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PICTORIAL MIDWIFERY

COMYNS BERKELEY

Fourth Edition

BAILLIÈRE, TINDALL AND COX

C. C. Miller



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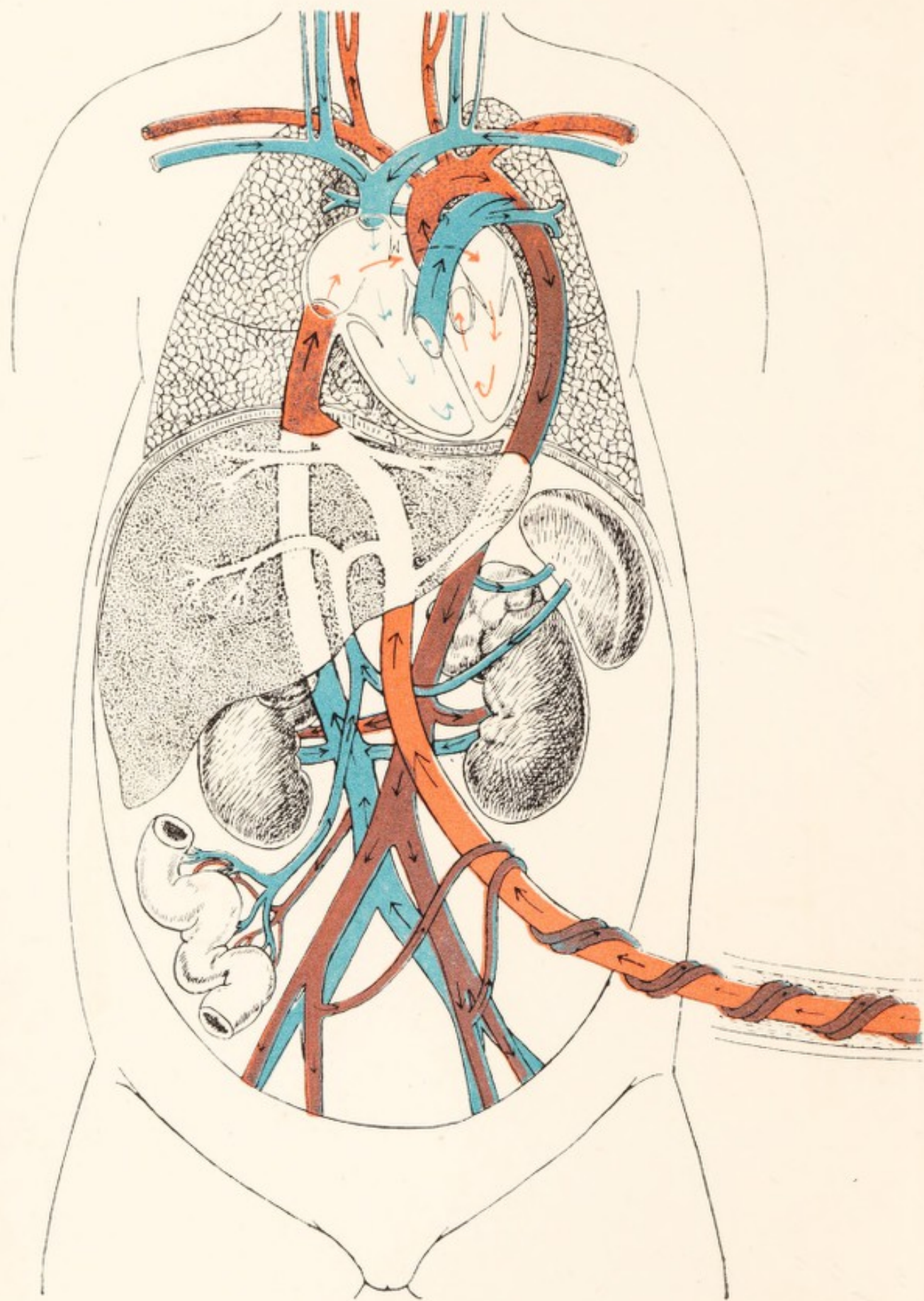
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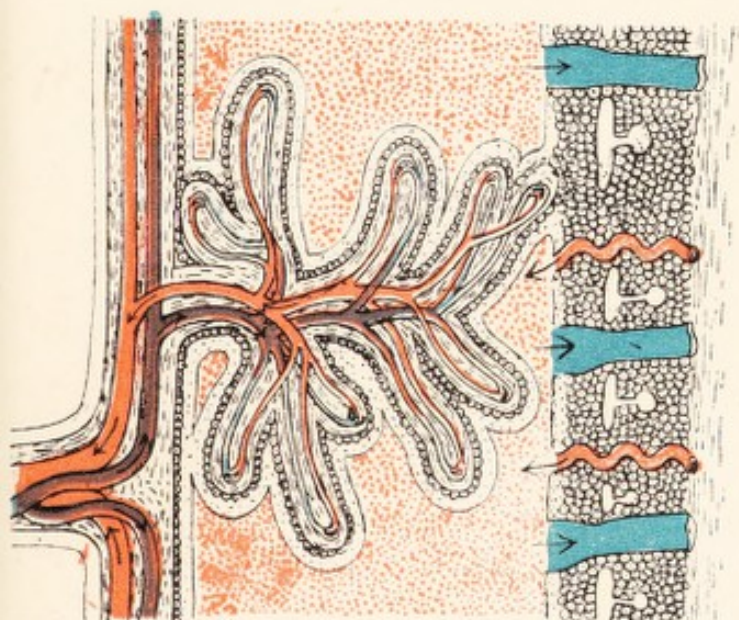
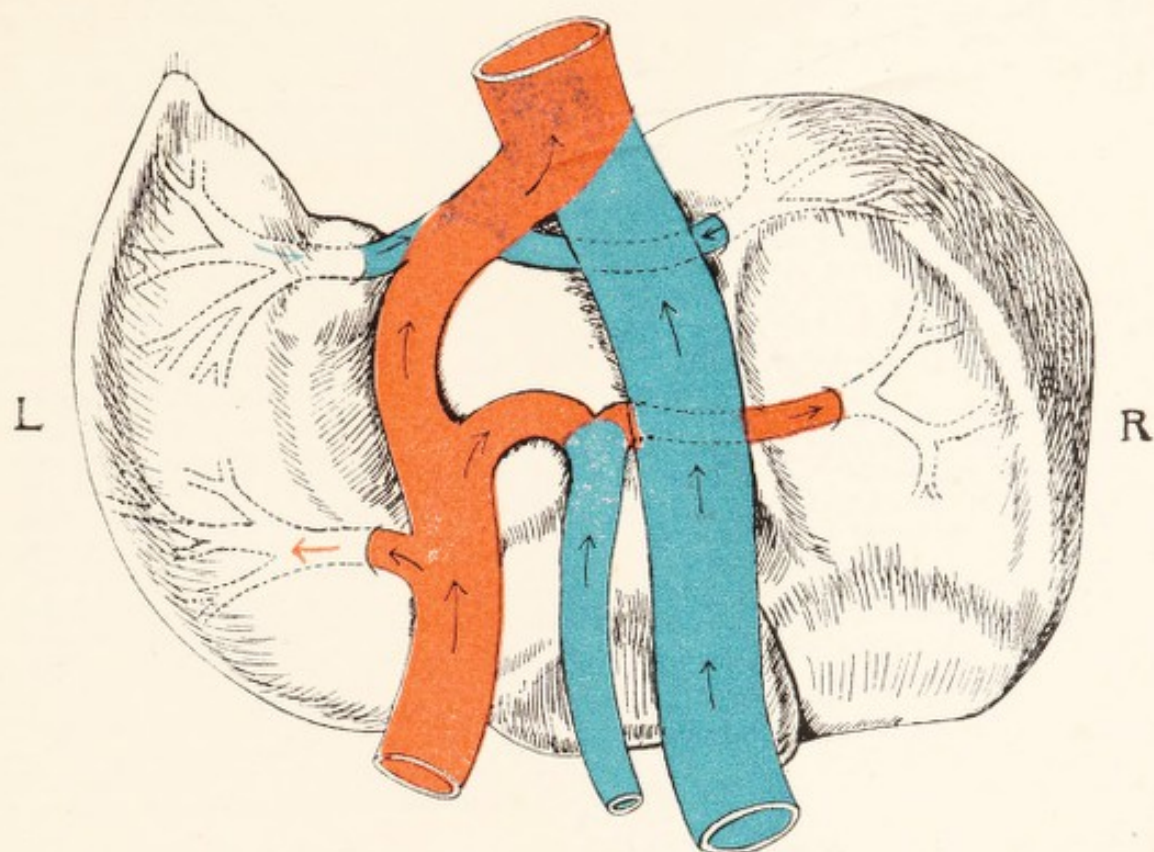
PICTORIAL MIDWIFERY



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N. H. BARCLAY-SMITH

aperture in the dividing wall between the right and left auricles, into the Left Auricle (13), thus by-passing the right ventricle. From the left auricle the blood flows past the Mitral Valves (14) into the Left Ventricle (15), and from thence past the Semilunar Valves (16), into the Arch of the Aorta (17). From the arch of the aorta the blood flows partly to the right into the Innominate Artery (18), and from thence into the Subclavian Artery (19), to be distributed to the upper part of the body and upper limbs, and into the Common Carotid Artery (20), to be distributed to the head and neck, and partly to the left, to be distributed to the Subclavian and Common Carotid Arteries direct, there being no innominate artery on the left side, the blood from the common carotid arteries being distributed by the External Carotid Arteries (21) and the Internal Carotid Arteries (22).

The upper part of the foetus is thus supplied with purer blood than any other part of its body, except the liver, which accounts for its greater development.

The venous blood from the head and neck flows down the External Jugular Veins (23) and the Internal Jugular Veins (24) into the Innominate Veins (26), and from the upper part of the body and upper limbs along the Subclavian Veins (25) into the innominate veins. From the innominate veins the blood flows into the Superior Vena Cava (27), and so into the right auricle.

There are thus two streams of blood entering the right auricle: the one which contains more arterial than venous blood, from the inferior vena cava, and the other which contains venous blood, from the superior vena cava. These two streams are prevented from mixing, to any appreciable extent, by the Eustachian Valve, which is attached to the right auricle between the point of entrance of the inferior vena cava and the Tricuspid Valves (28).

The descending stream of venous blood, which enters the right auricle from the superior vena cava, passes behind the ascending stream of mostly arterial blood, entering the right auricle from the inferior vena cava. It then flows out of the right auricle through the Tricuspid Valves (28) into the Right Ventricle (29). From the right ventricle the blood flows past the Semilunar Valves (30) into the Pulmonary Artery (31). The pulmonary artery divides into two. The larger division, which is called the Ductus Arteriosus (32), opens into the Thoracic Aorta (34), thus by-passing the arch. The smaller branch conveys the rest of the blood to the Right and Left Pulmonary Arteries (33).

It will thus be seen that the aorta, like the right auricle, has two streams of blood entering it, the one mostly arterial and the other venous. The stream entering via the ductus arteriosus flows down the thoracic aorta and Abdominal Aorta (35).

From the abdominal aorta part of the mixed blood is distributed to the abdominal viscera, other than the liver, and the rest flows into the Common Iliac Arteries (36), External Iliac Arteries (37), from whence it is distributed to the lower part of the body and the lower limbs, and Internal Iliac Arteries (38), from whence it is distributed to the pelvic viscera and lower part of the body.

Branching off from the two internal iliac arteries are the two Umbilical Arteries (39), or Hypogastric Arteries, as they are otherwise called, which convey most of the mixed blood to the chorionic villi in the placenta, where the foetal blood gets rid of its waste products into the intervillous space, from which they are drained off by the branches of the Uterine Vein (V.), the commencement of these branches draining the intervillous space being the Uterine Sinuses, which, when the placenta is separated, are closed by retraction, and so post-partum hæmorrhage is prevented.

The blood which has been distributed by the iliac arteries is collected by the Internal Iliac Veins (40), and the External Iliac Veins (41), and, flowing into the Common Iliac Veins (42), is emptied into the Inferior Vena Cava (9).

There are two sets of Semilunar Valves: one set is at the junction of the pulmonary artery and the right ventricle, and the other set is between the aorta and the left ventricle.

CHANGES AT BIRTH.

The umbilical cord having been ligatured and divided, that part of the umbilical vein before it gives off the branch to the left lobe of the liver, and which occupies the groove between the quadrate lobe and the left lobe, degenerates into the ligamentum teres. That part above the left branch, which occupies the groove between the Spigelian lobe and the left lobe, degenerates into a cord.

With the expansion of the lungs (directly the child breathes) all the blood flowing into the pulmonary artery is directed into the right and left pulmonary arteries to be oxygenated by the lungs, instead of most of it through the ductus arteriosus to the aorta to be oxygenated by the placenta. The ductus arteriosus is, therefore, of no further use and shrivels up. Lastly, all the blood entering the right auricle now flows direct into the right ventricle, and since the foramen ovale is now superfluous it gradually closes. Rarely the foramen ovale does not close completely, when the child will suffer from congenital heart disease, and is of a peculiar bluish colour, due to the arterial and venous blood mixing.

PICTORIAL MIDWIFERY

*AN ATLAS OF MIDWIFERY
FOR PUPIL MIDWIVES*

BY

SIR COMYNS BERKELEY

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WELSH NATIONAL SCHOOL OF MEDICINE, AND TO
THE CONJOINT BOARD, APOTHECARIES SOCIETY, AND THE CENTRAL MIDWIVES BOARD;
CHAIRMAN OF THE CENTRAL MIDWIVES BOARD

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PREFACE TO THE FOURTH EDITION

THE fourth edition has been thoroughly revised, in many places rewritten, and new material has been added.

C. B.

LONDON,
June, 1941.

PREFACE TO THE THIRD EDITION

A NEW edition of "Pictorial Midwifery" having been called for, the opportunity has been taken to revise the descriptive matter in many places and to rewrite it in others. Some of the original illustrations have been deleted and a number of new illustrations have been added.

A midwife who wishes to practise midwifery with safety to her patients should have a competent knowledge of the anatomy, physiology and pathology of pregnancy, labour and the puerperium. In this handbook I have concentrated on these subjects, so far as the necessary information can be conveyed by illustration, in the hope that such a method might serve as a useful auxiliary to the many excellent textbooks available for pupil midwives.

The utility of this atlas of midwifery for pupil midwives preparing for the state examination will, I hope, be generally accepted; but it may not be realized that it will also be specially useful to pupil midwives during Part II of their course of training, the more so if, during Part I of their course, while they are acquiring a knowledge of the theory of midwifery practice, they have learnt to use the atlas as an aid to memory. Part II of the course is designed to give the pupil midwife, who intends ultimately to practise as a midwife, an opportunity of gaining good experience in the practice of her chosen craft before she has to assume the full responsibilities of a qualified midwife. As her skill and experience grow, the supervision of her work during Part II of the course becomes less and less, so that she may have the opportunity of acquiring self-confidence and initiative. There are bound to be many occasions when she will want quickly to refresh her memory on some question of treatment or item of midwifery technique. Reference to the appropriate pictures and diagrams in the atlas should bring back to her mind the instruction which she has received.

My experience, as an examiner for many years, indicates that pupil midwives, as a rule, find it very difficult to understand the foetal circulation. With the kind assistance of Dr. Thomas Yeates, Professor of Anatomy at the Middlesex Hospital, and by the liberality of the publishers, an attempt has been made, with coloured diagrams, to simplify the subject, so far as it can be simplified.

Dr. Dupuy having died since the last edition was produced, I am indebted to Mr. Douglas J. Kidd for the new illustrations I have introduced into this edition.

I am grateful to Miss E. Sparkes, Matron of the Royal Maternity Hospital, Belfast, for some very useful suggestions.

C. B.

LONDON,
April, 1939.

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SECTION I

ANATOMY

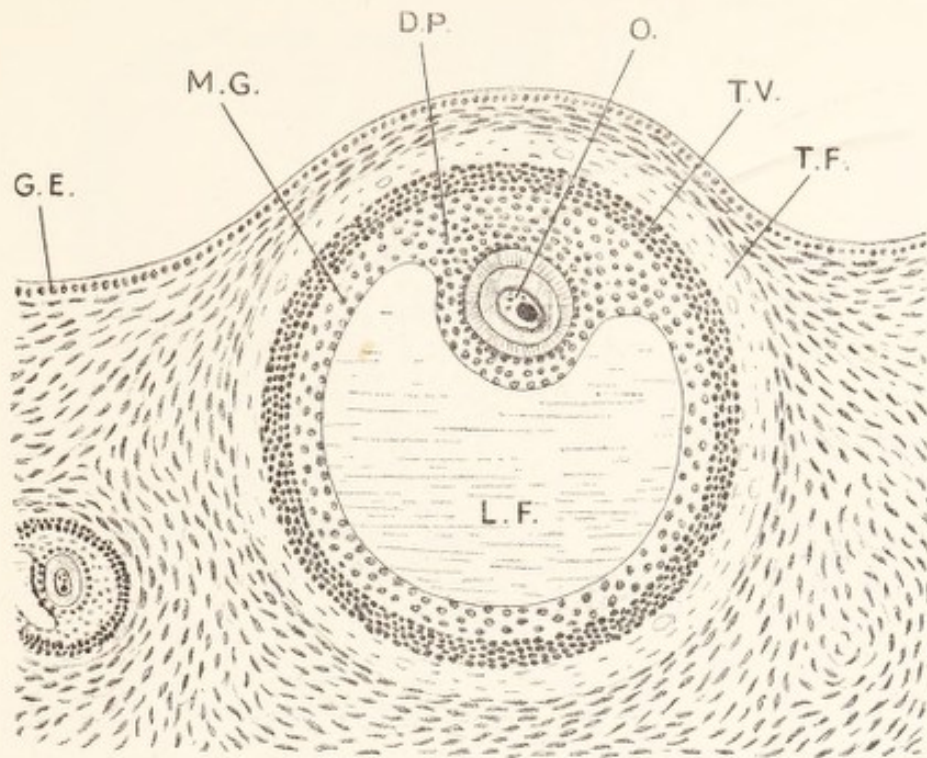


FIG. 1.—THE GRAAFIAN FOLLICLE.

The Graafian follicle, which contains the ripe oocyte, is formed as follows: The ovary, when developed, is covered by a single layer of cells termed the *germinal epithelium*, G.E. While the female foetus is still in the uterus processes of this epithelium bud down into the substance of its ovary and become converted into *primordial* follicles. The great majority of the follicles do not further develop, but at, and after, puberty certain of them ripen, which consists in the formation of the Graafian follicle and *maturation*.

One of the cells becomes much larger than the others, to form the oocyte. The cells closely embracing the oocyte form a structure termed the *discus proligerus*, D.P. Most of the remaining cells liquefy, L.F., except those on the extreme outside which form the *membrana granulosa*, M.G. Thus the Graafian follicle is formed.

Other cells of the ovarian stroma, outside the *membrana granulosa*, form two layers round the Graafian follicle; the internal layer being vascular is termed the *tunica vasculosa*, T.V., and the external layer being fibrous is termed the *tunica fibrosa*, T.F.

In due course the accumulation of the fluid is such that the Graafian follicle bursts and the oocyte escapes into the peritoneal cavity to be grasped or not, as the case may be, by the fimbriated end of the Fallopian tube. If the oocyte is thus grasped it is conducted into the Fallopian tube, and if there it meets a spermatozoon it becomes fertilized. Otherwise it perishes, as it does if it is not conveyed to the Fallopian tube.

As the Graafian follicle ripens it secretes a hormone termed *æstrin* which, being absorbed into the blood, causes the tissues of the uterus and breast to grow. The bursting of the Graafian follicle is termed *ovulation*, which generally occurs 14 days after the commencement of menstruation.

