours. If the ovum is not discharged from the uterus, remove it, using, with strict antiseptic precautions, the finger, or with greatest care, curette.

Premature Labor.

When performed after viability of child.

Indications.—1. *For diseases as above.*

2. *Special Indications*, as (*a*) Contracted Pelvis, (*b*) Advanced Phthisis, Grave Heart Disease, etc., threatening mother's life, (*c*) Habitual Death of Fœtus just before term.

Method.—Sims' position, aseptic hard rubber bougie passed in for 7 or 8 inches between deciduæ vera and reflexa. Labor begins after a variable period, 3 hours to a week, the average being 36 hours. If the mother's condition demand immediate delivery, the method is as follows :—(*a*) perforate the membranes, (*b*) forced dilatation of cervix with Barnes' bags or Hegar's dilators, (*c*) forceps, or version and extraction.

Forceps.

Uses and Functions.

(*a*) Tractor—most important.
(*b*) Rotator.
(*c*) Lever.
(*d*) Compressor—dangerous.

Indications.

1. *Anomalies in Expulsive Forces*—as uterine or abdominal inertia.
2. *Anomalies in Resistance*—in the pelvis, soft parts or fœtal

body, as minor degrees of contracted pelvis, abnormal rigidity or large fœtal head.

3. *Threatened Fœtal Life*—as prematurely detached placenta, compression or prolapse of the cord, prolonged pressure on fœtal head, feebleness of fœtal heart, sudden death of mother. If the heart sounds sink to 100 for a minute forceps should be applied.

4. *Debilitating diseases, acute or chronic, rendering the ordinary forces insufficient*—as phthisis, typhoid, heart disease, etc. In such the forceps should be applied at the beginning of the second stage to avoid asphyxia or to save the mother's strength.

5. *Life Endangered*—as in heart clot, eclampsia, hemorrhage, rupture of uterus.

6. *Abnormal Positions and Presentations and Anomalies in the Mechanism of Labor.*

As a general rule, they should be applied when the head, during the second stage, has been stationary for two hours.

Contraindications :—

1. *Os must be dilated.* Exception. When maternal or fœtal life is threatened, it is allowable to apply them to a partially dilated os, as when rupture of the uterus is threatened, as shown by the approach to the umbilicus of the groove over the contraction ring.

2. *Head must have engaged at the superior strait.* Exception. To bring head down as a tampon in marginal placenta prævia.

3. *Membranes must be ruptured.*

4. *Must not be used as tractors in faulty positions.*

5. *Should not be employed unless head be of average size.* If too small or too large, apt to slip and lacerate the soft parts.

6. *Should not be employed when the disproportion between the head and canal is too great.*

Forceps in Contracted Pelves.—Two factors, size of fœtal head and degree of contraction, must be considered to determine between the use of forceps at term and induction of premature labor. The determination of the size of the fœtus must be left to each individual's skill and experience in abdominal palpation. In contracted pelvis, if *justo-minor*, with conjugate 9½ cm., or over, it is justifiable to deliver with forceps at term. If the conjugate be less than 9½, induce labor preferably at 36th week.

In the *simple flat* or *rachitic flat*, 9 cm. is the limit in primiparæ ;

9½ cm. in multiparæ, whose uterine and abdominal forces are not so strong as in primiparæ, and in whom rupture of uterus is more apt to occur.

Forceps Recommended.—Simpson, for the low operation, Poullet v. Hecker or Tarnier, for the high operation. Sawyer's, to protect perineum as the head emerges.

Rules for Application.—In using the Simpson forceps, the left blade is always applied first. The *left* blade should be held in the *left* hand and introduced into the *left* side of the pelvis. *Right* blade *right* hand, *right* side of pelvis.

With the diagnosis of the presentation assumed, the steps in the application of the blades may be summarized as follows:—

1. Having introduced two fingers of the right hand into the vagina, the left blade, grasped at the lock by the left hand as a pen, is held almost perpendicularly, with the tip of the blade opposite the vulva.
2. The tip of the blade should enter the vagina and traverse the perineum toward the sacrum.
3. Rotate the blade outward in its long axis, to bring it in apposition with the posterior inclined plane of the pelvis, and thus escape the promontory of the sacrum when the handle is depressed.
4. Depress the handle, carrying it to the left side, the fingers of the right hand in the vagina guiding the blade and protecting the soft parts.
5. Introduce the right blade in a similar manner, substituting right for left in the above description.
6. To grasp the head properly and facilitate locking, rotate forward the *right* blade in the first and third positions, the *left* in the second and fourth.

Too great compression of the head may be avoided by placing a folded towel between the handles. Tractions should be made in a line parallel to the axis of the parturient canal—with the pains when present, at corresponding intervals when absent. During the intervals between the tractions the grip on the handles should be relaxed to release the head from compression.*

* The skill and manual dexterity required in all forceps operations can only be acquired by actual practice, hence the student must avail himself of the opportunity to learn the technique of all the operations in the Laboratory of Operative Obstetrics.