In the nucleus of all varieties of cells there are minute rod-like structures termed *chromosomes* of which the cells of each species have their own particular number. These chromosomes are the source of the hereditary characteristics of each species and, perhaps, play some part in the determination of sex. The nucleus of the oocyte of the human female contains 48 chromosomes, and that of the spermatozoon a similar number. When the oocyte becomes fertilized by a spermatozoon, or the *zygote* as it is now termed, 24 of its chromosomes unite with 24 chromosomes of the spermatozoon, so that the zygote then contains 48 chromosomes, combining maternal and paternal characteristics. This results in the condition termed *maturation*.

The term *ovum* is used by authors in different senses, and so is apt to cause confusion to pupil midwives. In this Atlas the following nomenclature is employed:

1. *Ova*, or eggs. Part of the constituents of the ovary.
2. Some of the ova develop into *oocytes* by the formation of Graafian follicles and *maturation*.
3. The fertilized oocyte is termed a *zygote*.
4. The embryo, placenta, and membranes in the uterus are termed the *ovum*.

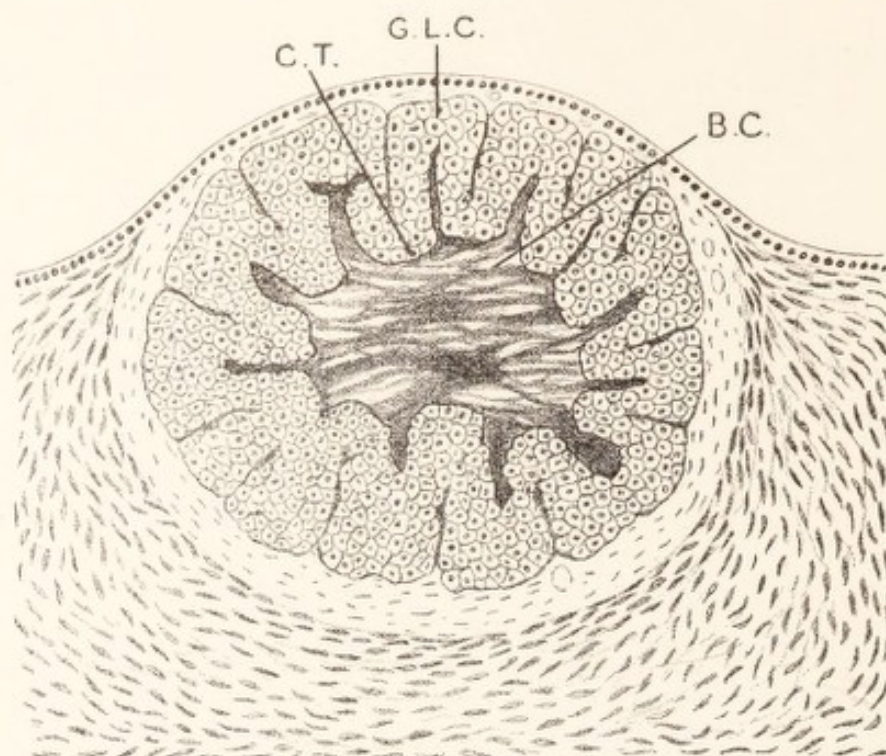


FIG. 2.—THE CORPUS LUTEUM.

When the oocyte has escaped certain changes take place in the rest of the Graafian follicle, which now becomes the corpus luteum. Most of the space formerly occupied by the fluid becomes filled with *blood clot*, B.C. Tufts of the *membrana granulosa*, which contain capillaries from the *tunica vasculosa*, C.T., grow into the blood clot. The cells in the tufts of the *membrana granulosa* are termed *lutein cells*, G.L.C., because of their colour which is yellow, and thus the corpus luteum gets its name.

The corpus luteum secretes a hormone called *progestin*, which, being absorbed into the blood, completes the preparation of the endometrium for the implantation of the zygote when it reaches the cavity of the uterus. This hormone also arrests ovulation during pregnancy and normally prevents miscarriage in the early stages of pregnancy.

If the oocyte is not fertilized within 2 weeks of its escape from the Graafian follicle the corpus luteum atrophies, and, becoming white, is termed the *corpus albicans*. If, however, the oocyte is fertilized, the corpus luteum continues to grow and secrete for 12 weeks, after which it stops growing but persists until the child is born, and then it gradually atrophies.

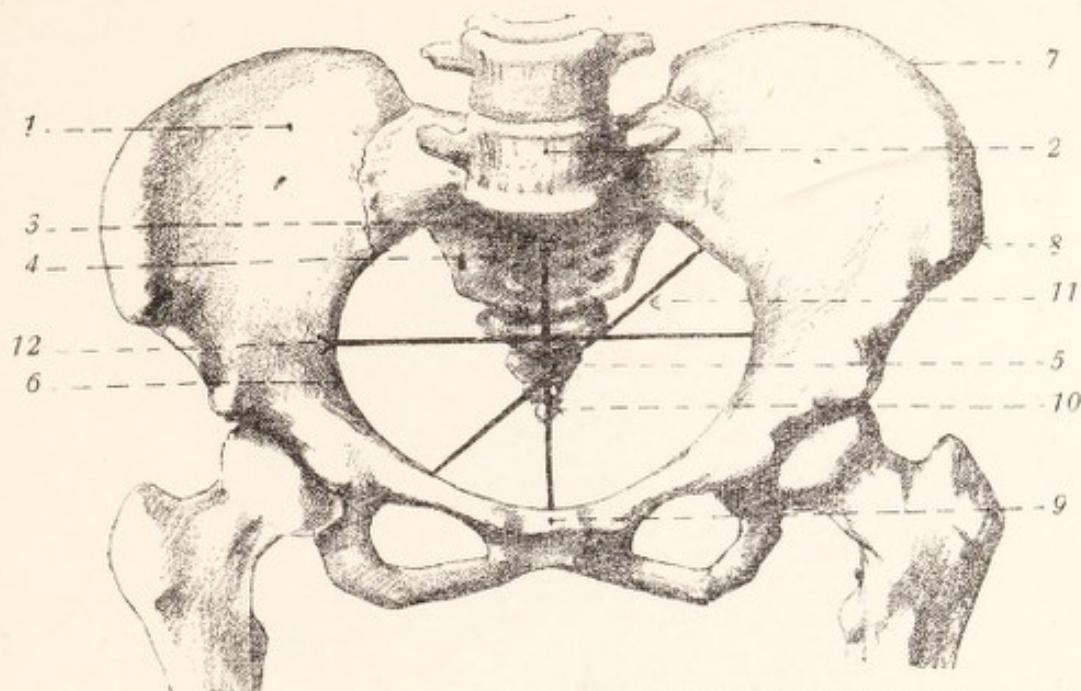


FIG. 3.—THE PELVIS FROM ABOVE : DIAMETERS OF THE BRIM OR INLET.

1. Iliac fossa. 2. 5th lumbar vertebra. 3. Promontory of sacrum. 4. Sacrum.
5. Coccyx. 6. Ileo-pectineal line. 7. Crest of ilium. 8. Anterior superior spine.
9. Symphysis pubis.

DIAMETERS OF THE BRIM OF THE PELVIS. 10. True conjugate, 4 inches. 11. Oblique, $4\frac{1}{2}$ inches. 12. Transverse, 5 inches.

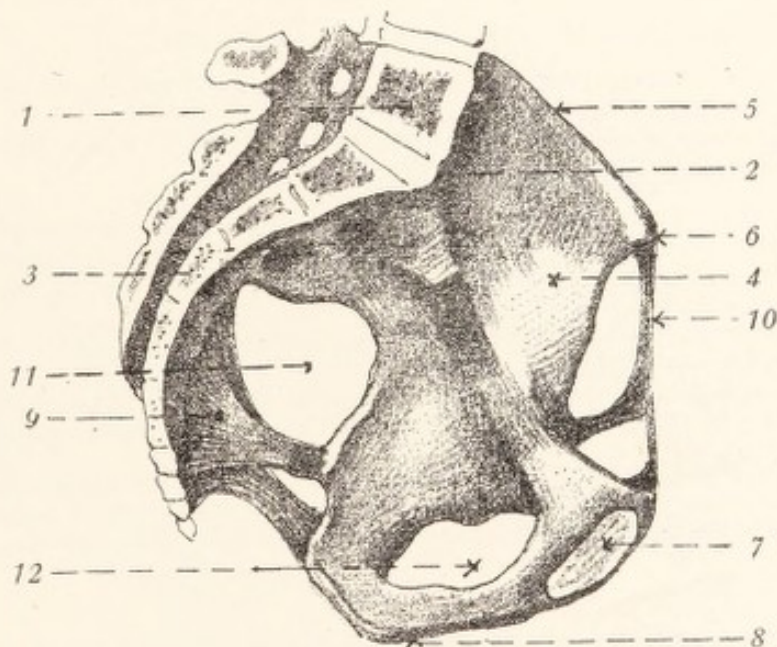


FIG. 4.—THE PELVIS FROM THE SIDE : LATERAL SAGITTAL SECTION.

1. 5th lumbar vertebra. 2. Promontory of sacrum. 3. Sacrum formed by the
fusion of five sacral vertebrae. 4. Iliac fossa. 5. Crest of ilium. 6. Anterior superior
spine. 7. Symphysis pubis. 8. Tuberosity of ischium. 9. Great sacro-sciatic liga-
ment. 10. Inguinal ligament. 11. Great sciatic foramen. 12. Obturator foramen.
The projecting portion of the intervertebral disc, where it touches the upper surface
of the first sacral vertebra, is known as the promontory of the sacrum.

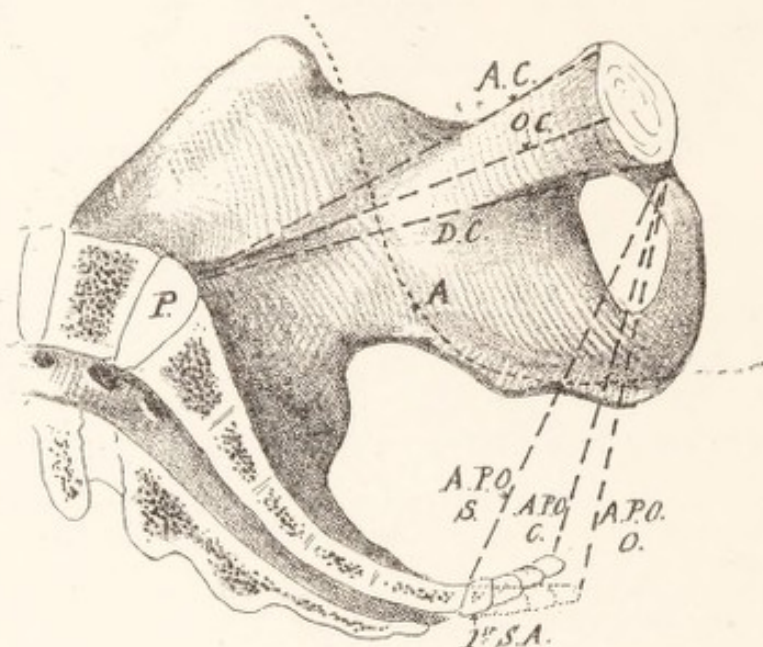


FIG. 5.—THE PELVIS FROM THE SIDE : DIAMETERS OF THE INLET AND OUTLET.

The diameters displayed are anatomical and obstetrical:

ANATOMICAL. *A.C.* Antero-posterior at the pelvic inlet. From the promontory of the sacrum to the top of the symphysis pubis.

A.P.O.S. Antero-posterior at the plane of the outlet. From the sacro-coccygeal joint to the apex of the pubic arch.

OBSTETRICAL. *O.C.* True conjugate, $4\frac{1}{4}$ inches. From the promontory of the sacrum to the nearest point on the symphysis pubis—that is, $\frac{1}{2}$ inch below its top.

D.C. Diagonal conjugate, $4\frac{3}{4}$ inches. From the promontory of the sacrum to the apex of the pubic arch.

A.P.O.C. Antero-posterior at the outlet, 5 inches. From the tip of the coccyx to the apex of the pubic arch.

A.P.O.O. Antero-posterior at the outlet when the coccyx is pushed back, $5\frac{1}{4}$ inches.

P. Promontory of the sacrum. *A.* Axis of the pelvic canal.

A good method of measuring the transverse diameter of the outlet is by pressing the closed fist between the tuberosities of the ischium. If the fist is of normal size and can be pressed in between the tuberosities the diameter of the outlet is not less than normal.

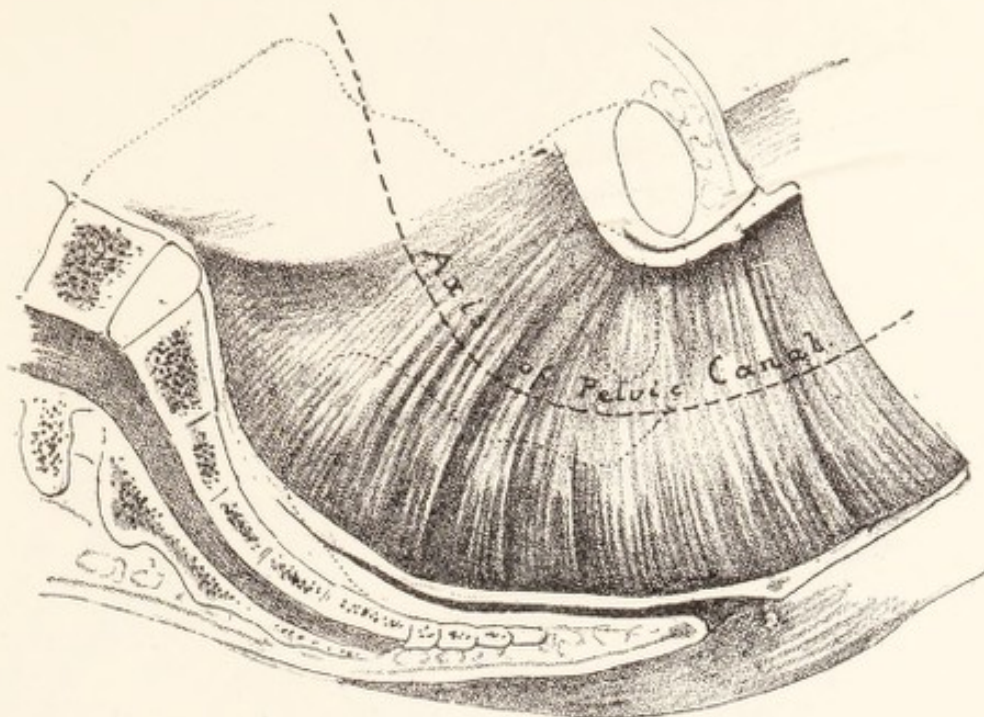


FIG. 6.—AXIS OF THE PELVIC CANAL.

The axis of the pelvic canal shows the position of the centre of the head of the foetus as it passes through the pelvis. This axis, which is an imaginary line, is obtained by taking any number of antero-posterior diameters of the true pelvis, between the plane of the brim and that of the outlet, and joining the centre of these diameters.



FIG. 7.—MEASUREMENT OF THE DIAGONAL CONJUGATE.

The true conjugate can only be measured directly after labour by a special instrument. An estimate of the true conjugate is, however, made by passing two fingers of the right hand backwards and upwards into the vagina till the end of its middle finger touches the promontory of the sacrum. The hand is then carried upwards and forwards until its index finger touches the apex of the pubic arch. The index finger of the left hand is then placed at the point of contact, the fingers are withdrawn from the vagina, and the distance between the tip of the middle finger of the right hand and where the index finger of the right hand has touched the pubic arch is measured with a tape measure. Normally the measurement should be $4\frac{1}{2}$ inches. Thus, to ascertain the measurement of the true conjugate, $\frac{1}{2}$ inch must be deducted from that of the diagonal conjugate.

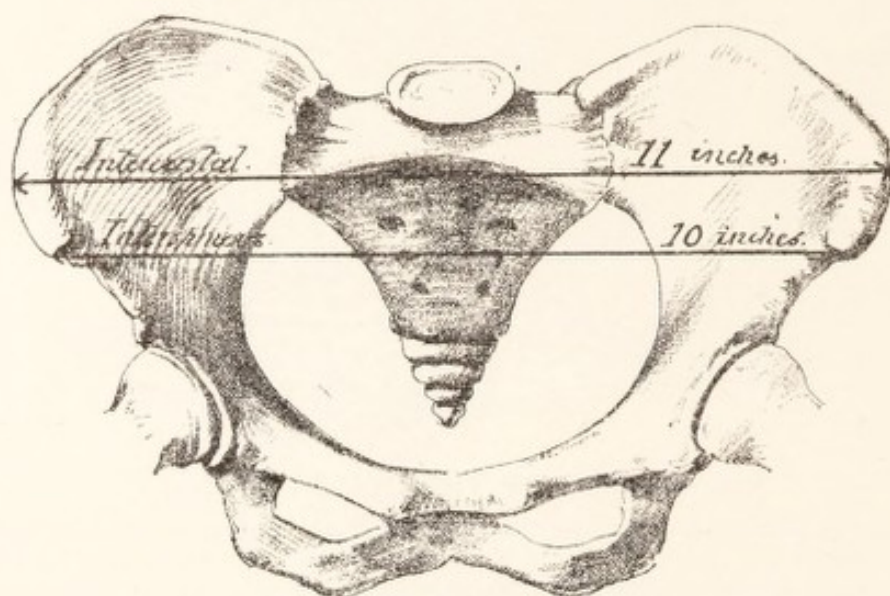


FIG. 8.—INTERSPINAL AND INTERCRISTAL DIAMETERS OF THE PELVIS.

INTERSPINAL. This measurement is taken by placing one point of the pelvimeter on the outside of one anterior superior spine, and the other point on the outside of the opposite anterior superior spine. It should be 10 inches.

INTERCRISTAL. This measurement, which is the widest part separating the crests of the ilia, is taken by placing one point of the pelvimeter on the outer margin of one crest of the ilium, and the other point on the outer margin of the opposite crest of the ilium. It should be 11 inches.

The two measurements are of use in determining if there is any contraction of the pelvis, and, if so, of the commoner forms, which variety. Thus in a flat pelvis the difference between the interspinal and intercristal, which is normally 1 inch, is reduced so that the interspinal is as long as the intercristal. In a generally contracted pelvis, on the other hand, the difference of 1 inch is constant, but both measurements are shorter. In both flat and generally contracted pelvis the external conjugate is definitely shortened. In a generally contracted and flattened pelvis both measurements are shorter, the normal difference between them is less than 1 inch.

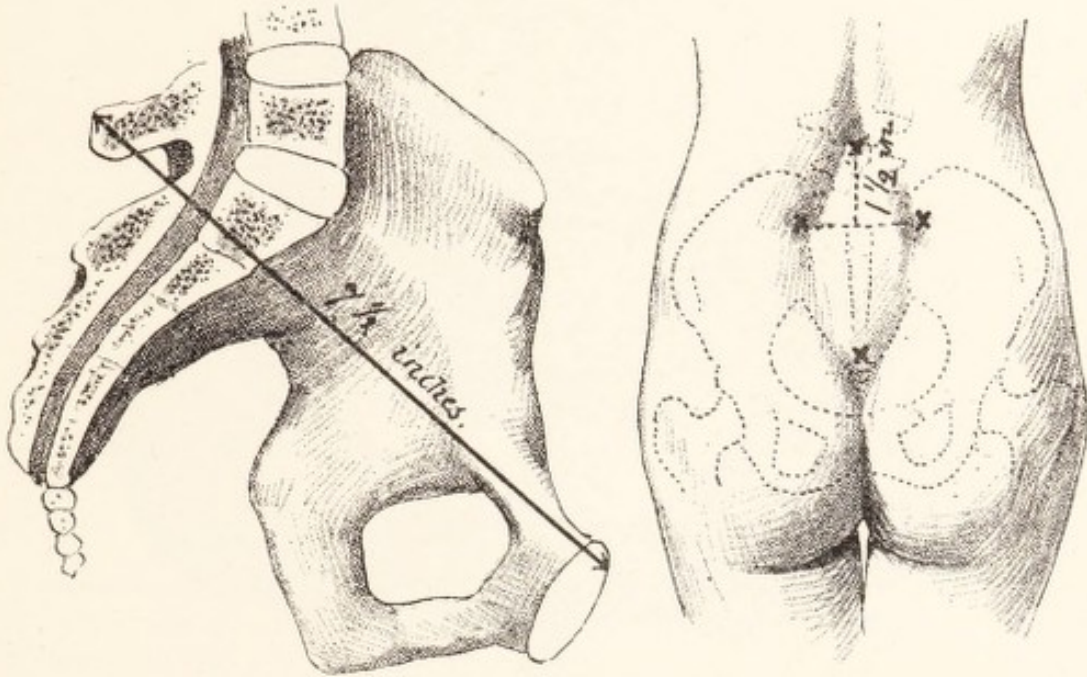


FIG. 9.—EXTERNAL CONJUGATE DIAMETER OF THE PELVIS.

This measurement is taken with a pelvimeter, one point of which is placed on the spine of the last lumbar vertebra, and the other on the front of the pubes. It should be $7\frac{1}{2}$ inches. It is not always easy to feel the spine of the last lumbar vertebra. In case of doubt the position of this spine can be ascertained as follows: The position of each posterior superior spine of the iliac bones can easily be determined if the woman stands up. A point $1\frac{1}{2}$ inches above the centre of a line joining these two iliac spines denotes the position of the spine of the last lumbar vertebra. The positions of the posterior superior spines are at times indicated by dimples in the skin.

The external conjugate diameter is only a rough guide to the size of the true conjugate as the bones, and tissues covering them, vary in thickness in different people. If the measurement is over $7\frac{1}{2}$ inches the true conjugate is not likely to be diminished, and if it is under 7 inches it is likely to be diminished. The measurement is taken either when the patient is standing or is in the left lateral position.

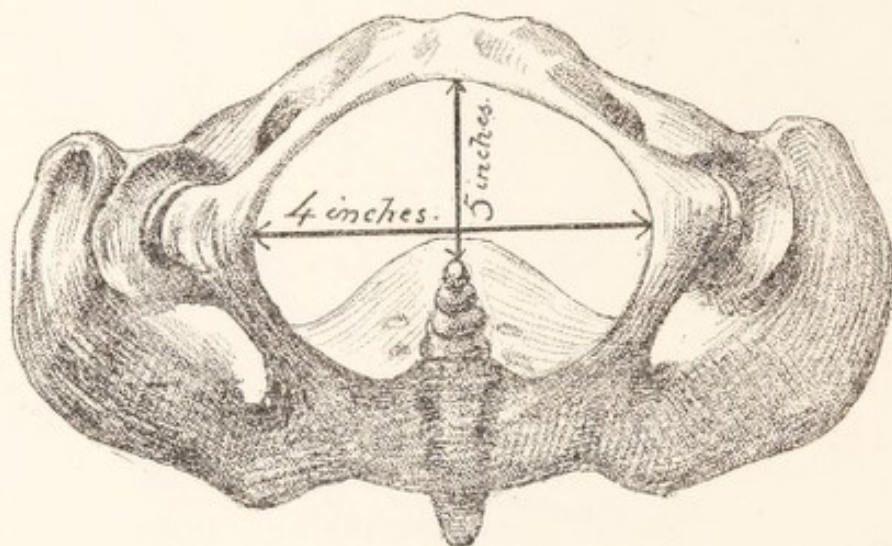


FIG. 10.—DIAMETERS OF THE OUTLET OF THE PELVIS.

In certain cases of pelvic contraction, such as the generally contracted or funnel-shaped pelvis, the outlet will be contracted. Some women of good stature and figure have a pelvis the shape of which approaches that of the male with an outlet which is smaller than that of the female. Unless care is taken to measure the pelvis antenatally such a contraction may easily escape detection. It may then happen that the brim was large enough to allow the head to enter the cavity of the pelvis, but the head is arrested low down in the pelvis. The important diameters of the outlet are the antero-posterior and the transverse.

ANTERO-POSTERIOR. The patient being placed in the lithotomy position, one point of the pelvimeter is placed at the apex of the pubic arch, and the other on the tip of the coccyx. It should be 5 inches.

TRANSVERSE. One point of the pelvimeter is placed on the inner surface of the ischial tuberosity, and the other point on the inner surface of the opposite tuberosity. It should be 4 inches.

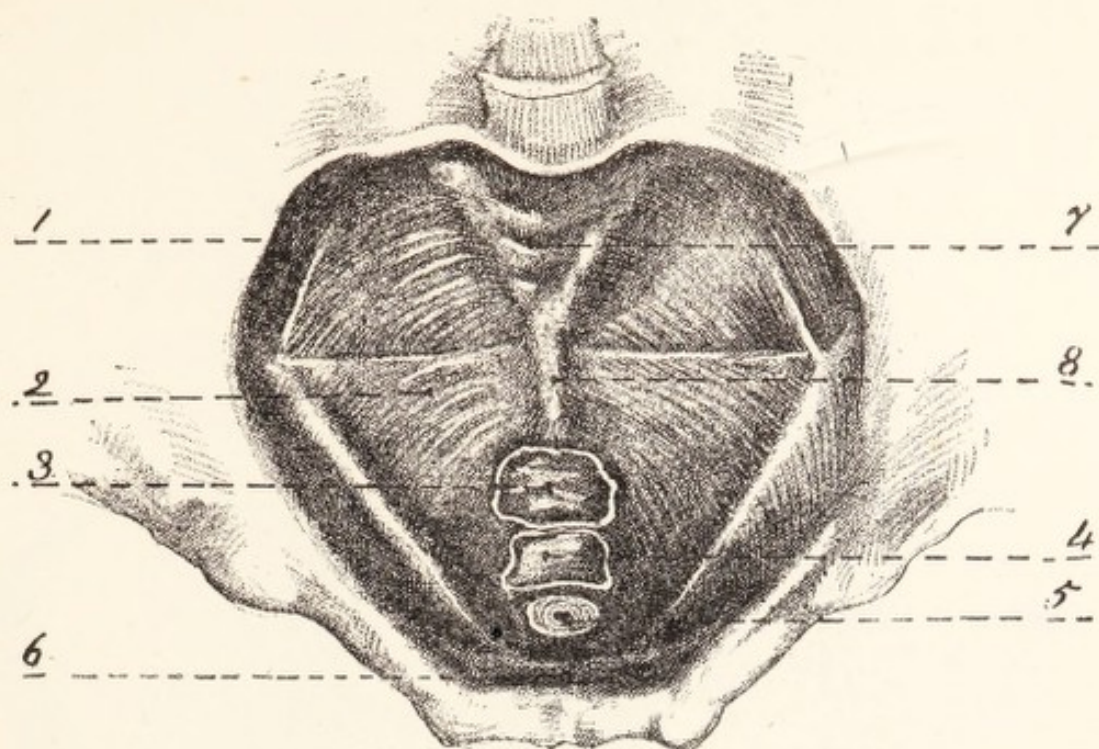


FIG. 11.—THE PELVIC FLOOR AS SEEN FROM ABOVE.

The muscles forming the floor and lateral walls of the pelvic cavity:

1. Ischio-cavernosus. 2. Levator ani. 3. Rectum. 4. Vagina. 5. Urethra.
6. Symphysis pubis. 7. Sacrum. 8. Coccyx.

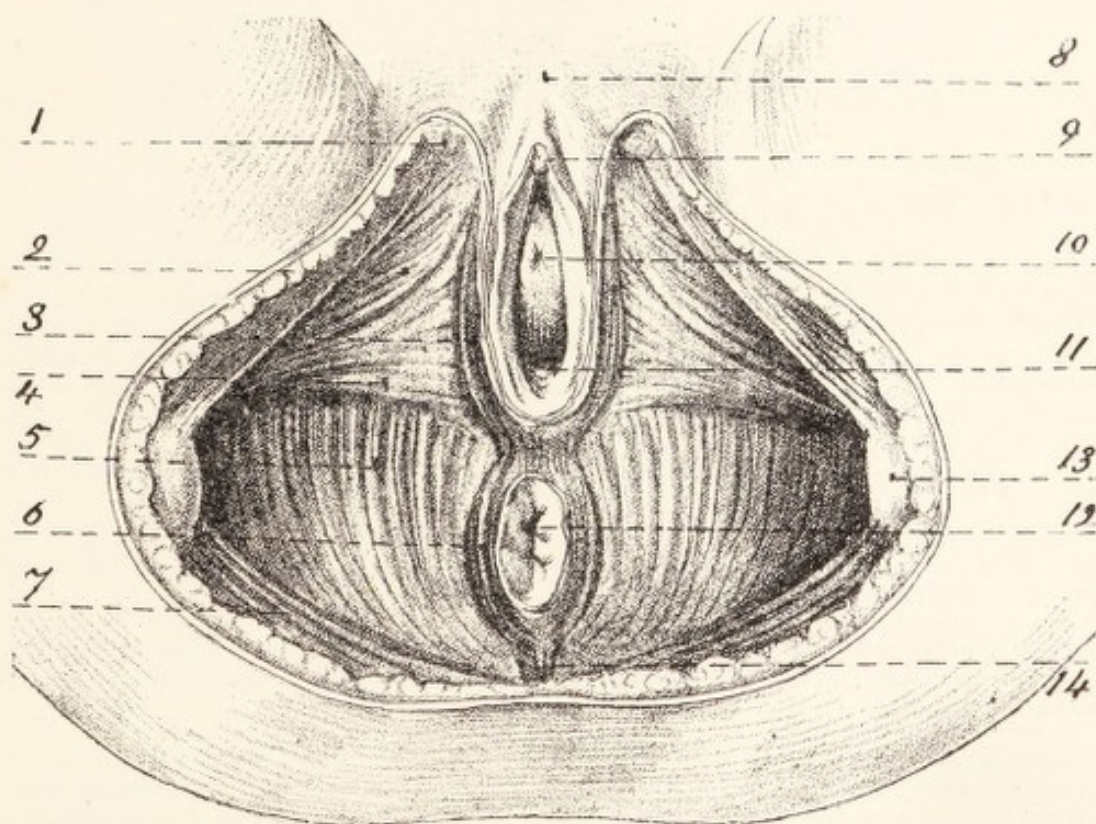


FIG. 12.—THE PELVIC FLOOR AS SEEN FROM BELOW.

1. Labium majus in section. 2. Ischio-cavernosus or erector-clitoridis. 3. Bulbo-cavernosus. 4. Transversus perinei. 5. Levator ani. 6. Sphincter ani. 7. Ischio-coccygeus. 8. Mons veneris. 9. Clitoris. 10. Urethra. 11. Vagina. 12. Rectum. 13. Tuberosity of ischium. 14. Coccyx.

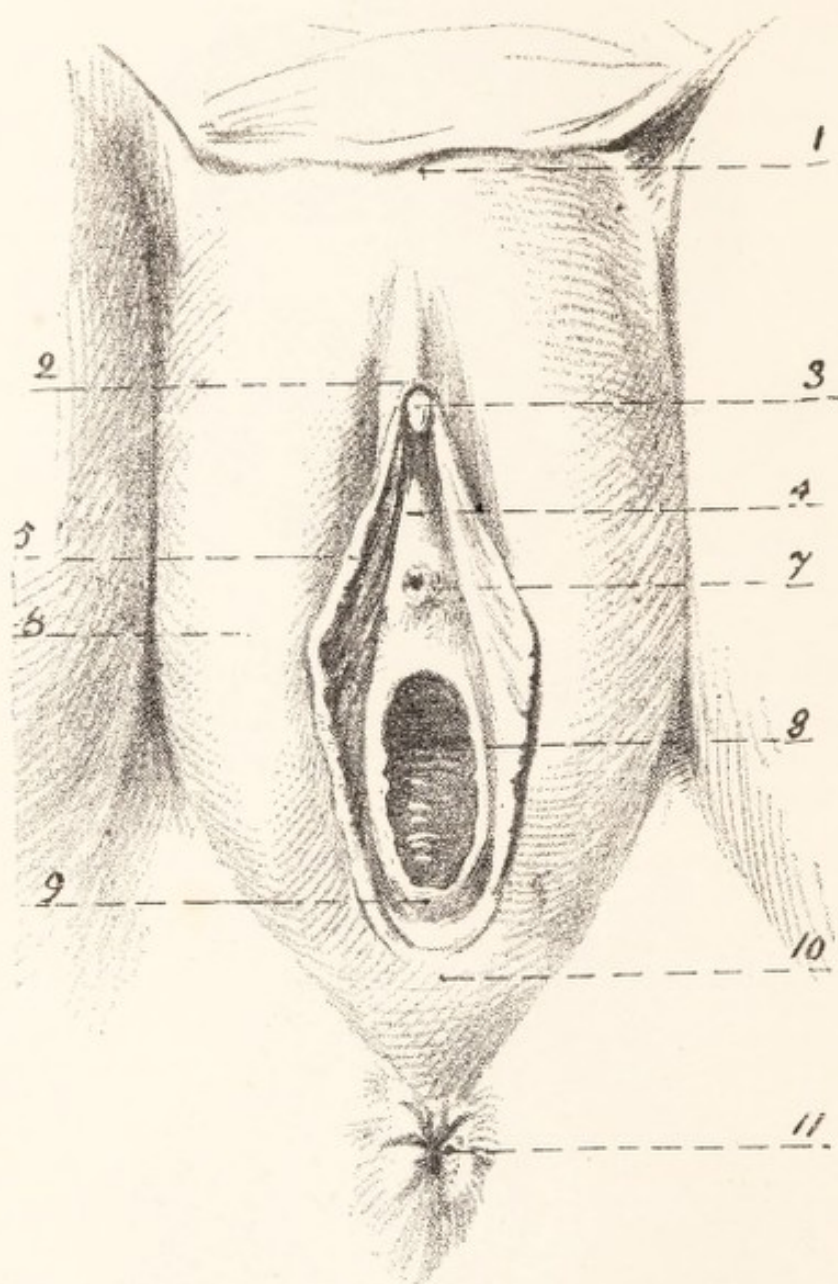


FIG. 13.—THE EXTERNAL GENITAL ORGANS, OR VULVA.

1. Mons veneris. 2. Prepuce of the clitoris. 3. Clitoris. 4. Vestibule. 5. Labium minus. 6. Labium majus. 7. Orifice of the urethra. 8. Orifice of the vagina. 9. Hymen. 10. Base of the perineum. 11. Anus.

The labia majora are united at their posterior extremities by a fold of skin termed the *fourchette*. That part of the vulva between the hymen and fourchette is termed the *fossa navicularis*.

The perineum consists of a superficial part, between the posterior part of the orifice of the vagina and the anus, and a deep part. The superficial part is covered with skin and forms the base of the perineal body. The latter is triangular in shape and is composed of muscle and tendinous structures passing upwards between the posterior wall of the vagina in front and the anterior wall of the rectum behind.

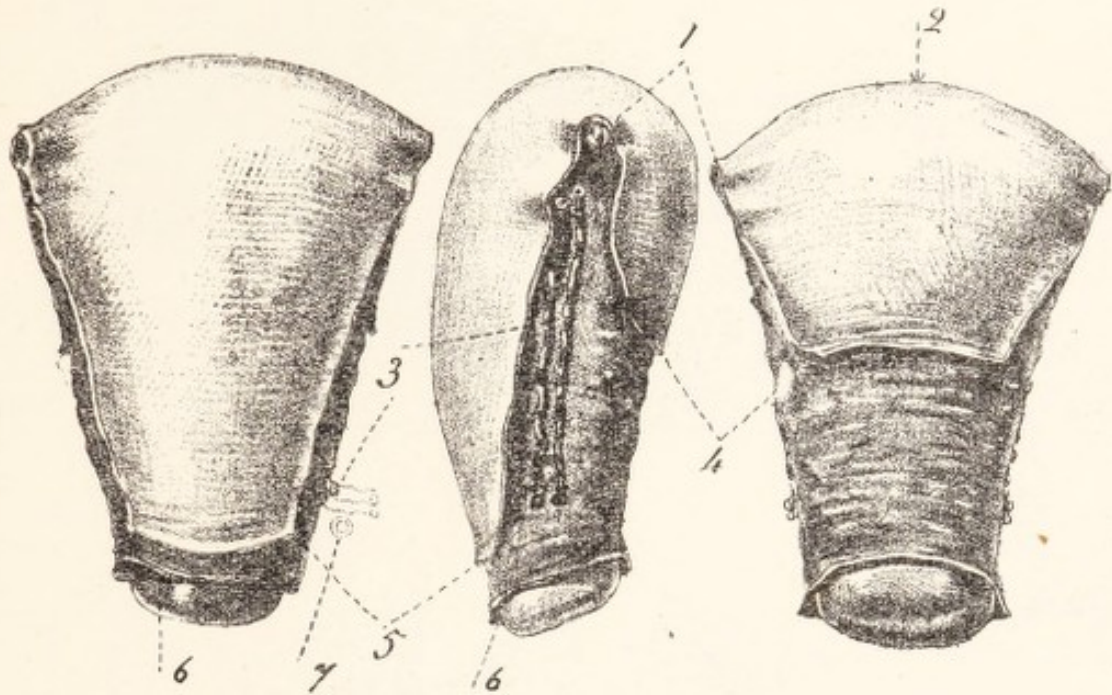


FIG. 14.—UTERUS : POSTERIOR, LATERAL, AND ANTERIOR VIEWS.

1. Cut uterine end of the Fallopian tube. 2. Fundus of the uterus above the level of the insertion of the Fallopian tubes. 3. Uterine ends of uterine artery and vein. 4. Lower limit of the peritoneum covering the anterior surface of the uterus. The peritoneum then passes on to the bladder, forming the utero-vesical pouch. 5. Lower limit of the peritoneum covering the posterior surface of the uterus. The peritoneum then passes backwards on to the rectum, forming the pouch of Douglas. 6. Cut edge of vagina. 7. Transverse section of ureter as it passes under the uterine vessels on its way to the bladder.

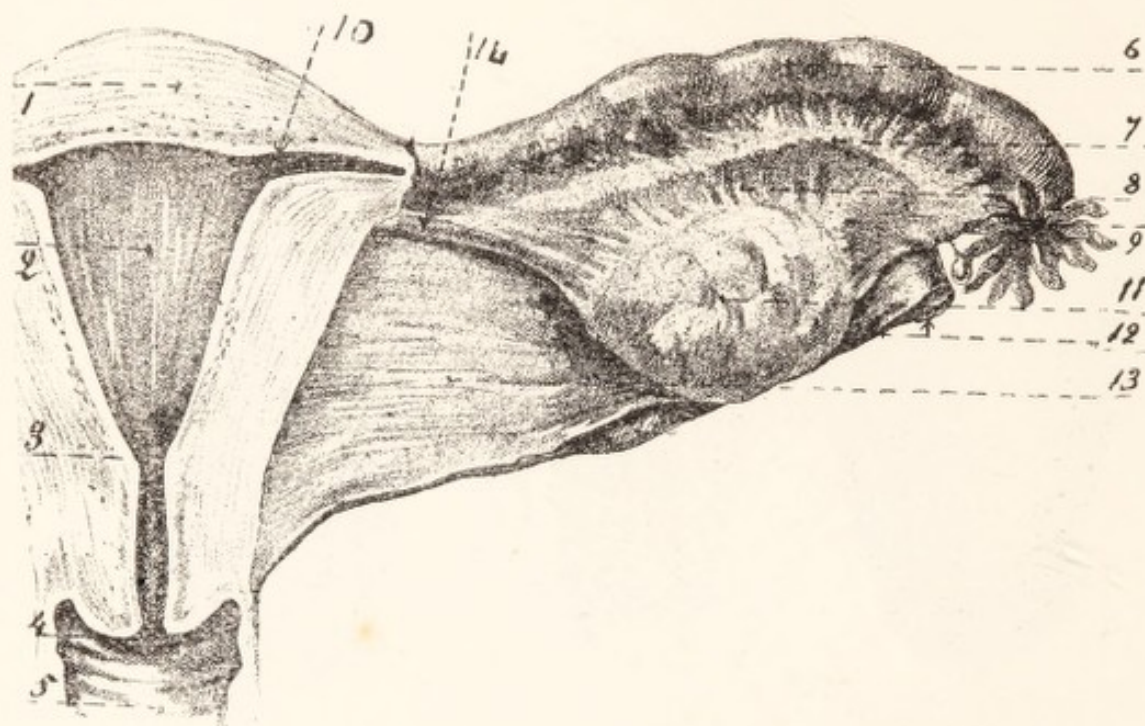


FIG. 15.—UTERUS, OVARY, FALLOPIAN TUBE, AND BROAD LIGAMENT.