Preliminaries to the Operation.—An anæsthetic always renders the operation less difficult. The lithotomy position at the edge of the bed is the most convenient. The blades should be immersed in a 5 per cent. solution of carbolic acid or boiling water, rubbed with a 50 per cent. solution of carbolic acid in glycerine and folded in a clean towel. Just before using them vaseline should be applied to their outer surfaces.

Version.

Version is an operation or manœuvre to change the position of the fœtus in utero.

Varieties :—

(*a*) Version by the head (cephalic).
(*b*) Version by the breech.
(*c*) Podalic.

Methods :—

(*a*) Postural.
(*b*) External manipulation.
(*c*) Internal manipulation.
(*d*) Combined or Bi-polar.

Indications for Version.

1. Presentations of the trunk—usually shoulder.
2. Deformity of pelvis.
3. Sudden dangers, when the head is not engaged, as eclampsia, heart clot, etc.
4. Malpositions of the head, as presentations of the ear, parietal bone, brow or face.
5. Placenta prævia.
6. Prolapse of cord.

In all cases combined version should be tried first, followed by podalic if combined fails.

Contraindications :—

1. The presenting part should not be engaged nor out of os.
2. High position of contraction ring.

Conditions rendering the operation difficult, dangerous, or impossible :—

(*a*) An undilated and undilatable vagina.
(*b*) A similar condition of cervix, as in placenta prævia, where

the operation is performed early. Always anæsthetize and overcome the rigidity gradually.

(*c*) Inability to effect an entrance into the uterus, as occurs when the liquor amnii has been lost and the uterus is retracted, when the uterus is permanently contracted (tetanus of uterus so called), or when there is obstruction by the fœtus, as hydrocephalus, spina bifida with meningocele.

(*d*) Inability to bring the feet down after they are grasped.

(*e*) Conditions interfering with external hand, as excessive amount of fat in abdominal wall, hysteria, chorea, epilepsy, eclampsia.

Conditions Most Favorable for the Operation :—

(*a*) Uterus distended by liquor amnii.

(*b*) Os dilated.

(*c*) Uterine muscles not irritable.

(*d*) Abdominal muscles flexible and thin.

(*e*) Cervix not rigid.

Postural.—This method may be used in deviated vertex presentations. Ear presenting, turn the patient on the side, so that breech may face to that side and thus bring vertex over os. Brow presenting, turn to that side toward which the face looks, and thus secure flexion and cause vertex to present.

Combined.—The patient should be placed in the lithotomy position and anæsthetized. Externally use the hand nearest the part acted upon, operator facing the mother.

Head is preferably brought to superior strait because it is usually nearer centre of pelvis, is more easily manipulated externally and vertex presentation most favorable to fœtus.

Podalic.—Preliminaries: (*a*) Secure relaxation of uterus and abdominal muscles by anæsthetic. (*b*) Secure lowest position of fœtal feet by turning mother on that side toward which the feet point. (*c*) Use that hand, made aseptic, which midway between pronation and supination corresponds to abdomen of the child. The hand reaches the anterior foot first, and the advantages of resting content with traction on a single foot are :—

(*a*) A further entrance into uterus is unnecessary.

(*b*) Easier to hold.

(*c*) The other doubles up along the abdomen and thus dilates cervix more thoroughly.

(*d*) Secures sacro-anterior position of breech, which is desirable.

When the knee is born cease traction, unless there exist some indication for immediate delivery, stop the anæsthetic, turn the patient on her back, listen to fœtal heart-sounds and leave the further delivery to nature until the head is about to be born, when it should be extracted by the following methods, in the order given :—

(*a*) Wiegand.
(*b*) Veit-Smellie.
(*c*) Prague.
(*d*) Forceps.

Not more than five minutes should be consumed in the operation.

When rapid delivery of breech cases may be required, it is accomplished by means of the fillet or flexible blunt hook.

Embryotomy.

Embryotomy is mutilation of the fœtus and comprises several operations :—

(*a*) Craniotomy.
(*b*) Decapitation.
(*c*) Evisceration.
(*d*) Amputation of extremities.

Craniotomy.—Comprises opening the head, diminishing its size, and its extraction.

Indications when the Child is Dead.—When the mother can be saved risk or suffering by the child's delivery.

Indications when the Child is Living.

(*a*) When the head is very large.
(*b*) When the pelvis is very small.

Many authors advise the operation when the conjugate measures 6–8 cm., but the size of the head, its compressibility and the muscular power of the woman are elements to be considered. Premature labor, when possible, should be the treatment. At term, forceps, version, Cæsarean section are alternatives. Always secure a consultation to share responsibility.

Instruments for Operation.

1. Perforator. Blot's, Smellie or Hodge scissors.

2. Large catheter, and carbolized solution for washing out brain substance.

3. Cephalotribe. Karl Braun's, Tarnier's Basiotribe.
4. Cranioclast. Karl Braun's or Hirst's.

The operation consists of the following steps :—

(*a*) Etherization.
(*b*) Vaginal douche of bichloride solution.
(*c*) Volsella forceps to steady scalp.
(*d*) Perforation of cranium.
(*e*) Contents of cranium washed away.
(*f*) Crushing with cephalotribe.
(*g*) Extraction with cranioclast.

Decapitation.—

Indication.—Impacted shoulder presentation.

Instruments.—Braun's hook, or Ramsbotham's sharp hook.

Amputations, and *Evisceration* are very rarely indicated. Some forms of monsters may require them.

Symphyseotomy.

The operation is a division of the joint, allowing diastasis of the bones during labor, the child being delivered by the natural passage. Was performed for the first time on a dead woman in 1665, on a living woman in 1777. In 1866 the operation was revived, and from that time to 1881 it was performed fifty-three times with a death rate of 18 per cent. Not much space is gained and the operation is no longer employed.

Cæsarean Section.

When the escape of the child by the natural passage is impossible, it may be delivered by an abdominal and uterine incision (Cæsarean section). If by an abdominal and vaginal incision the operation is called laparo-elytrotomy. Cæsarean section may be performed ante- or post-mortem.

Post-mortem Cæsarean Section.—When the death of the mother is assured, cut open the abdomen and uterus with any instrument at hand. A living infant has been extracted twenty minutes, three quarters of an hour and even two hours after the death of the mother.

Cæsarean Section upon the Living Woman.—Performed for the first time in 1500. Five years ago, in England, the death rate was $99\frac{3}{10}$ per cent.

Varieties:—

Porro-Cæsarean.—In 1876 Porro modified the operation by performing, in addition to laparo-hysterotomy, a laparo-hysterectomy, *i. e.*, removal of the uterus. The stump is fixed in the abdominal wound preferably by Koeberle's nœud. In 150 cases the death rate was 54 per cent., but since 1884 to the present time it has fallen to 20 per cent. The operation is performed to obviate any discharge into the abdominal cavity through the uterine sutures.

Porro-Müller.—In this a long abdominal incision is made, the uterus is lifted out and then incised. The application of an Esmarch around the cervix to control hemorrhage was also a modification of Müller.

Sänger.—The modifications of Sänger have given an operation which is the most successful and the one to employ, except when certain conditions indicate the Porro-Cæsarean as preferable. The mortality with the best of German operators is 5 per cent., for mothers and less for the children. In general, it has now been reduced to 20 per cent.; for continental Europe to 12 per cent., and there have been six consecutive operations in Philadelphia without a death. The main feature of Sänger's discovery is the introduction of two rows of silk sutures to close the uterine incision, one through the uterine muscle down to the decidua (two to the inch), and the other superficial (Lembert suture) to tuck in the peritoneal covering of the uterus which unites in twenty-four hours, and thus prevents leakage into peritoneal cavity. Another element of success is to be found in the fact that the operation is now undertaken in time, before forceps, version, embryotomy or other operations have been tried.

Indications.—Are relative and absolute.

(*a*) *Absolute.*—Some condition which admits of no other method of treatment.

1. Pelvic deformity. In flat pelves when conjugata vera is 6.5 cm. ($2\frac{1}{2}$ inches) or less. It may be required in osteomalacia and spondylolisthesis, also in Nægele's and Roberts' pelves.

2. New growths obstructing the pelvis, as a large fibroid, bony tumors of the sacrum, carcinoma, etc.

(*b*) *Relative.*—When the condition admits of some other method of treatment, but the question arises whether Cæsarean section will

not give the best result for mother and child, *i. e.*, it is selected as likely to give best results.

1. Pelvic deformity. Conjugate vera 6.5 cm. ($2\frac{1}{2}$ inches) to $8\frac{1}{3}$ cm. ($3\frac{1}{8}$ inches). When the conjugate measures $8\frac{1}{3}$ cm., the operation is indicated only when the child is abnormally large.

2. Rupture of the uterus may often require the Sänger operation.

The Porro operation is indicated when the pelvis is so choked up as to interfere with drainage of lochia; when the woman has been long in labor and is septic, or when other methods of treatment have been unsuccessful, and the danger of sepsis thus increased; when the uterus fails to contract, or when hemorrhage is profuse.

Technique of the Operation.—(Sänger, or improved Cæsarean.)

(*a*) *Time.*—The most favorable time is from 250th to 265th day after conception. The introduction of a bougie into the uterine cavity to institute labor pains is an advantage. The operation should be performed after labor has begun.

(*b*) *Instruments.*—Those ordinarily used in a laparotomy.

(*c*) *Preparatory Treatment.*—Includes disinfection of abdomen and external genitals, evacuation of bladder and bowels, etc., as for laparotomy.

(*d*) *Abdominal incision* should extend one-third above and two-thirds below umbilicus.

(*e*) *Esmarch tube* should be placed around cervix to control bleeding.

(*f*) *The uterine incision* should be long enough to allow the escape of the child's head, and the child extracted, grasping it as may be most convenient.