The anterior half of the uterus is removed. 1. Fundus of the uterus. 2. Cavity of the uterus. 3. Internal os. 4. External os. 5. Vagina. 6. Fallopian tube. 7. Mesosalpinx. 8. Mesovarium. 9. Infundibulum or fimbriated end of the tube. 10. Interstitial portion of tube. 11. Ovary. 12. Infundibulo-pelvic ligament. 13. Broad ligament. 14. Ligament of ovary.

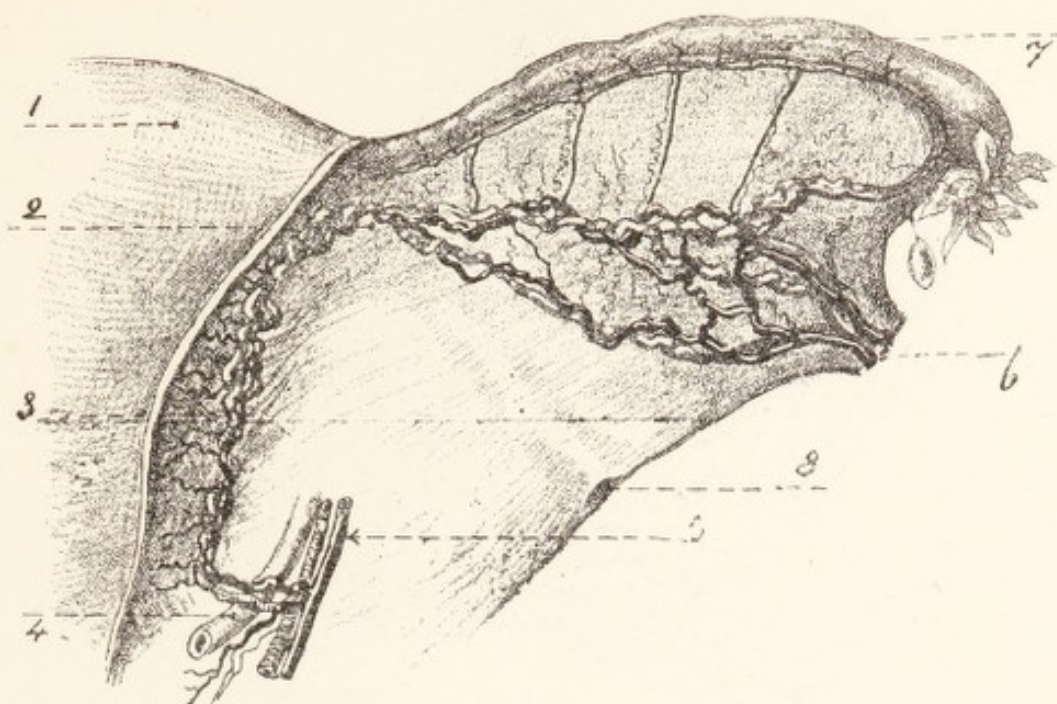


FIG. 16.—BLOOD SUPPLY OF THE UTERUS, FALLOPIAN TUBE, AND OVARY.

1. Uterus. 2. Anastomotic branches between uterine and ovarian vessels. 3. Uterine arteries and veins. 4. Ureter. 5. Internal iliac vein and artery. 6. Ovarian artery and veins. 7. Tubal branches. 8. Broad ligament.

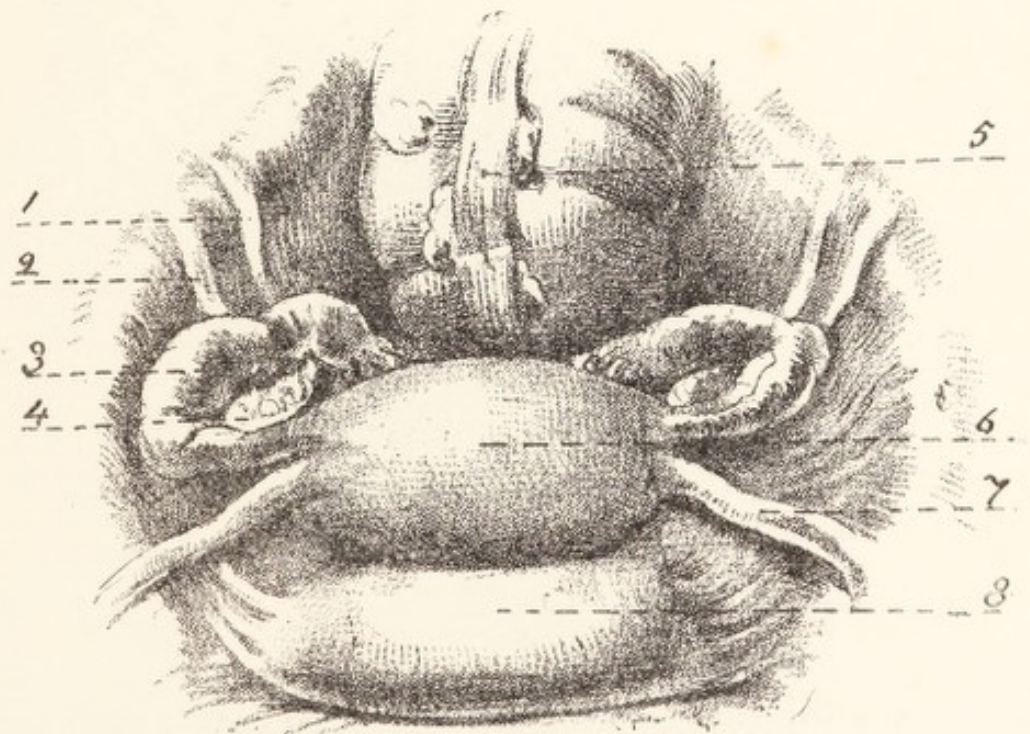


FIG. 17.—THE PELVIC VISCERA AS SEEN FROM ABOVE.

1. Ureter passing over the brim of the pelvis. 2. Infundibulo-pelvic ligament. 3. Fallopian tube. 4. Ovary. 5. Rectum. 6. Uterus. 7. Round ligaments. 8. Bladder.

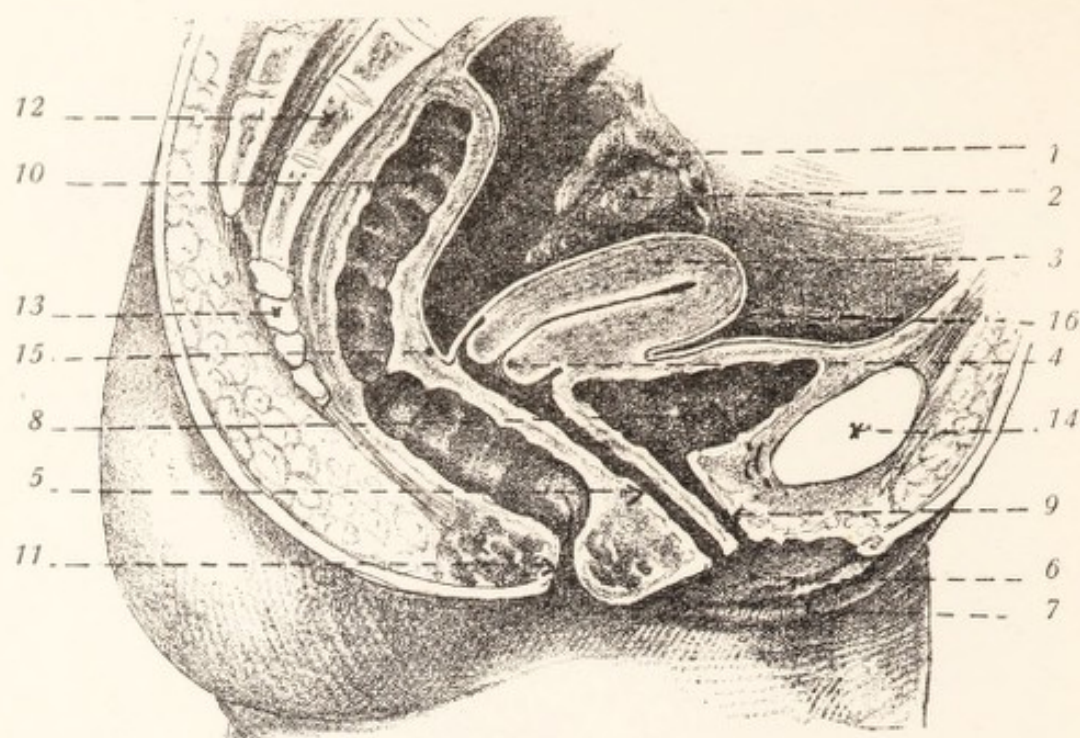


FIG. 18.—THE PELVIC VISCERA AS SEEN FROM THE SIDE :
PELVIS DIVIDED IN HALF.

1. Fallopian tube. 2. Ovary. 3. Body of the uterus. 4. Neck of the uterus.
5. Vagina. 6. Labium minus. 7. Labium majus. 8. Bladder. 9. Urethra.
10. Rectum. 11. Anus. 12. Sacrum. 13. Coccyx. 14. Symphysis pubis. 15. Pouch
of Douglas. 16. Utero-vesical pouch.



FIG. 19.—NORMAL SITUATION OF THE PLACENTA AND MEMBRANES.

The uterus is divided in half. The placenta is normally situated on the upper segment of the posterior uterine wall, generally near the fundus of the uterus.

The membrane covering the foetal surface of the placenta, the umbilical cord and in contact with the liquor amnii and nearest the child, is termed the *amnion*. The membrane adherent to and passing off from the edges of the placenta lining the cavity of the uterus and outside the amnion is termed the *chorion*. The amnion can be separated from the *chorion* and placenta as far as the umbilical cord.

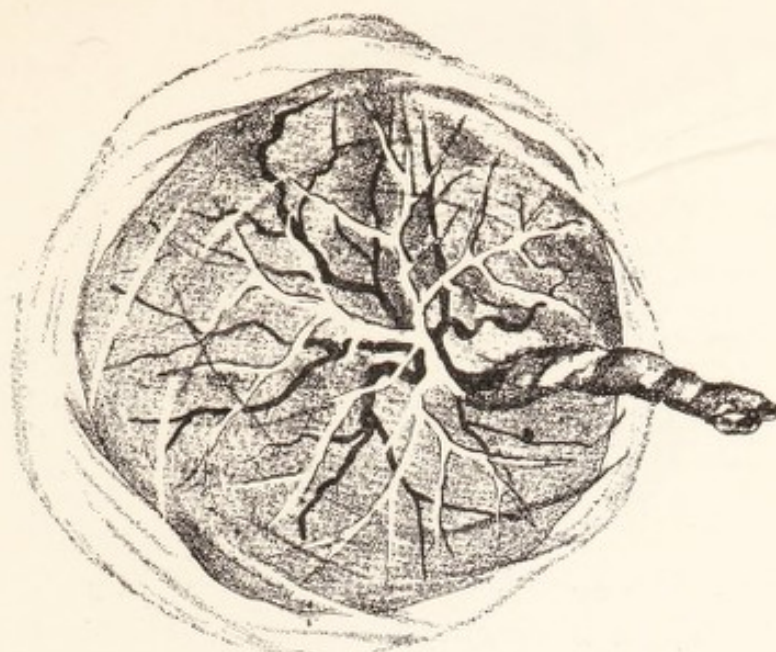


FIG. 20.—FŒTAL SURFACE OF THE PLACENTA.

The foetal surface is smooth, being covered by the amnion. Underneath the amnion can be seen the umbilical arteries and veins as they radiate from the point of insertion of the umbilical cord.

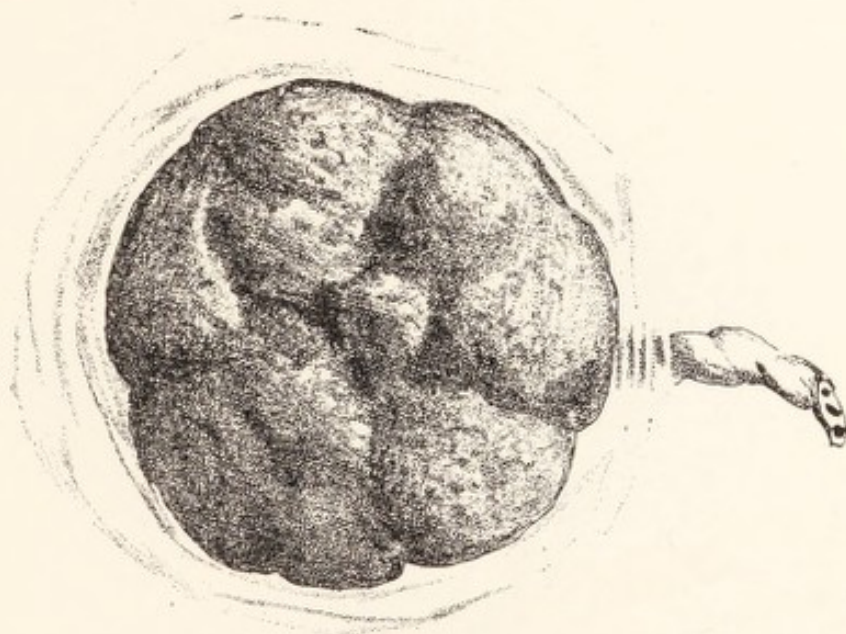


FIG. 21.—MATERNAL SURFACE OF THE PLACENTA.

The maternal surface is rough, and consists of a number of somewhat irregular areas called cotyledons divided by depressions (sulci). When examining the placenta after its expulsion, it should be held in the hollow of the hands, maternal surface upwards, in order to see if the cotyledons fit into each other. If they do not, there is a piece of placenta missing.

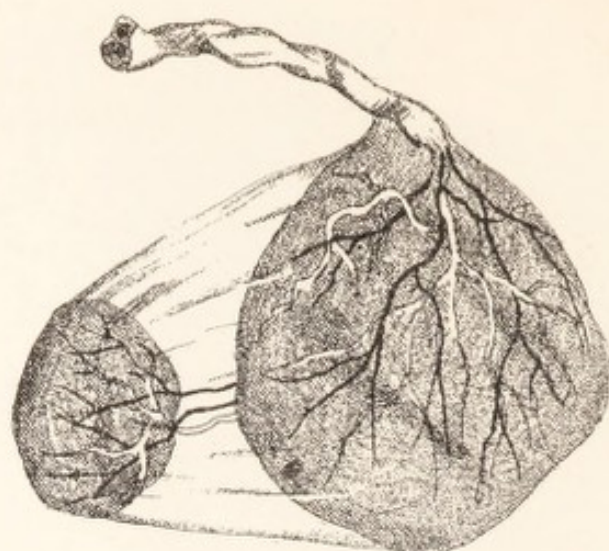


FIG. 22.—PLACENTA SUCCENTURIATA.

The placenta succenturiata shown in this figure is too large. It is situated in a portion of the chorion stretching from the edge of the main placenta, and is due to the chorionic villi in this situation not having atrophied, as is normally the case. Passing between it and the main placenta are two arteries and one vein. This small piece of placenta may remain attached to the wall of the uterus when the main placenta is expelled. In this case, when the after-birth is examined, a hole is found in the chorion, and passing between the placenta and the hole can be seen bloodvessels in this membrane. If the small piece of placenta is retained in the uterus, it may give rise to post-partum hæmorrhage or, if it dies, puerperal sepsis. Later, if it is adherent, it may cause subinvolution of the uterus with excessive loss at the menstrual periods.

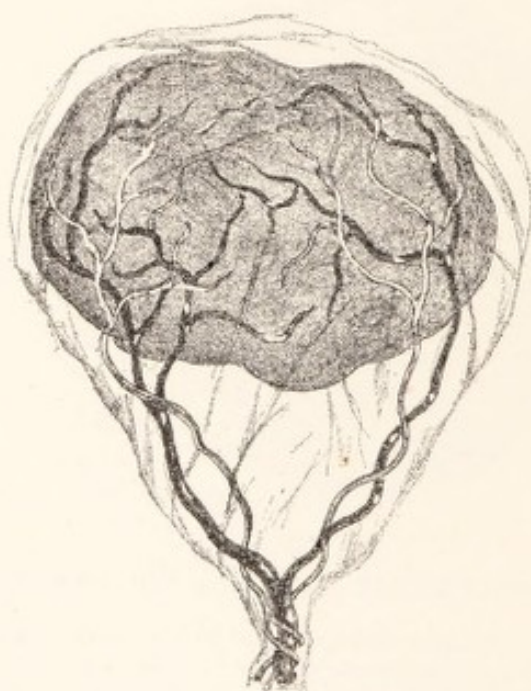


FIG. 23.—PLACENTA VELAMENTOSA.

A rare condition, in which the cord is inserted into the membranes at some distance away from the placenta. The vessels radiating from the cord to the placental margin may be compressed during labour, or may be torn when the membranes rupture. In the latter case the child may die.

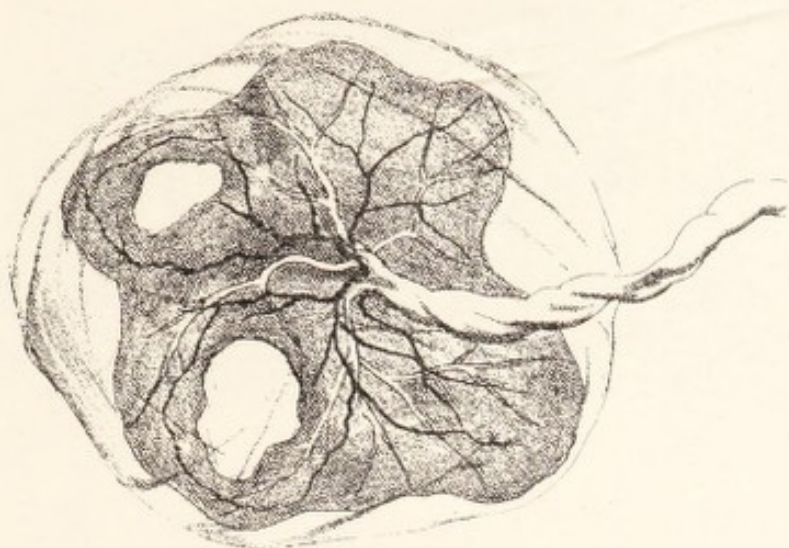


FIG. 24.—PLACENTA FENESTRATA.

A rare condition, in which there are one or more holes in the placenta.