(*g*) *The placenta is next extracted*, followed by the Sänger method of suture to close the uterine wound. The abdominal wound is then closed after the toilet of the abdominal cavity has been completed, and the after-treatment combines the features of management after labor and laparotomy.

Laparo-elytrotomy.

In 1806 Jörg devised an operation which consisted of an incision over Poupart's ligament, dissecting up the peritoneum until the vagina is reached, when the latter is incised transversely, the cervix dilated, and the child thus extracted above the inlet. In 1820 this operation was performed by Ritgen, with a fatal result. In 1822 it

was proposed by Physic, of Philadelphia, and in 1823 done by Baudelocque. In 1876, Thomas and Skene, of New York, performed it, and it was called by them laparo-elytrotomy. Since 1876 its mortality has been 50 per cent., and therefore it should not come into general use.

Laparo-cystectomy.

An operation performed in advanced extrauterine pregnancy for removal of fœtus and entire sac. It is performed like an abdominal section for any cystic tumor in the abdominal cavity with dense adhesions. The sac is to be evacuated or not, as indicated, and adhesions separated, if necessary, after ligation.

Dystocia.

Causes :—

A. Anomalies in force, expulsive or resistant.
B. Accidents.
C. Disease.

(A) Anomalies in Force.

I. In Expulsive Power of Uterus or Abdominal Muscles.

(*a*) Excess of expulsive power.
(*b*) Defect of expulsive power.

(a) Excess of Expulsive Power.

(1) *Uterine.*—Excessive uterine contraction is rare. Occurs most frequently in primiparæ, and does not seem to be dependent upon the muscular development of the patient.

Diagnosis.—Abdominal palpation shows frequent and forcible uterine contraction. Vaginal examination shows rapid advance of presenting part. Cry of patient is exaggerated.

Difficulties.—The severe pain and precipitate expulsion of the child.

Treatment.—Anæsthetic. Resist advance of presenting part. In the earlier stages if the pains be so frequent as to threaten exhaustion, lessen nerve action and muscular power by chloral, gr. xv every fifteen minutes, until three doses are taken. Bromides or opium may also be used.

(2) *Abdominal.*—Excessive abdominal power occurs in the second stage, and should be similarly treated.

(3) A *relative excess* occurs when the opposition is less, as in a roomy pelvis, a pelvis with straight sacrum, relaxed or lacerated perineum, fœtus very small or premature. The dangers of rapid expulsion thus likely to follow are, laceration of the perineum, syncope, post-partum hemorrhage, rupture of the cord, premature detachment of the placenta. When due to such a cause, treatment should supply resistance by holding the head back with the thumb or small, straight forceps.

(4) Excess occurs when there is a *gradual decrease of the intervals between the contractions*, until a final condition of tetanic spasm may result. This may be due to a serious obstruction, as deformity of pelvis, abnormal presentation, fibroids, cancer of cervix, ovarian tumor, agglutination of external os, etc., or there may be a true spasm of the uterus, as may develop in an irritable primipara with liquor amnii drained off.

Diagnosis.—By palpation above and below the contraction ring.

Treatment.—Remove the cause. If a true spasm, chloral and opium.

(B) Defect of Expulsive Power.

Uterine Inertia—Causes.—(1) *Weakness of muscle*, as occurs sometimes in multiparæ, exhausted primiparæ, general diseases, as pneumonia, typhoid, phthisis, cancer, over-distention from twins or hydramnion.

(2) *Apathy of muscle.*

(3) *Emotion.*

Dangers.—Relaxation predisposes to septic infection, pressure necroses, post-partum hemorrhage. The child may become asphyxiated by pressure on its brain centres or compression of the cord.

Treatment.—Rise of temperature and other signs of exhaustion demand interference. It is always best to err on the safe side and terminate the labor. If due to weakness of muscle, stimulants, quinine gr. xv, forceps. If to apathy of muscle, introduce a bougie; if to emotion, administer an anæsthetic. If it occurs early, terminate the labor by rapid dilatation of cervix and version. Ergot should not be given, as it excites tetanic spasm and contracts the cervix. The fœtus is often semi-paralyzed, its blood supply partly shut off, and if an obstruction to labor exists, rupture of the uterus may follow its use.

II. Anomalies in Force of Resistance.

MATERNAL OBSTRUCTIONS.

1. *Contracted Pelvis.*

Treatment.—Differs with grade of deformity. *Conjugate* 9½ *to* 11 *cm.*—Can allow to go to term, expecting the labor to be rather difficult and prolonged. Complications are frequent, as abnormal positions and presentations of child, which are four times as frequent as in normal pelves. Prolapse of cord is also a frequent complication. The most frequent abnormality is transverse situation of the head at pelvic inlet, as described under abnormalities in the mechanism of vertex presentations. Prolongation of labor and exaggerated complaints of patient must be expected. Increased expulsive powers are demanded, and if insufficient, forceps or version must be resorted to. In primiparæ spontaneous termination is more frequent. In multiparæ, or when muscular force is diminished, assistance is often needed. When forces are normal and child not over-sized, non-interference with nature's mechanism is the cardinal rule. Forceps interferes by preventing partial extension, favorable moulding and lateral inclination, and should not, therefore, as a rule, be applied until head has entered pelvic cavity, when it is not usually required unless inertia uteri develops. *Conjugate below* 9 *to* 9½ *cm.*—Indicate induction of premature labor from 2 to 4 weeks before expected delivery depending upon degree of flattening. After labor has begun, the head in flat pelves is apparently low down, from shallow depth of pelvis and low position of caput succedaneum, and this mistaken idea may induce one to apply forceps. In such a case, either non-interference or version and extraction are indicated,—the former in primiparæ or in women with strong expulsive powers, the latter in multiparæ or in women with deficient expulsive powers. Forceps may be applied after the head has entered the pelvis. *Conjugate so contracted as to be impassable.*—Accurate and precise diagnosis of the degree of deformity should always be made in order to spare the women the dangers of futile attempts at extraction with forceps or by version, when craniotomy or Cæsarean section are indicated. (See Craniotomy and Cæsarean section.)

2. *Congenital Anomalies of Development in Genital Canal.*—As double uterus. May interfere by its bulk or contractions of the

empty uterus. If placenta is attached to septum, alarming post-partum hemorrhage may occur.

3. *Closure and Contraction of Cervix.*—As *atresia*, *cicatricial contraction* or *rigidity*. Atresia is never complete, and may be overcome by pressure on the small opening with the tip of a sound or finger. *Cicatricial contraction* may require incisions, controlling the hemorrhage temporarily by clamped sutures. *Rigidity* usually yields to copious hot douches. Chloral, morphia, belladonna ointment have been recommended.

4. *Closure and Contraction of Vagina or Vulva.*—As by constricting bands, cicatrization, hæmatomata, requiring incisions.

5. *Displacements of Uterus.*—Anterior, lateral, sacculation, hypertrophic elongation of cervix. The first requires a binder, the second side position, with compress under fundus. Version or forceps to bring head into pelvic cavity for sacculation. Incisions radiating from os for elongated cervix.

6. *Tumors of Genital Canal.—Carcinoma of Cervix.*—If extensive may require Cæsarean section.

Fibroids.—If low down and diagnosed during pregnancy, remove by abdominal section, induce abortion, or perform Cæsarean section at term. If movable they may be pushed out of the way during labor.

Polypi.—Ligate base and remove at term.

7. *Tumors of Neighboring Organs.—Ovarian Cystoma.*—Usually cause abortion. Ovariotomy during pregnancy is justifiable. If they obstruct during labor aspirate per vaginam. *Cysto-colpocele* or *Rectocele* should be replaced until forceps are used to bring the head past them. *Calculi* or *fecal* masses should be removed. A decomposed fœtus in utero, as result of obstructed labor, should be removed antiseptically.

Fœtal Obstructions.

1. *Overgrowth.*

2. *Malformations and Tumors.*—Treatment varies with each case. Version or embryotomy usually required.

3. *Diseases.*—As cystic kidneys, effusions into the serous cavities, anasarca, enlarged liver, etc.

4. *Malpresentations and Faulty Positions.*—As shoulder, face, brow, compound.

5. *Multiple Births.*

Twins.—Head of one, feet of the other, most frequently present. If both engage, retard one and extract the other. The cord may be coiled around one. The chins may lock, when an effort should be made to push back the one presenting by the head. Failing, amputate the head of this one and deliver the one presenting by the breech, or push the latter back and deliver the former with forceps. In any case, when one is born, do not follow the expectant plan, as sometimes advised, but at once determine the position and presentation of the one remaining in utero. Correct it, if necessary; give ergot and terminate the labor.

6. *Abnormalities in Fœtal Appendages.*

Membranes.—If too thin, an early rupture precedes a dry labor with irritable uterus; if too thick, child apt to be born with a "caul." *Liquor Amnii.*—If too little, consequences are similar to those of premature rupture; if too much, there is inertia, as result of over-stretching.

Cord.—If short, may cause premature detachment of placenta or prevent advance of the child.

Placenta.—May be adherent, from syphilis or endometritis during pregnancy. The alarming hemorrhage resulting requires removal of the adherent portion.

(B) Dystocia due to Accidents to Child or Mother.

(*a*) ACCIDENTS TO THE CHILD.—1. *Prolapse of Cord.* Causes: lack of conformity of presenting part with shape and size of pelvis, as small head, malpresentations (face, shoulder, breech), contracted pelvis. Less commonly hydramnios, too long a cord, lateral deviation of uterus.

Diagnosis.—Easy. Has been mistaken for prolapse of intestines.

Prognosis.—Mortality 53 per cent.

Treatment.—Postural and manual, *i. e.*, knee-chest posture, and endeavor to replace with fingers. Instrumental, a catheter with counter-opening used as repositor. If these fail, resort to version or rapid extraction with forceps, placing the cord at that sacro-iliac joint where it would be least pressed upon.