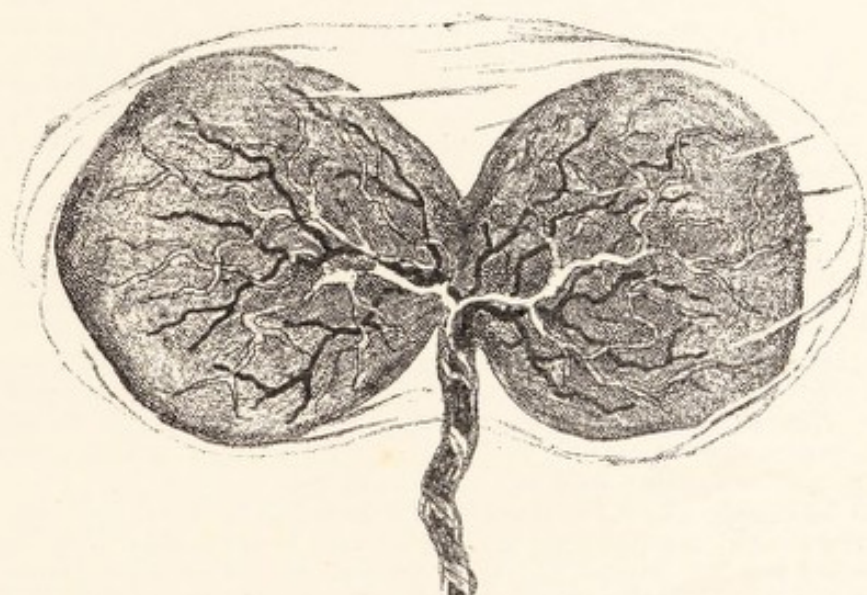


FIG. 25.—BIPARTITE PLACENTA.

In this condition the placenta is incompletely divided into two lobes, the vessels extending over both lobes before joining to form the umbilical cord.

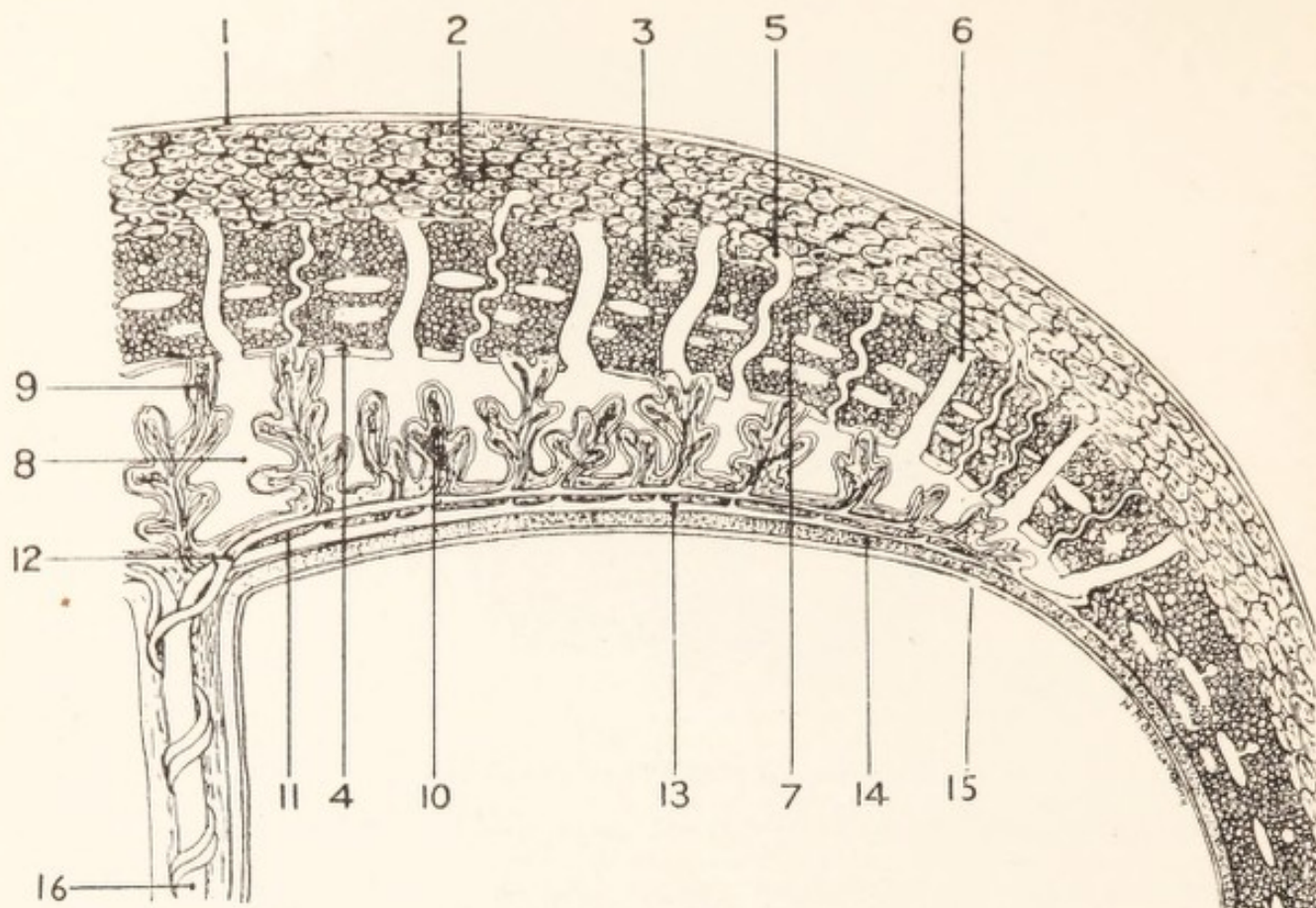


FIG. 26.—SECTION THROUGH THE PLACENTA AND THE WALL OF THE UTERUS AT TERM : DIAGRAMMATIC.

1. Peritoneum. 2. Muscle. 3. Decidua. 4. Syncytium lining the intervillous space. 5. Maternal artery opening into the intervillous space. 6. Maternal vein (uterine sinus) draining the intervillous space. 7. Deep and expanded portion of the uterine glands, the ampullary layer. 8. Intervillous space filled with maternal blood. 9. Fixation villi. 10. Free villi. 11. Branch of the umbilical vein. 12. Branch of an umbilical artery. 13. Branch of umbilical vein. 14. Chorion. 15. Amnion. 16. Umbilical cord, from without inwards—amnion, chorion, connective tissue (Wharton's jelly), two umbilical arteries, one umbilical vein.

The Placental Circulation.

The fertilized oöcyte has a number of minute processes projecting from its circumference. The use of these processes, which are termed *primitive chorionic villi*, is to absorb nourishment from the glands of the Fallopian tube and uterus, and the tissue of which they are composed is, therefore, termed *trophoblast*. By the time the zygote arrives at the cavity of the uterus this trophoblast, on microscopical examination, can be seen to be differentiated into two layers. The outer layer is termed *syncytium*, and it has the power of eating away the decidua with which it comes into contact, and the inner layer is named, after its discoverer, Langan.

The ovum, by means of its syncytium, now burrows into the decidua as far as the ampullary layer (called also the spongy, perforation or postage stamp layer), the hole that it makes closing up behind it. That portion of the decidua lining the fundus, into which the upper pole of the zygote eats its way, is termed the *decidua basalis*. That portion in contact with the lower pole, between it and the cavity of the uterus, is termed the *decidua capsularis*, and that portion in contact with the sides of the ovum is termed the *decidua vera*. To anticipate matters, by the time the growing zygote has filled the cavity of the uterus, the vera and capsularis have come into contact and have atrophied into a thin membrane.

Coexistent with the burrowing of the zygote six things have been happening: 1. The primitive villi in the *decidua basalis* have been branching very luxuriantly. 2. The primitive villi in the capsularis and vera atrophy. 3. From a certain number of the villi which are left, Langan's cells penetrate the syncytium and grow into that part of the decidua basalis deep to the ampullary layer. These are termed *fixation villi*, and they form girders, as it were, binding the maternal and foetal portions of the placenta together so that they cannot fall apart. 4. The ends of the *free villi* unite with one another through the medium of the syncytium, and a series of spaces are thus formed

[Continued on page 21.]

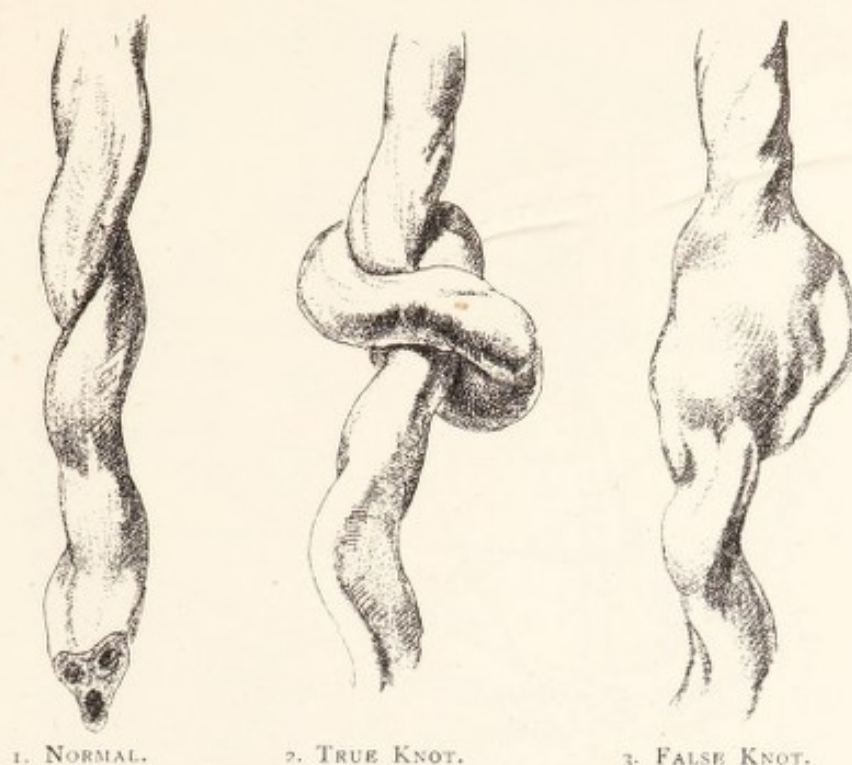


FIG. 27.—THE UMBILICAL CORD.

1. The cut section shows the two arteries and one vein. 2. As a rule this knot is recently formed, perhaps during delivery, and loose. If tight, the circulation may be impeded and the child die. If it has been formed some time the knot consists mostly of amnion and the vessels, Wharton's jelly being atrophied. 3. A false knot is incorrectly named; it is not a knot, but a local swelling of Wharton's jelly.

lined with syncytium, this structure having extended also from the villi to cover the foetal surface of the decidua. 5. The syncytium of the villi not only eats away parts of the decidua, but also opens arteries and veins running in it, with the result that maternal blood escapes and fills the spaces between the villi. These "blood lakes" coalescing, one large *intervillous space* is formed into which flows arterial blood from the mother and out of which drains venous blood into the mother. In this blood float the free villi. 6. Growing up from the chorion into each villus is the minutest portion of connective tissue, carrying with it capillaries from a branch of the umbilical vein and from a branch of an umbilical artery. Thus is formed the complete *chorionic villus*.

A sponge dipped in water gives some idea of a portion of the placenta if one visualizes the holes in the sponge (which all communicate with one another) as the intervillous space, the solid portion as the branching villi, and the water as the maternal blood.

The placenta thus consists of two parts bound together: a *maternal* part comprising the decidua basalis, the intervillous space, and the maternal blood; and a *foetal* part comprising chorion, the free villi and the fixation villi.

It will thus be seen that although the maternal and foetal blood never mix, there is the thinnest partition only between the two. This partition consists of syncytium, Langhans' cells, the connective tissue core and the walls of capillaries.

The foetal circulation is carried on as follows: Oxygen, in the mother's arterial blood entering the intervillous space, passes through the coverings of the villi into the foetal blood in the venous capillaries. The foetal blood, thus oxygenated, passes along the capillaries of the umbilical vein into the umbilical vein and down the umbilical cord into the foetus. Circulating through the foetus (see frontispiece), it leaves this as venous blood by the umbilical arteries, passing up the umbilical cord, then along the branches of these arteries into the arterial capillaries of the villi from which the carbonic acid escapes into the venous blood of the intervillous space, this blood leaving the intervillous space by the maternal veins opening into it to be reoxygenated by the mother. Thus the placenta acts as the lungs of the child, the lungs themselves being inactive till its birth.

By a similar process, salts in solution, to form the bones and tissues of the child, and proteids, fats, and sugar to nourish the child, soak into the foetal blood from the mother's blood, while the waste products of the child soak out of the foetal blood into the mother's blood, whence they are conveyed to the mother's excretory organs to be dealt with by them. The placenta, therefore, acts also as a digestive and excretory organ for the child.

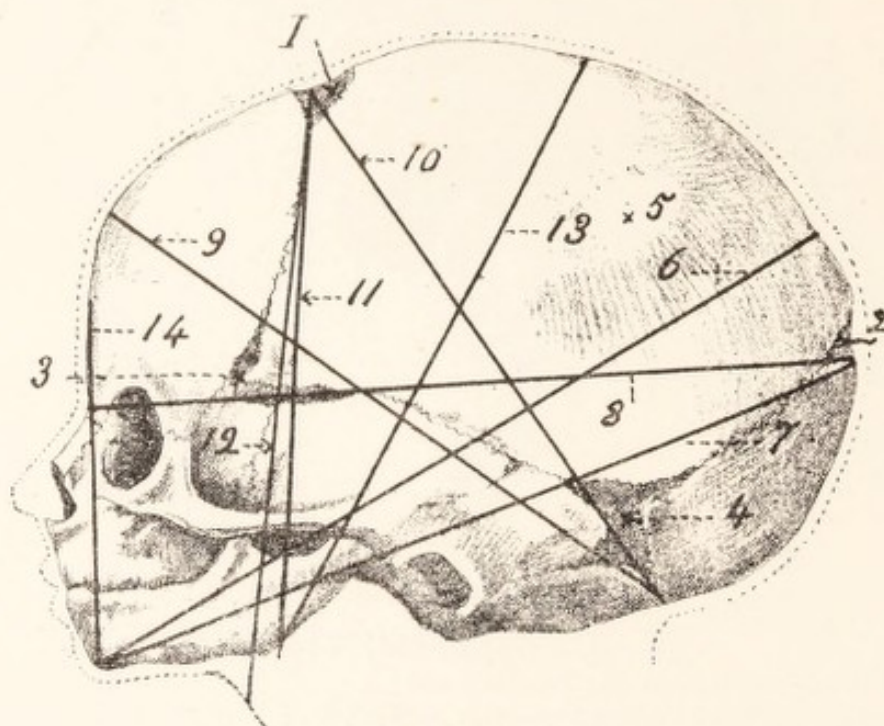


FIG. 23.—SIDE VIEW OF THE FŒTAL SKULL AND ITS DIAMETERS.

1. Anterior fontanelle. Lozenge-shaped; four sutures running into it; large.
2. Posterior fontanelle. Triangular-shaped; three sutures running into it; generally absent at birth or otherwise small.
3. Anterior temporal fontanelle } Cannot usually be felt. May be mistaken for
4. Posterior temporal fontanelle } posterior fontanelle.
5. Parietal eminence.
6. Vertico-mental, $5\frac{1}{4}$ inches. Thrown across the pelvis in a brow presentation.
7. Occipito-mental, $4\frac{3}{4}$ inches. Thrown across the pelvis in complete extension of the after-coming head.
8. Occipito-frontal, $4\frac{1}{2}$ inches. Thrown across the pelvis in a persistent occipito-posterior position.
9. Sub-occipito-frontal, 4 inches. Thrown across the pelvis in an incompletely flexed vertex.
10. Sub-occipito-bregmatic, $3\frac{3}{4}$ inches. Thrown across the pelvis in a completely flexed vertex.
11. Sub-mento-bregmatic, $3\frac{3}{4}$ inches. Thrown across the pelvis in a completely extended face.
12. Cervico-bregmatic, $3\frac{3}{4}$ inches. Thrown across the pelvis in a persistent mento-posterior position.
13. Sub-mento-vertical, $4\frac{1}{2}$ inches. Thrown across the pelvis in an incompletely extended face.
14. Mento-nasal, $1\frac{1}{2}$ inches. Diameter of face induced for delivery after the operation of cranioclasm.

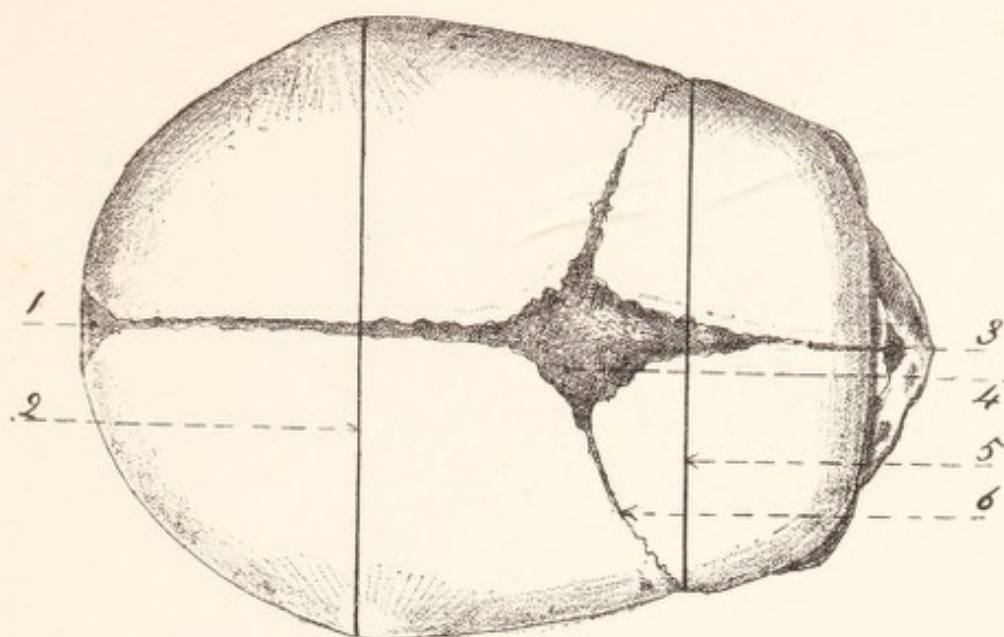


FIG. 29.—TOP VIEW OF THE FŒTAL SKULL AND ITS DIAMETERS.

1. Posterior fontanelle. 2. Biparietal, $3\frac{1}{4}$ inches. 3. Frontal suture. 4. Anterior fontanelle. 5. Bitemporal, $3\frac{1}{4}$ inches. 6. Coronal suture.

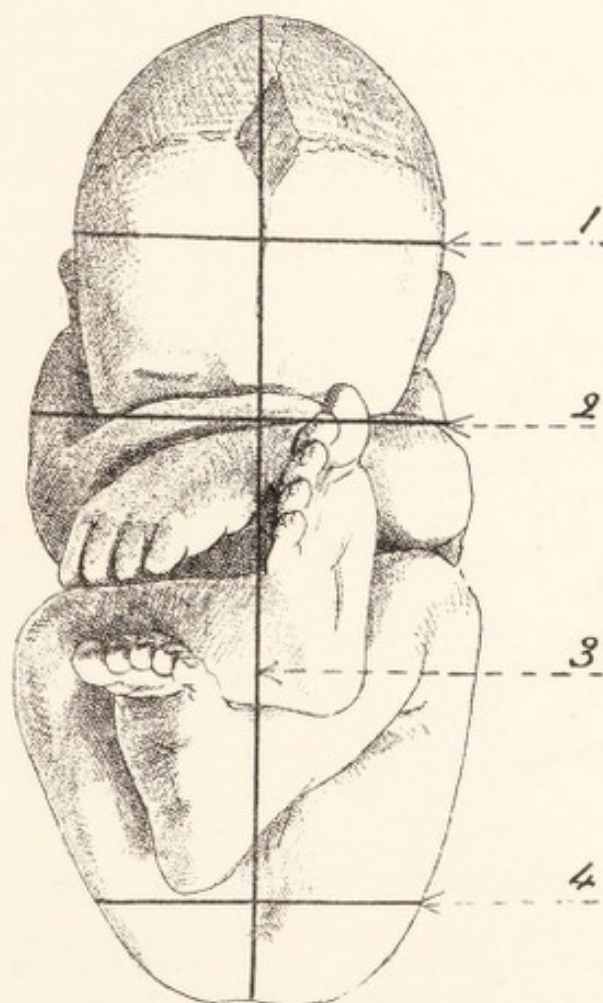


FIG. 30.—THE FŒTUS : OTHER DIAMETERS AND MEASUREMENTS.