2. *Rupture of Cord.* Rare.

(*b*) ACCIDENTS TO THE MOTHER.—*Hemorrhage* occurring before,

during or after labor. Ante-partum hemorrhage may be due to placenta prævia, premature detachment of placenta, rupture of uterus.

(1) *Placenta Prævia.*—The placenta is said to be prævia when it is attached to any portion of the lower uterine segment.

Causes.—It is the result of a low situation of the ovum, but why this occurs is not yet satisfactorily explained. It is more frequent in multiparæ and those of the poorer class.

Varieties.—Central, Partial, Marginal, Lateral.

Symptoms.—Hemorrhage, occurring as early as the second month in the central variety, during labor or not at all in the lateral. The characteristics of the hemorrhage are, sudden onset without pain, the patient often finding a gush of blood while in bed, and return of the bleeding, with progressively increasing quantity at decreasing intervals. Rarely, the hemorrhage is controlled by nature, a clot forming or syncope occurring, and a fatal hemorrhage before the 7th month has not been recorded.

Treatment.—Prior to 7th month, expectant. After 7th month, *induction of premature labor* by forced dilatation of cervix and combined version. The breech should be brought down, as it controls the hemorrhage and does not cut off the blood supply to the fœtus. Use the right hand internally, as the smallest segment of the placenta is usually on the left side.

In the central variety perforate the placenta if necessary.

Wiegand's treatment is placing an antiseptic tampon in the upper third of the vagina, allowing the head to push it out.

Incubation and gavage should be used if the child is born early after 7th month.

(2) *Accidental Hemorrhage.*—Hemorrhage from premature detachment of the placenta. May be one of four classes :—

1. Centre of placenta detached.
2. Upper margin detached and blood extravasated between membranes and uterus.
3. Membranes rupture and blood passes into amniotic cavity.
4. Cervix obstructed by clot, membranes or presenting part, when it is *concealed.*

Causes.—Similar to those of abortion, as decidual apoplexy, violent exercise, emotion, etc. Occurs more frequently in the latter months of pregnancy and in multiparæ.

Diagnosis.—The symptoms are similar to rupture of uterus. There is hemorrhage, with sudden excruciating pain and shock in both, but in rupture of the uterus the membranes are broken, the presenting part recedes, the uterus is well contracted, while in accidental hemorrhage the membranes are not always broken, the presenting part does not recede and the uterus is distended by the accumulated blood, particularly in the concealed variety.

Prognosis.—Grave.

Treatment.—Perforate membranes, thus securing some control of hemorrhage by the contraction of uterus, followed by forced dilatation of cervix and version.

(3) *Post-Partum Hemorrhage.*—Nature's mechanism of controlling hemorrhage :—

1. Leucocytes beginning to block up sinuses in latter months of pregnancy.
2. Contraction.
3. Retraction.

Causes :—

1. *Those which interfere with contraction*, as (*a*) weakness from general disease, bad hygiene, mental anxiety ; (*b*) muscle fibre at fault, as when undeveloped, fatigued, overstretched, or inactive by reason of surrounding inflammatory products ; (*c*) anomalies in innervation of muscle fibre.

2. *Mechanical.*—Retained placenta, clots, old adhesions, tumors, as fibroids, ovarian cysts, distended bladder or rectum.

Symptoms.—Sudden gush of blood, or four or five ounces lost every few seconds. Uterus relaxed. Constitutional signs of severe hemorrhage, as, vertigo, air hunger, pallor, etc.

Treatment.—(*a*) *Prophylactic.* When there is any probability of its occurrence, as soon as head is born inject into thigh a syringeful of ergot, properly manipulate uterus and apply binder.

(*b*) *Curative.*—Always have in readiness, water 112°–120°, empty basin, vinegar, ice broken size of fist, clean handkerchief, hypodermic syringe, ergot.

The indications are : 1. Control the hemorrhage, and 2, treat the after condition.

The first indication is met by the following in the order given :—

(*a*) External stimulation of uterus.

(*b*) Carry the other hand into the uterus and remove any clots, placenta, etc.

(*c*) Ice applied internally and externally, but not persisted in.

(*d*) Handkerchief soaked in vinegar squeezed at the fundus.

(*e*) Hot water.

(*f*) Electricity.

(*g*) Intrauterine tampon of iodoform gauze.

(*h*) Drugs, as iodine, styptic salts of iron, etc., are dangerous, as the coagula produced by them may extend into the vessels, are firm and must be broken up by putrefaction, exposing the patient to septic poisoning.

Treatment of the After-condition.—While controlling the hemorrhage, nurse should administer hypodermic of ether. When the bleeding has ceased administer an enema of hot water and frequently repeated small doses of coffee, milk, brandy, etc. Autotransfusion by bandaging extremities, compressing abdominal aorta or actual transfusion ($\frac{6}{10}$ of 1 per cent. of ordinary NaCl solution). When reaction is established, a hypodermic of morphia may be given.