1. Biparietal: diameter, $3\frac{1}{4}$ inches. 2. Bis-acromial: diameter, $4\frac{1}{4}$ inches. 3. Verticopodal: diameter, $9\frac{1}{2}$ to 10 inches. 4. Bitrochanteric: diameter, 4 inches.



FIG. 31.—SUB-OCCIPITO-BREGMATIC.

From the junction of the head with the neck behind to the anterior fontanelle. The largest diameter thrown across the pelvic cavity when the head is completely flexed in a vertex delivery.

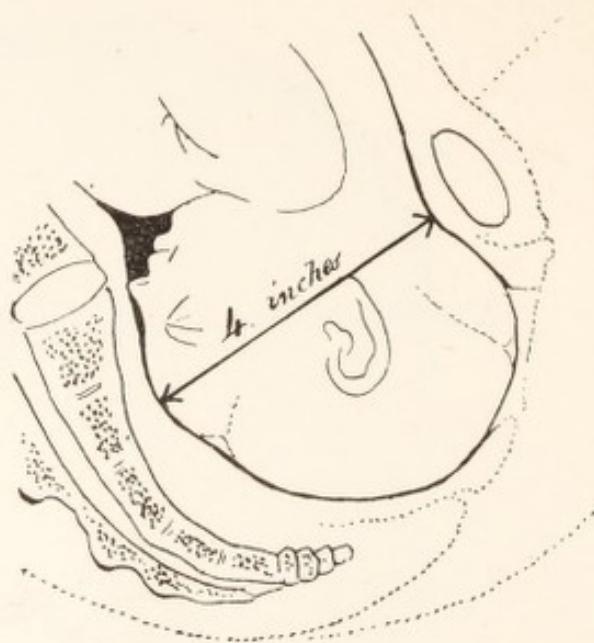


FIG. 32.—SUB-OCCIPITO-FRONTAL.

From the junction of the head with the neck behind to the prominence of the forehead. The largest diameter thrown across the pelvic cavity when the head is not so fully flexed in a vertex delivery. In those cases in which the head is expelled from the vagina before its neck has escaped under the pubic arch rupture of the perineum is more likely

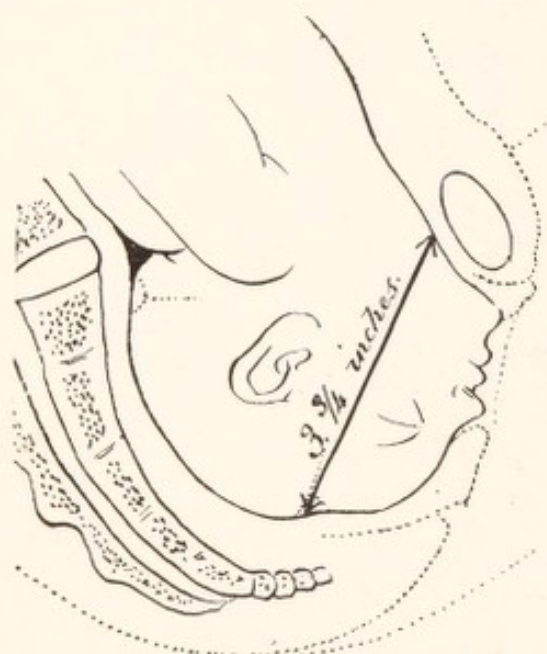


FIG. 33.—SUB-MENTO-BREGMATIC.

From the junction of the head with the neck in front to the anterior fontanelle. The diameter thrown across the pelvic cavity when the head is completely extended in a face delivery.



FIG. 34.—SUB-MENTO-VERTICAL.

From the junction of the head with the neck in front to the point farthest away on the vertex. The largest diameter thrown across the pelvic cavity in a face delivery when the head is not completely extended.



FIG. 35.—OCCIPITO-FRONTAL.

From the root of the nose to the posterior fontanelle. The largest diameter thrown across the pelvic cavity when the head is incompletely flexed in an unreduced occipito-posterior position in a vertex, and in incomplete flexion of the after-coming head in a breech delivery.



FIG. 36.—OCCIPITO-MENTAL.

From the point of the chin to the posterior fontanelle. The largest diameter thrown across the pelvic cavity as a result of complete extension of the after-coming head in a breech delivery.



FIG. 37.—MENTO-NASAL.

From the tip of the chin to the orbital plate of the frontal bone. The diameter of the face which is induced for delivering the head after the vault has been removed by the operation of cranioclasm.

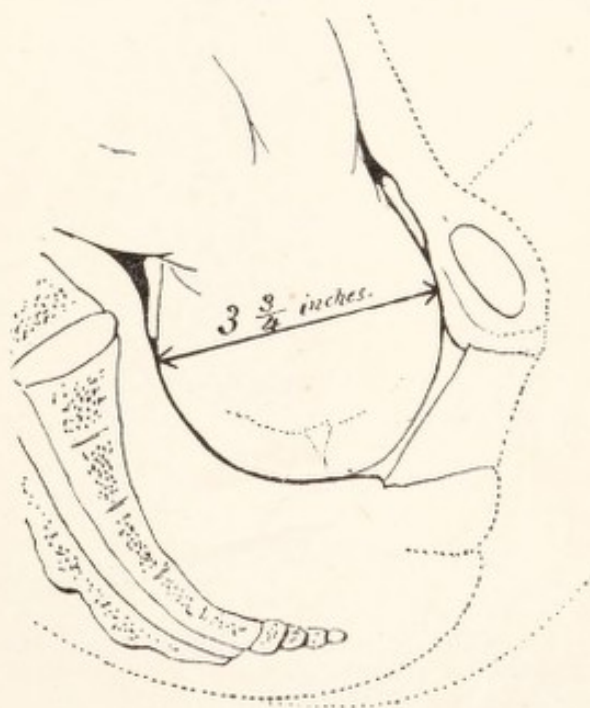


FIG. 38.—BI-PARIETAL.

From the points farthest apart between the parietal eminences. The largest diameter which enters the antero-posterior diameter of the brim as the head advances in a case of flattened pelvis.

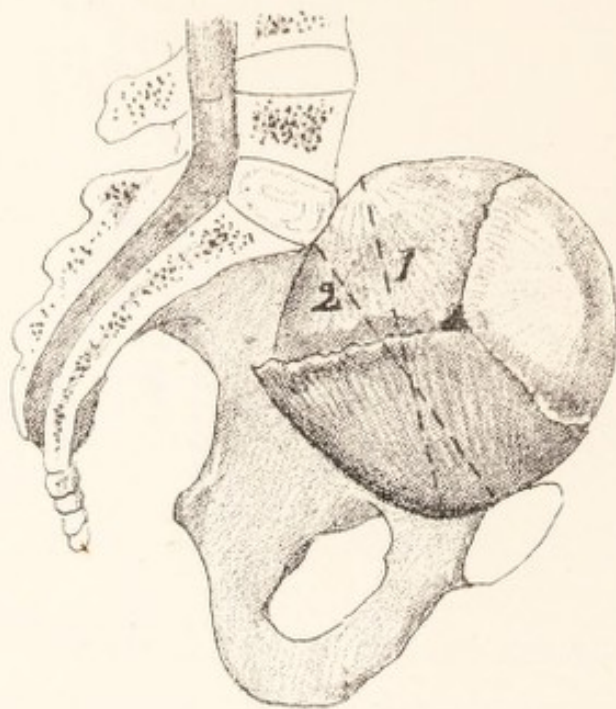


FIG. 39.—SUPER-PARIETO-SUB-PARIETAL.

From *above* one parietal eminence to *below* the other. When the head of the child engages in the brim of a flattened pelvis, it does so in the transverse diameter of the brim and by lateral flexion of the head. This flexion is known as Naegele's obliquity, and by it the bi-parietal diameter (1), which measures $3\frac{1}{4}$ inches, is replaced by the super-parieto-sub-parietal diameter (2), measuring about $\frac{1}{2}$ inch less. In the illustration the anterior parietal bone overlaps the posterior, the sagittal suture is nearer the promontory of the sacrum, and the anterior parietal bone is presenting. This is the best position for the head when passing through the brim in labour with a flattened pelvis.

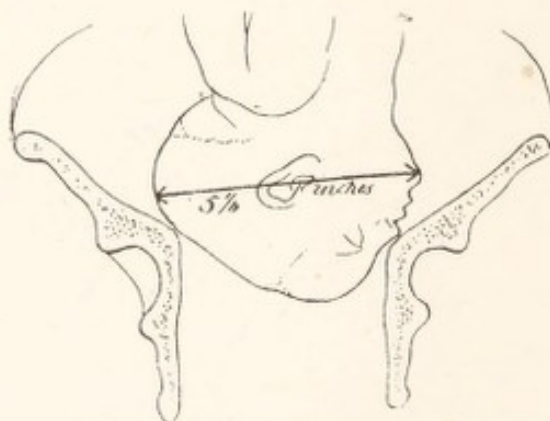


FIG. 40.—VERTICO-MENTAL.

From the point of the chin to the point farthest away from it on the vertex. This diameter of a brow presentation prevents the head entering the pelvic cavity. The head lies transversely.

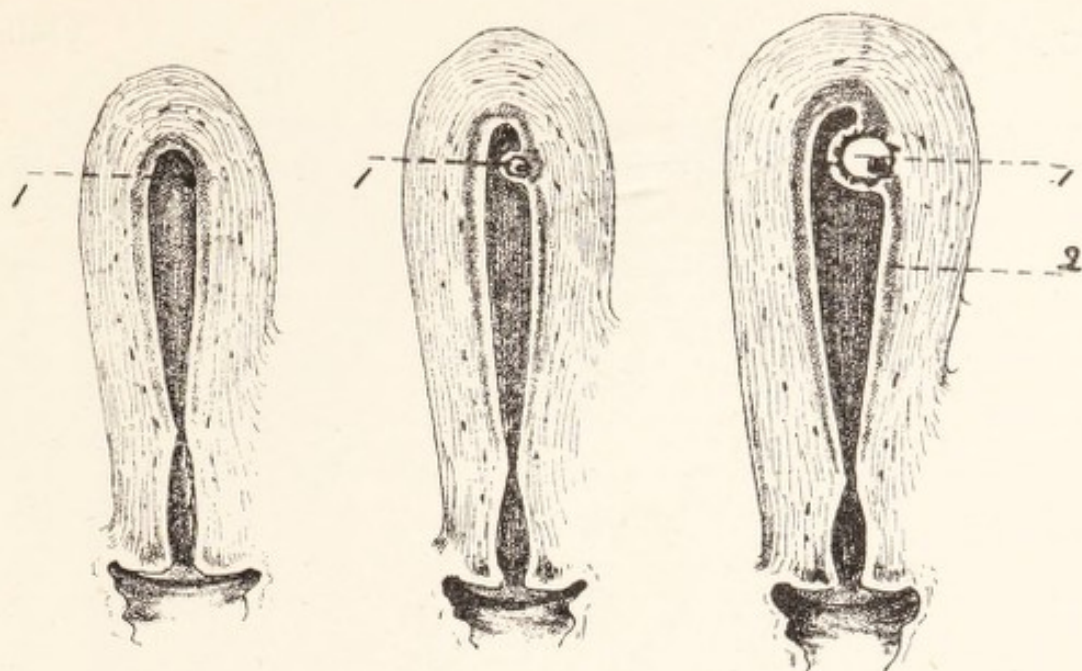


FIG. 41.

FIG. 42.

FIG. 43.

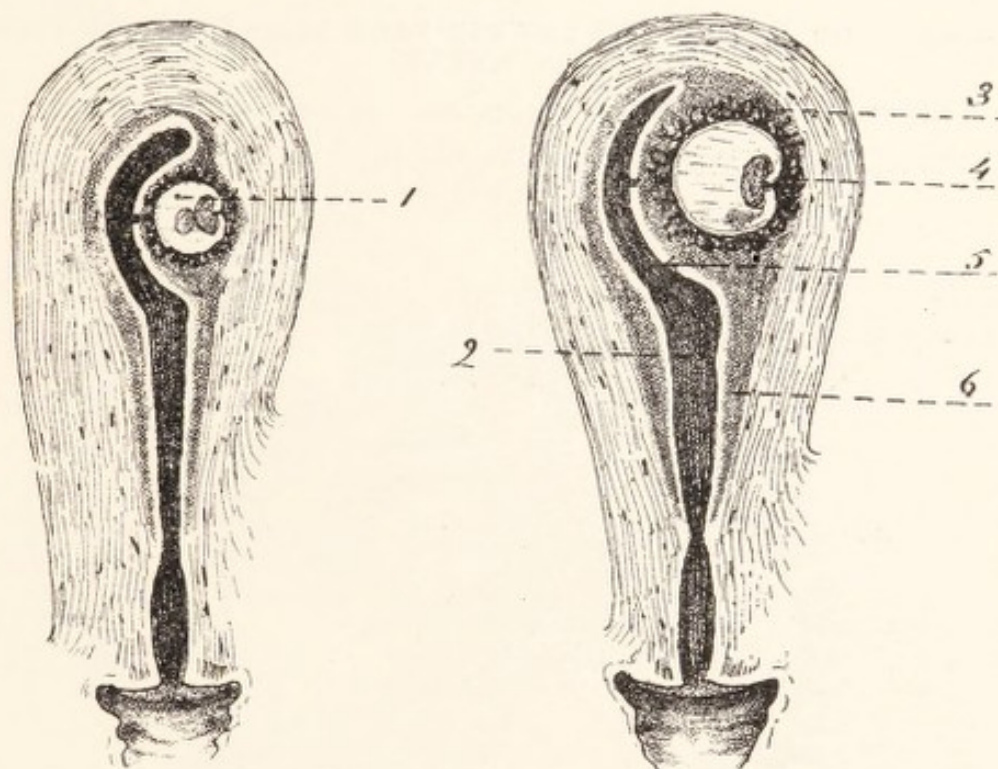


FIG. 44.

FIG. 45.

FIGS. 41-45.—THE EMBEDDING OF THE ZYGOTE.

FIGS. 41, 42, 43, 45.—The zygote eroding its way into the decidua by means of its trophoblast, which is the outer layer of cells of the fertilized ovum.

FIG. 42.—The zygote at rest in the decidua. That portion of the decidua to which it is attached, nearest the uterine muscle, is the decidua basalis. The part surrounding the zygote, nearest the cavity of the uterus, is the decidua capsularis; the rest of the decidua lining the cavity of the uterus is the decidua vera.

FIG. 43.—Showing the chorionic villi just forming. 1. Developing foetus. 2. Decidua vera.

FIGS. 44 and 45 show the appearances described in Figs. 42 and 43 more clearly. 1. Liquor amnii and foetus. 2. Uterine cavity. 3. Chorionic villi. 4. Decidua basalis. 5. Decidua capsularis. 6. Decidua vera.

(From "Midwifery by Ten Teachers," by kind permission of Edward Arnold and Co.)

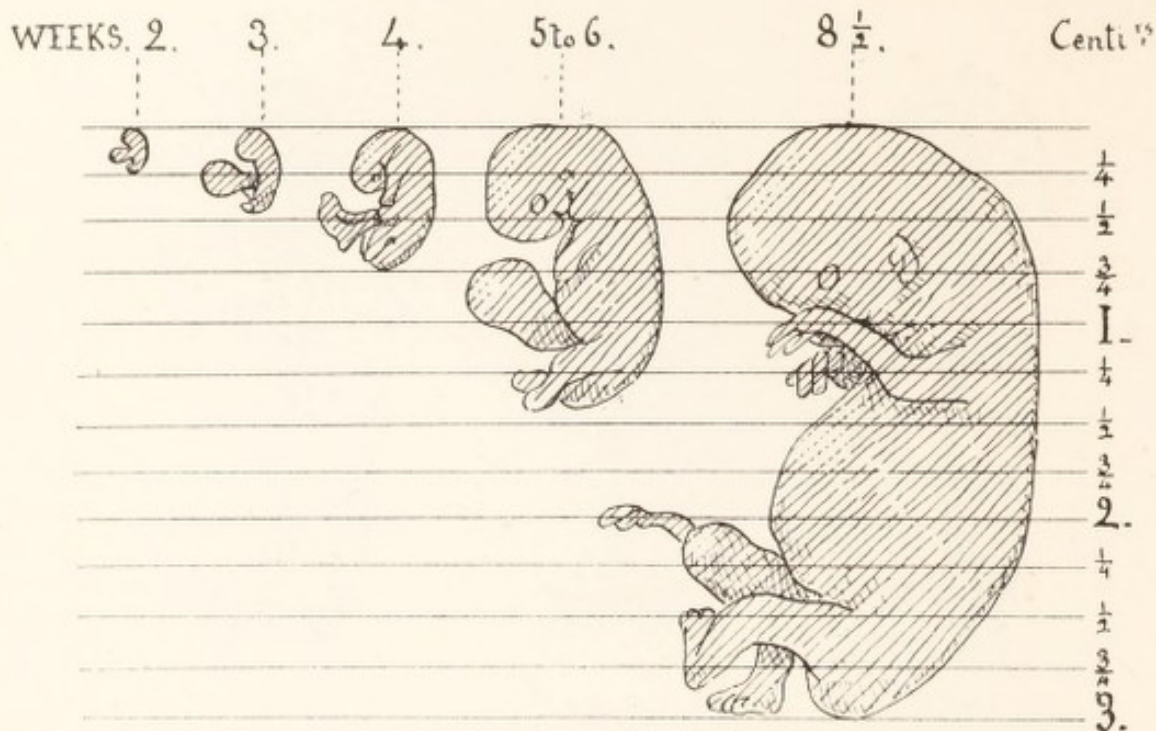


FIG. 46.—RELATIVE SIZE OF THE EMBRYO FROM THE SECOND TO EIGHT AND A HALF WEEKS.

The measurements are in centimetres. 2 $\frac{1}{2}$ centimetres = 1 inch.

(Modified from "Midwifery by Ten Teachers," by kind permission of Edward Arnold and Co.)

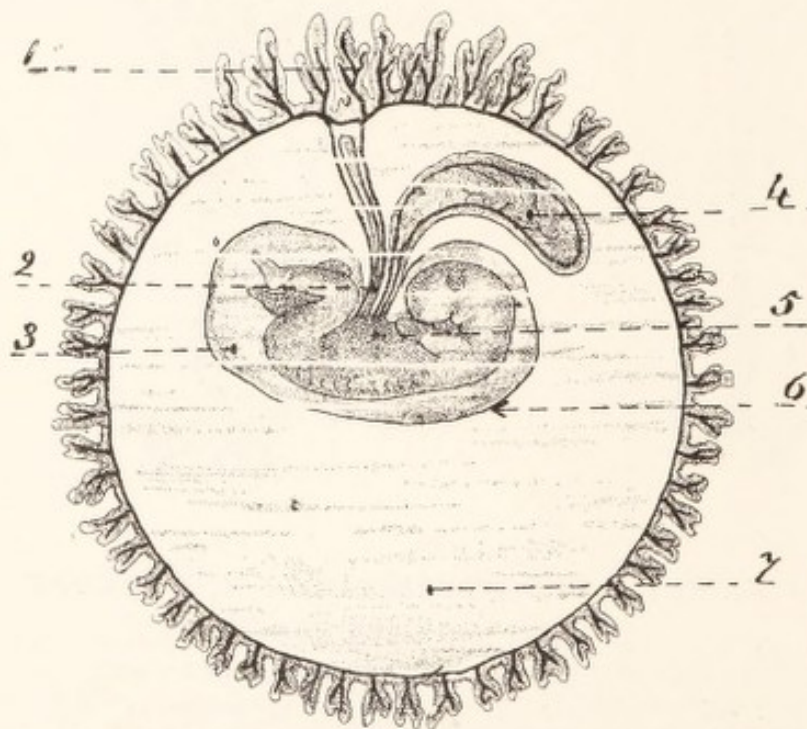


FIG. 47.—SECTION THROUGH A HUMAN OVUM, SHOWING THE EMBRYO AND ITS MEMBRANES : DIAGRAMMATIC.

1. Chorionic villi, site of the foetal placenta. The remainder of the chorionic villi atrophy by the 12th week. 2. Umbilical cord. 3. Amniotic cavity. 4. Umbilical vesicle. 5. Foetus. 6. Amnion. 7. The cavity between the amnion and the chorion which, as pregnancy advances, gradually becomes smaller until the amnion and chorion are in contact. Very rarely a small cavity may persist to term, containing fluid, and the condition then results in a double bag of membranes.



FIG. 48.—HUMAN OVUM AT EIGHT WEEKS OF INTRA-UTERINE LIFE.

Showing the embryo, the amnion, the amniotic cavity, the chorion and chorionic villi. From the 8th week to the 12th week the chorionic villi gradually atrophy, except where they are attached to the decidua basalis. At this situation the villi increase in number and form the foetal portion of the placenta. Thus at the 12th week the placenta is formed, with the exception of the ampullary (separation or postage-stamp) layer of the maternal part of the placenta, which is not formed till the 28th week. It is the absence of this separation layer between the 12th and the 28th weeks that leads to the placenta being retained in the uterus in some cases of abortion.

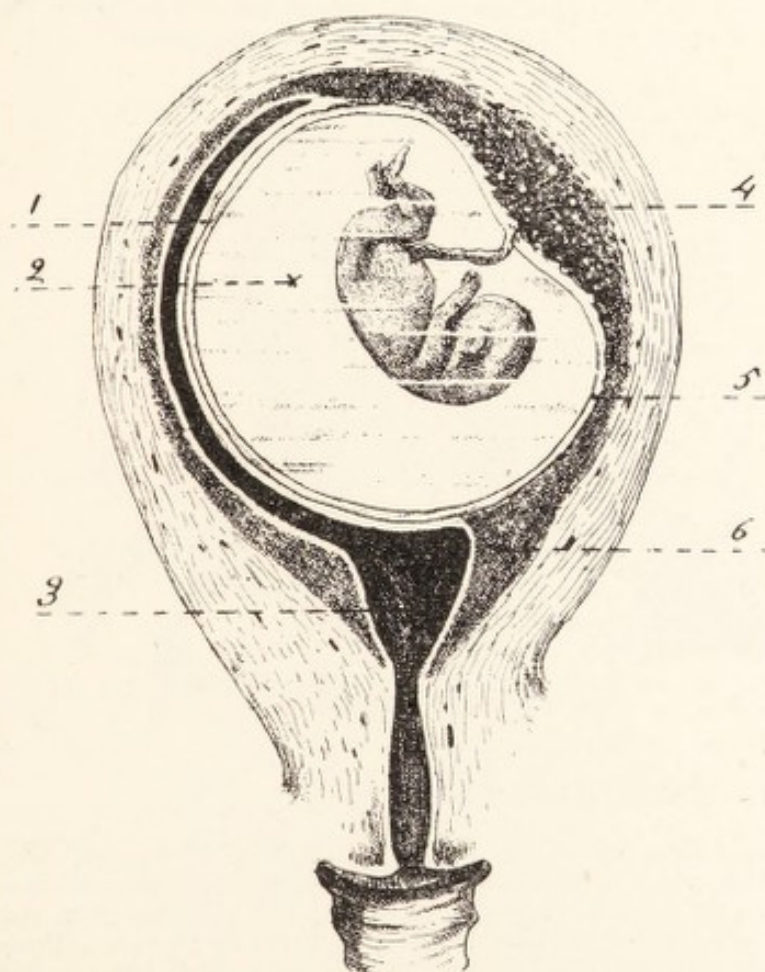


FIG. 49.—HUMAN OVUM IN THE UTERUS AT TWELVE WEEKS OF INTRA-UTERINE LIFE.

1. Decidua capsularis. 2. Amniotic cavity. 3. Decidual cavity. 4. Placenta, formed of chorionic villi and the decidua basalis. 5. Chorion and amnion. 6. Decidua vera.

The decidual cavity is nearly obliterated. It is from the decidua lining this cavity that a pregnant woman on rare occasions bleeds when the period would have been due, and is thus said to menstruate. Most cases of hæmorrhage, however, from the pregnant uterus in the first 12 weeks are due to a threatened abortion, and after the 12th week must be due to this, as there is no decidual cavity left, the ovum occupying all the available space in the uterus.



FIG. 50.—SIMS' SEMI-PRONE POSITION.

The patient lies with her breasts touching the bed, her left arm hanging over the edge of the bed, and her right leg drawn up. This position is a useful one for packing the vagina in cases of hæmorrhage due to abortion, accidental or unavoidable hæmorrhage. It is also used by doctors when replacing an incarcerated retroverted gravid uterus. Sims' position allows air (15 pounds to the square inch) to enter the vagina, so that this canal becomes very distended and is easier to pack. The pressure of the air in the vagina helps to push up the fundus of the uterus when reposition of that organ is being attempted. Sims first discovered that this position of the patient ballooned out the vagina and so allowed him, with the aid of his speculum, to see the tear between the bladder and vagina when he first started operating upon vesico-vaginal fistulæ.

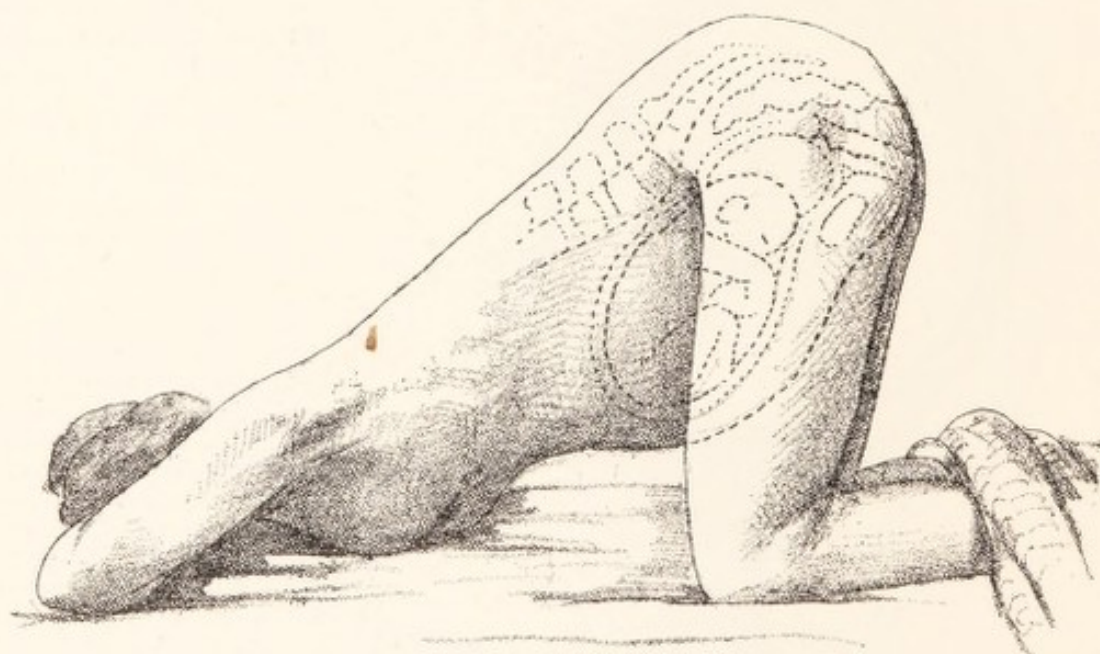


FIG. 51.—KNEE-CHEST POSITION.

This position is sometimes employed when the doctor is releasing an incarcerated and retroverted gravid uterus. It is also employed in presentation of the umbilical cord. In this position the fundus is at a lower level than the cervix, so the cord tends to slip back by gravity. A patient in labour cannot keep in this position more than fifteen minutes, so that at the end of this time she must lie on her side for a short time before reassuming the knee-chest position. It is important to remember that presentation of the cord may be due to a malpresentation or contracted pelvis preventing the presenting part fitting properly into the lower uterine segment.

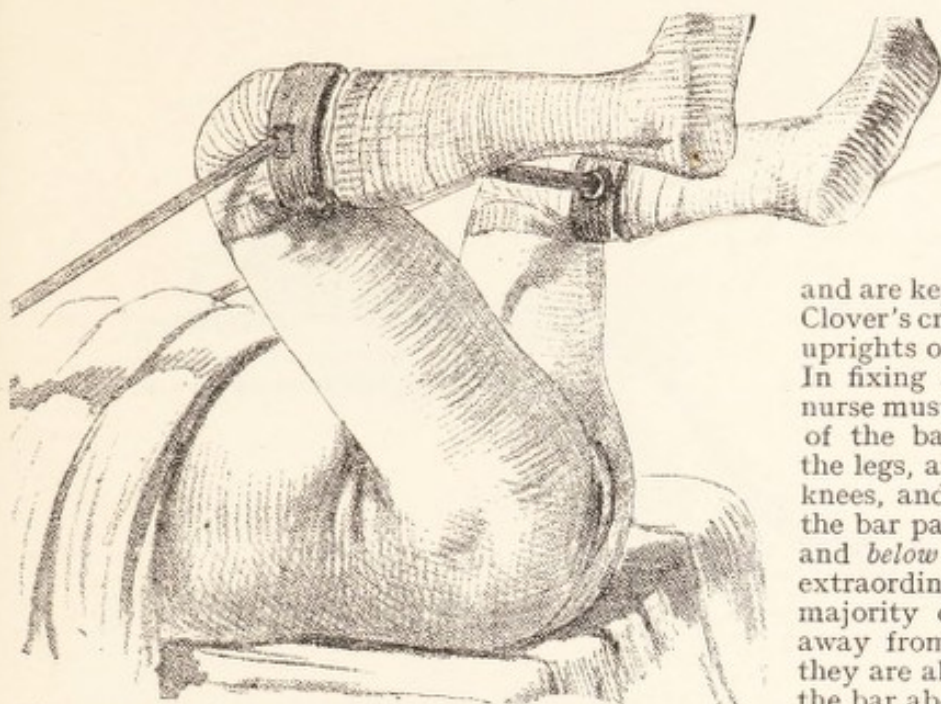


FIG. 52.—LITHOTOMY POSITION.

In this position the patient is placed, either on a table or across the bed, on her back. Her thighs and legs are flexed,

and are kept in this position by a Clover's crutch or by special iron uprights on the operating table. In fixing a Clover's crutch the nurse must be sure that the ends of the bar, to be attached to the legs, are strapped *below* the knees, and the strap that holds the bar passes *over* one shoulder and *below* the other. It is an extraordinary thing that the majority of sisters and nurses away from hospitals always, if they are allowed, fix the ends of the bar above the knees and the

strap round the neck. Doctors have been known to do the same.

If a Clover's crutch is not available, a stick, suitably padded, can be placed across and under the knees, and a bandage then affixed to each end as is the strap.

This position is the correct one when any operation has to be performed upon the patient by the vaginal route. Thus induction of premature labour, craniotomy, cephalotripsy, and the induction of abortion are carried out with the patient in this position. It is the best position for packing the vagina in cases of ante-partum hæmorrhage.

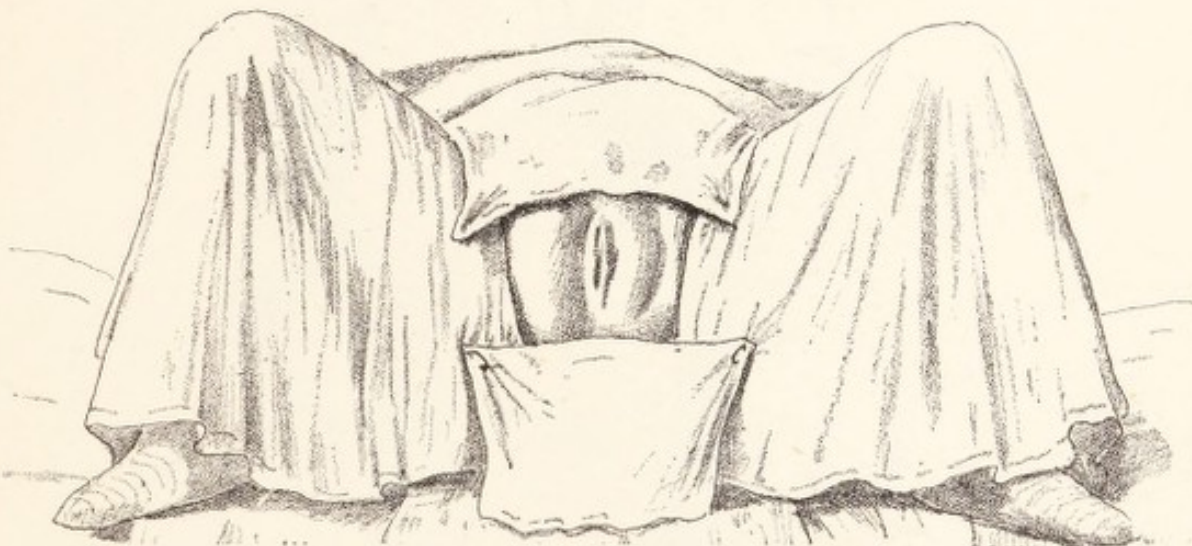
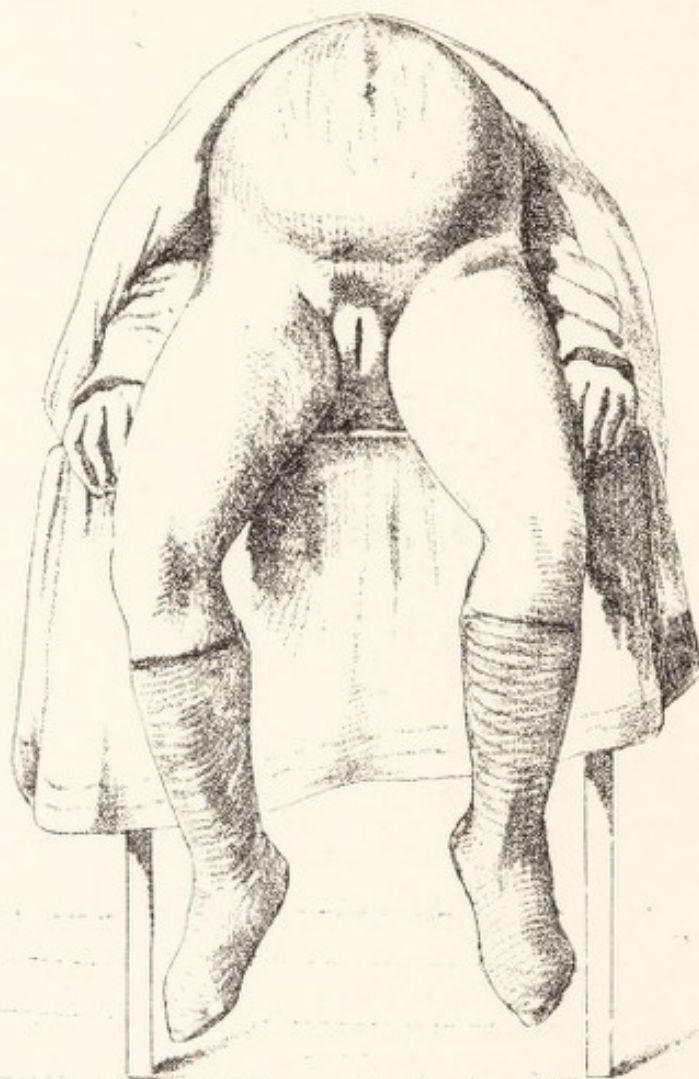
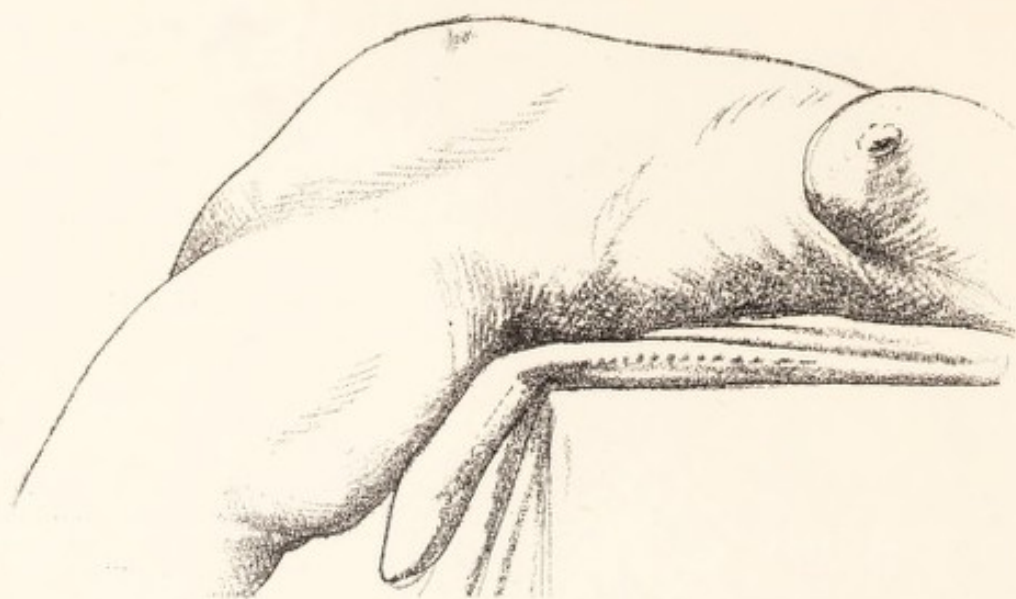


FIG. 53.—MODIFIED LITHOTOMY POSITION.

This is the position during the 3rd stage of labour and when the perineum has to be sutured. The four sterilized towels are fixed with safety pins. Many doctors place the patient in this position when delivering her by the forceps, and some during a normal 2nd stage. This is also the best position in which to measure the diagonal conjugate diameter and the antero-posterior and transverse diameters at the outlet. For the treatment of post-partum hæmorrhage, for manual removal of the placenta and for douching, the modified lithotomy position is the correct one.

The patient is placed across the bed with the legs drawn up and held in position, the feet resting on the edge of the bed and the buttocks being brought as near the edge as possible. If a Clover's crutch is available, the true lithotomy position can be used with better advantage when performing the operations mentioned above, especially when there is not sufficient assistance to hold up the two legs in position. When a Clover's crutch is used the nurse, or some assistant, must hold the patient steady; otherwise she may fall off the table and be seriously injured. This has occurred.



FIGS. 54 AND 55.—WALCHER'S POSITION.

The patient is placed on her back across the bed or on a table, her buttocks projecting over the edge and her feet not touching the floor. The true conjugate diameter is thus increased by rather more than a quarter of an inch, due to the rotation forwards of the symphysis pubis. If the head of the child is delayed at the brim of the pelvis, because the latter is flattened and the case is otherwise suitable for the application of the forceps, the patient is placed in the Walcher position until the head of the child has passed through the brim of the pelvis.