(4) *Hemorrhage from Injuries.*—Exceptionally may be fatal. The most common source is in the anterior wall of vagina near the urethra, where it should be controlled by antiseptic catgut or silk ligature. Exceptionally an anomalous artery may be torn in the cervix or perineum requiring immediate operation.

(5) *Rupture of Uterus.*

Cause.—Obstruction to labor.

Diagnosis.—Placenta Prævia, Accidental Hemorrhage, Rupture of Uterus are the three causes of grave antepartum hemorrhage. In the latter there is shock, great alarm on the part of the patient, the membranes are broken, the presenting part recedes, the examining hand finds the rent, and perhaps feels coils of intestines. The child may be felt in the abdominal cavity with the uterus small and firmly contracted. The danger signal is thinning of the lower uterine segment and a high position of the contraction ring.

Treatment.—Varies with the cause. Deliver by podalic version. If the hemorrhage ceases and there are no clots, no meconium and good drainage, no active treatment required beyond irrigation with 2 per cent. solution of creolin, otherwise open abdomen and suture

after the Sänger method. During the puerperium the uterus may rupture as result of septic ulceration, pressure necroses, or more rarely from malignant septic degeneration of the chorion.

(6) *Inversion of the Uterus*—The rarest of all accidents to the mother, and happens before or after delivery of the placenta with equal frequency. It may be partial or complete.

Cause.—It may arise spontaneously in the so-called paralysis of the placental site, or it may be due to too vigorous traction on the cord or compression of the fundus.

Symptoms.—Occurs suddenly and is usually associated with shock and hemorrhage. Physical examination per rectum reveals a cup-like body containing, perhaps, the prolapsed tubes and ovaries.

Treatment.—Occasionally spontaneous reduction occurs, particularly when the inversion is partial. Remove the placenta if still adherent and reduce as Lusk advises, or by placing fingers just inside the constricting cervix, and while spreading apart to relieve constriction the thumb pushes fundus up.

(7) *Other accidents to the mother are Rupture of Symphysis*, requiring a binder or plaster bandage; *Separation of Sacro-iliac Joints; Fracture of Sacro-coccygeal Joint; Lacerations and Perforations with Instruments; Diastasis of Abdominal Muscles.*

(C) Dystocia due to Disease.

(1) *Puerperal Convulsions.*—*Causes.*—Hysteria, epilepsy, tumors of the brain, meningitis, profound anæmia following post-partum hemorrhage, apoplexy, or the convulsions may arise in that curious nervous condition after labor or during pregnancy so easily responding to reflex disturbances.

(2) *Eclampsia.*—Is the name given to the most frequent variety of puerperal convulsions.

Causes.—Obscure. Theories of causation: (*a*) Urea. (*b*) Carbonate of Ammonium. (*c*) Urinæmia. (*d*) Trauber-Rosenstein. (*e*) Prof. Hirst approves the following: Anæmia in the deeper portions and congestion of the surface of the brain, due to the sudden rise of arterial pressure resulting from the accumulation of poisons in the mother's blood (probably leucomaïnes generated in the fœtal body), her kidneys being unable to excrete them. Insufficient excretion may be produced by occlusion of ureters.

Frequency.—Occurs once in three hundred cases; most frequently in primiparæ, and during labor; least frequently during the puerperium.

Symptoms.—(*a*) *Prodromal.*—Sharp pain is sometimes felt in the head, epigastrium or under clavicle; muscæ volitantes with failure of vision and rolling of the head.

(*b*) *Of the Attack.*—A few moments after the above the attack comes on with a stare, pupils at first contract, eyelids twitch, eyeballs roll, mouth pulled to one side, the neck is then affected, and the spasm finally spreads to trunk and upper extremities. The lower part of lower extremities are rarely spasmodically affected. Consciousness is lost for a minute or two, and during the varying length of interval between the attacks there is more or less stupor.

Prognosis.—30 per cent. die. Influenced by the violence and frequency of the attacks, the character of the pulse, degree of coma, and perhaps the height of temperature. Mortality of the child, 50 per cent.

Treatment.—(*a*) *Preventive.*—The urine of all pregnant women should be critically examined. If there be evidences of nephritis or the kidney of pregnancy, a restricted diet consisting largely of milk should be advised. Colds should be avoided, diuretics administered, and cathartics to prevent constipation. If the symptoms fail to respond to this treatment, the induction of premature labor should be considered.

(*b*) *Curative.*—Indications are to eliminate the poison and combat the spasm. Includes the treatment of the spasm during the intervals, and the obstetric treatment. During the spasms, inhalations of chloroform. In the interval between the spasms, venesection, a pint or more; croton oil, two or three drops; an enema containing a drachm of the bromide of potash and forty grains of chloral. In severe cases, a hot bath, 100° or more, with ice or cold cloths applied to the head. Morphia, elaterium, veratrum viride, may be used. Guard the patient from injury, especially the tongue, which may be protected by placing between the teeth a brush handle wrapped in a handkerchief.

1. *Obstetric Treatment.*—If the os is dilated, terminate the labor with forceps or by version. If the convulsions occur early, and the os is not dilated, wait until partial dilatation occurs, and complete the delivery by combined version and extraction.

2. *Shock.*—Lowered temperature and other symptoms of shock may develop after labor.

3. *Typhoid.*—Rare. Premature labor occurs in 65 per cent. of cases.

4. *Pneumonia or other Adynamic Diseases.*—Require stimulants. Whiskey, digitalis, carbonate of ammonium administered in the first stage and labor terminated.

5. *Valvular Defect in Heart.*—Extensive mitral disease frequently causes death. The heart is embarrassed during pregnancy or labor, and manifests its weakness directly after the expulsion of the child or placenta. When the discharge of blood is profuse, cardiac failure is rare in these cases, thus indicating the treatment: Venesection, removing 8–16 oz., if there is not much blood lost after labor. Digitalis should be given in the first stage, and forceps or version and extraction resorted to in the second.

Sudden Death during or directly after Labor.

Causes.—1. *Profound Mental Impressions*, as sudden joy, grief, fear, exaggerated shame.

2. *Thrombosis*, resulting from excessive pains.

3. *Heart failure*, most frequently due to fatty degeneration.

4. *Some Complications*, as accidental, unavoidable, or post-partum hemorrhage, rupture or inversion of uterus.

5. *Rupture of Hæmatoma*, externally or internally.

6. *Syncope.*—This is not usually fatal. It is favored by the determination of blood from the brain, as by hemorrhage. Thromboses in the heart may form, and those in the uterine sinuses may be prolonged and embolism result.

7. *Embolus.*—May be the result of syncope, or it may be caused by entrance of air.

Symptoms.—Sudden shock, heart failure, death.

8. *Rupture of Gastric Ulcer.*

Effect of Maternal Death upon the Fœtus.—The fœtus survives rarely more than a few minutes. It has lived for two hours. When making an autopsy on a parturient woman, it is convenient to split the symphysis and remove the genital tract in one piece.

APPENDIX.

Selection of Wet Nurse.

In addition to qualities enumerated (page 45), she should, preferably, be a multipara; her child approximately the same age as the one to be nursed; nipple should be well shaped, and it is of advantage to have made a chemical analysis of her milk.

Artificial Feeding.

The disadvantages of substituting cows' for mother's milk may be accounted for by three factors:—

1. *Difference in Chemical Composition* (see Table of Analysis, page 44).—This difficulty is overcome by preparing the milk as follows: To make four ounces, take 3 tablespoonfuls of weak cream or 2 of ordinary cream and 1 tablespoonful of milk, 4 tablespoonfuls of sterilized water, 1 tablespoonful of lime-water, 102 grains of sugar of milk.

2. *Bacteriological Contents.*—Cows' milk, particularly in the hot summer months, is infected with microörganisms and their poisonous products, ptomaïnes. Tyrotoxicon is the most virulent animal alkaloid found in milk. To destroy these poisons, sterilization by steam is necessary. Boiling changes the chemical constitution and renders the milk less nutritious (3 per cent. of CO_2, oxygen, nitrogen driven off, and 20 per cent. of albuminoid constituents found as a thick scum on the surface). Two steamings for twenty minutes each will absolutely sterilize the milk; one is usually sufficient.

3. *Quantity.*—Overfeeding is a common mistake. The following table indicates the proper quantity:—

Age.	Interval.	Number of Feedings in 24 Hours.	Amount of Food at Each Feeding	Total Amount in 24 Hours.
1st week.	2 hours.	10	1 oz.	10
2d–6th week.	2½ hours.	8	1-2	12–16
6th–12th week.	3 hours.	6	3–4	18–24
6th month.	3 hours.	6	6	30
12th month.	3 hours.	5	8	40

The greater the weight, the greater the gastric capacity. Gastric capacity = $\frac{1}{100}$ of body weight + 1 gramme each day (Ssnitkin). It takes a baby fifteen minutes to empty the breast, and this time, therefore, should be consumed in emptying the bottle. The plain rubber nipple should be used, not the feeding tube.

Preparation of Artificial Food.—1. Have ten small Rotch bottles prepared clean every morning.

2. Put in each of them, by means of a funnel, to secure dryness of the neck of the bottle, cream ℥iv, milk ℥ij, water ℨj, milk sugar gr. l.

3. Sterilize.

4. Add ℥ij lime-water to each bottle before use.

This mixture lacks by $\frac{8}{10}$ of 1 per cent. the same amount of non-coagulable albuminoids as compared with mother's milk. Should the child, by weekly weighings, fail to show the normal gain, add one and a fourth drachms of white of egg to ten ounces of water, and distribute this among the ten bottles.

Proprietary foods should not be used. Condensed milk, under some circumstances, may be employed, diluted with nine parts of water, and ℥j cream added for each ounce.