SECTION II
PREGNANCY

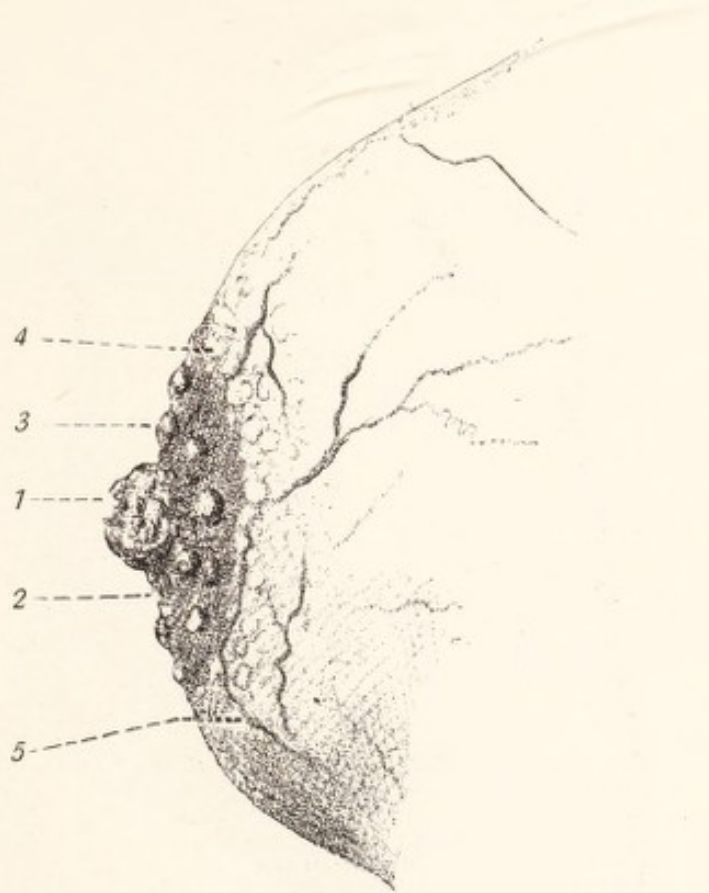


FIG. 56.—THE BREAST.

1. Prominent nipple. 2. Primary areola, a pigmentation which is much darker in brunettes. 3. Montgomery's follicles, sebaceous glands. 4. Secondary areola, on the margin of the primary areola, composed of small whitish spots; appears at the 5th month of pregnancy; an important sign in primigravidæ. 5. Enlarged veins.

At the end of the 3rd month a clear fluid can be expressed from the glands of the breast, appearing in drops at the nipple. In the later weeks of pregnancy this fluid, which is thick and yellow, is called colostrum. The constituents of the fluid are protein, fat, water, and colostrum corpuscles. These corpuscles are the epithelial cells from the acini of the gland, and contain large drops of fat formed from the breaking down of the protoplasm of the cell. Colostrum has more protein and less sugar and fat than milk, and the epithelial cells are cast off whole. The protein being serum-albumin, corresponding to that found in the blood, can thus be absorbed into the blood of the child without calling upon the digestive powers of its stomach. On and after the 3rd day of the puerperium, when the milk is secreted, the colostrum corpuscles gradually disappear, the drops of fat bursting out of the epithelial cells into the ducts of the gland and the cells remaining behind.

The breast changes are, as a rule, only of use for diagnostic purposes during pregnancy in primigravidæ.

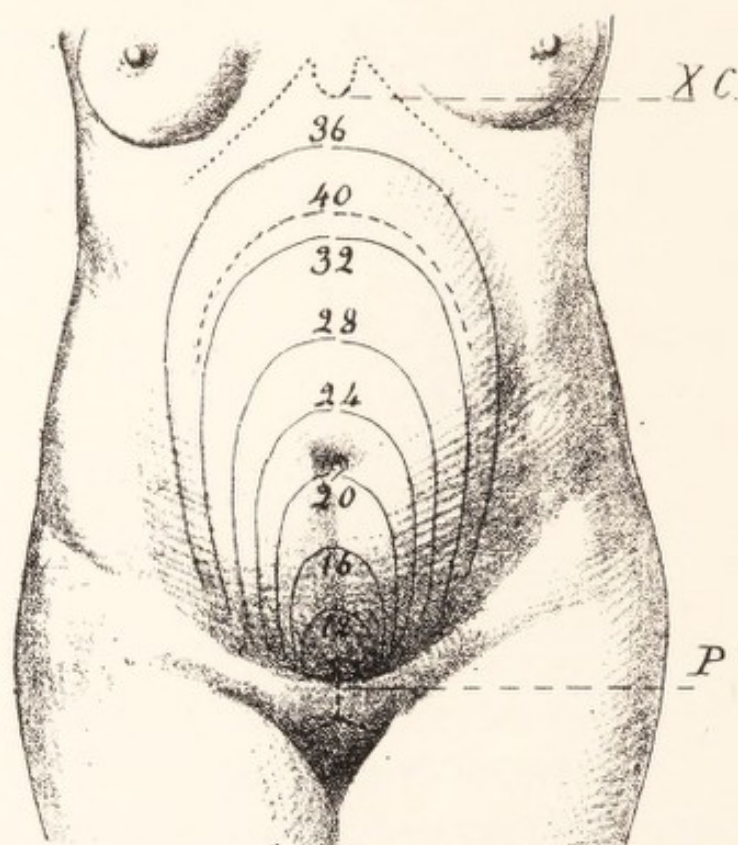


FIG. 57.—HEIGHT OF THE UTERUS FROM THE EIGHTH TO THE FORTIETH WEEK OF PREGNANCY : FRONT VIEW.

X. C., Xiphoid cartilage or lower end of the sternum, 38th week. *P.*, Symphysis pubis.

Note that at the 40th week the height of the uterus is lower than at the 38th week. The measurements here depicted must be taken as a rough estimate. The amount of fat in the abdominal wall, whether the patient is a primigravida or a multipara, and the personal factor of the person who is measuring, have all to be taken into account.

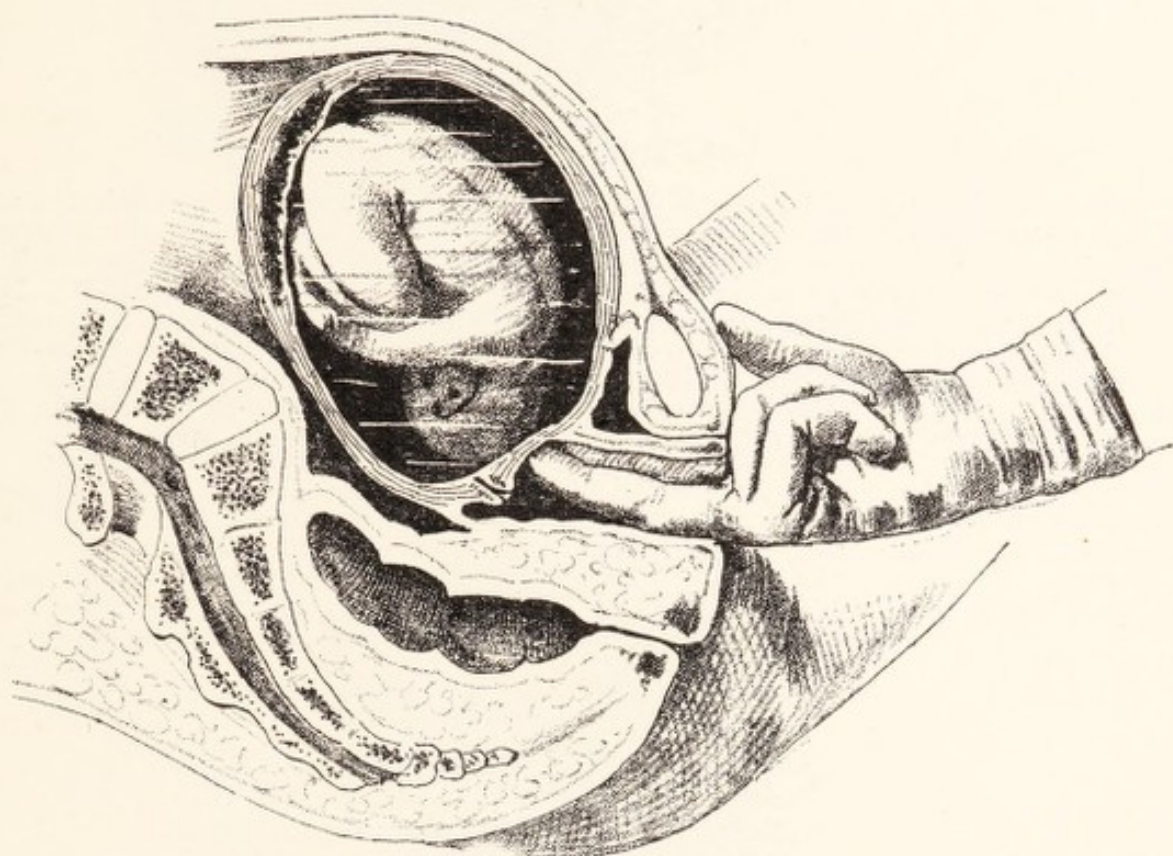


FIG. 58.—INTERNAL BALLOTTEMENT.

With the patient lying on her back, one or two fingers are inserted into the vagina and into the anterior fornix. The foetal head, which can be felt, is then pushed up with a slight jerk. The head will then float away from the fingers to return with a distinct tap. This sign, which depends on the relatively large amount of liquor amnii compared with the size of the foetus, can be detected from the 16th to the 30th week. After this the amount of liquor amnii gradually becomes too small to allow the foetus to float.

The midwife, as a rule, does not have to examine for the presence of the foetus by internal ballottement. She relies, if necessary, on external ballottement. This is carried out, the patient being on her back, by pressing on the distended uterus by a series of sharp taps with the tips of the fingers. The liquor amnii is thus displaced and the fingers impinge on the solid body of the foetus.



FIG. 59.—CARNEOUS OR BLOOD MOLE.

A blood mole is formed before the placenta is formed by the rupture of bloodvessels in the decidua, the maternal blood escaping between the chorion and the decidua. The foetus thus deprived of its blood-supply perishes. The fluid part of the blood is absorbed and the remainder organizes and forms a carneous mole or fleshy mass. The patient may abort at the time, or there may at first be slight bleeding from the vagina, or a reddish-brown discharge; but if this ceases, the mole may remain in the uterus several weeks before it is expelled, the signs and symptoms of pregnancy ceasing. If the mole is cut through after its expulsion, a smooth-lined cavity will be found in the centre. This is the amniotic cavity, and it may or may not contain a foetus.



FIG. 60.—VESICULAR MOLE.

In this condition small cysts form in the chorionic villi, which resemble in appearance hydatid cysts, and in consequence the mole is sometimes called a hydatidiform mole. As by the 12th week those chorionic villi which are not forming the foetal placenta have atrophied, a vesicular mole is therefore nearly always formed before the 12th week. The uterus is, as a rule, larger than it should be for the period of gestation, most of the increase in size being due to retained blood-clot. This condition is not devoid of danger, which may arise from bleeding, sepsis, or erosion of the wall of the uterus by the chorionic villi leading to rupture of that organ. Chorion-epithelioma, which is a very fatal form of tumour, in the majority of cases occurs in women who have had vesicular moles.

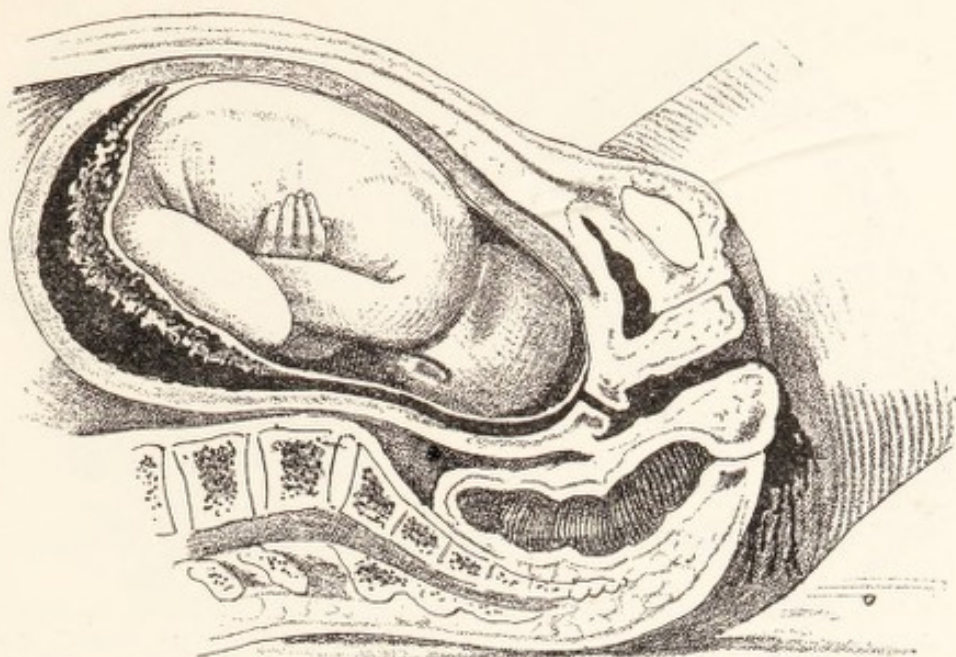


FIG. 61.—EXTERNAL OR REVEALED ACCIDENTAL HÆMORRHAGE.

Part of the placenta, which is situated in its normal position, is separated from the uterine wall. The blood escaping from the uterine sinuses passes between the chorion and the wall of the uterus, through the cervical canal and vagina. In the illustration the whole of the placenta is shown separated. This is rare; generally only a portion is separated. If the bleeding is slight, rest and opium may be all that is required. If the bleeding is severe, the doctor may rupture the membranes, put on a binder, and give ergometrine. Sometimes, in addition, he will pack the vagina.

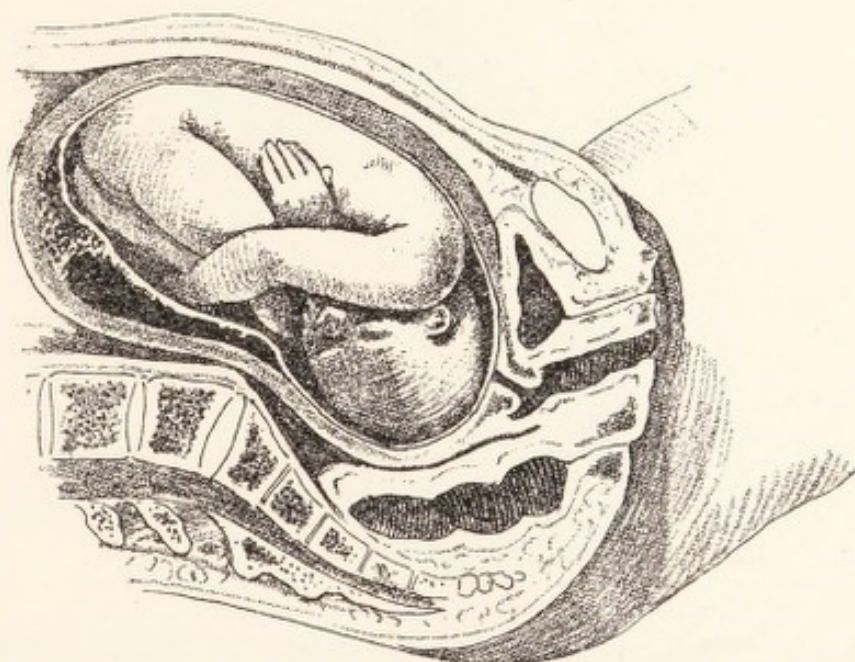


FIG. 62.—INTERNAL OR CONCEALED ACCIDENTAL HÆMORRHAGE.

Part of the placenta, which is situated in its normal position, is separated from the uterine wall. The blood that escapes is held up between the chorion and uterine wall, or behind the placenta. This complication is due to the uterus not contracting, and so it becomes distended with the retained blood, instead of forcing it out through the vulval orifice. As a rule, in cases of internal accidental hemorrhage, a certain amount of blood-stained serum is expelled, and so, unless the general and abdominal symptoms and signs have been carefully noted, the attendant may mistake the very serious condition of internal accidental hemorrhage for the far less serious external variety. The concealed variety is generally associated with toxæmia, when albumin will be found in the urine. The doctor will pack the vagina and give morphia. If the condition of the patient improves, the packing will be removed, the membranes ruptured, and a binder applied. If the condition gets worse, Cæsarean section alone remains, the death-rate of which in such circumstances is at least 50 per cent.

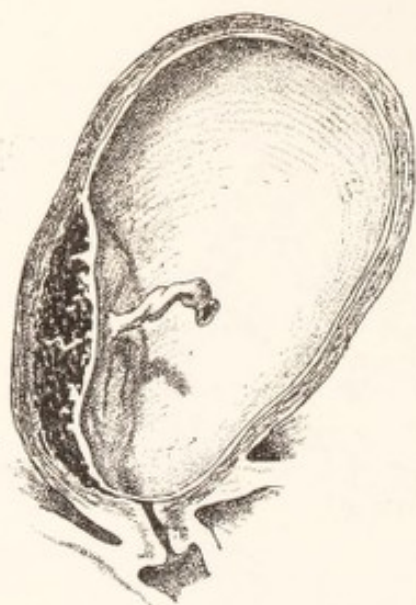


FIG. 63.—MARGINAL PLACENTA PRÆVIA.

Part of the placenta is attached to the lower uterine segment, but does not overlap the internal os, the rest of the placenta being attached to the upper uterine segment.



FIG. 64.—PARTIAL PLACENTA PRÆVIA.

Part of the placenta is attached to the lower uterine segment and overlaps the internal os, the rest of the placenta being attached to the upper uterine segment.



FIG. 65.—CENTRAL OR COMPLETE PLACENTA PRÆVIA

If the placenta is entirely attached to the lower uterine segment, the condition is called central placenta prævia. If, however, the margin of the placenta cannot be reached on passing a finger into the uterus, this is called complete placenta prævia, whether the whole of the placenta is attached to the lower uterine segment or only part of it.

The bleeding associated with placenta prævia, due to the partial separation of a placenta situated, or partly situated, over the lower segment of the uterus, is known as unavoidable hæmorrhage. Unavoidable because when the lower segment of the uterus commences to stretch, that part of the placenta which is attached to it, being inelastic, cannot stretch with it, and so becomes separated.

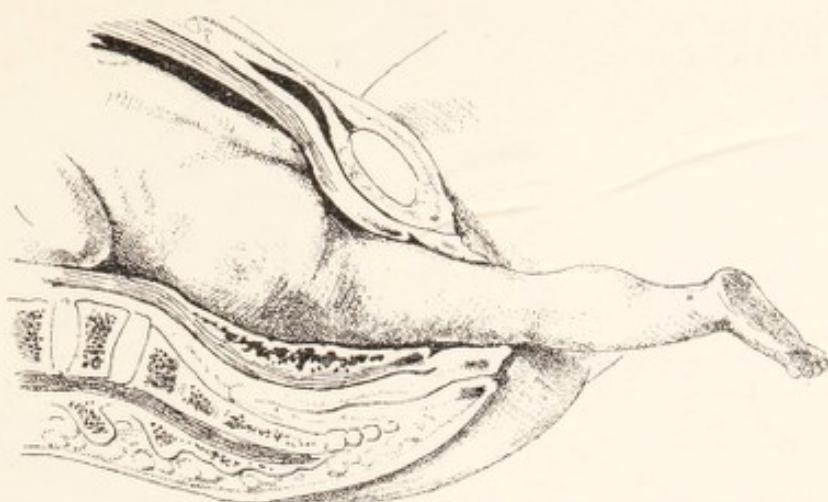


FIG. 66.—TREATMENT OF UNAVOIDABLE HÆMORRHAGE: BRINGING DOWN A LEG.

A method of arresting the bleeding is to pull down a leg of the child, so that the half-breech presses against the separated portion of the placenta. The advantage of this method is that a special instrument is not required, and if the presentation is a breech, an anæsthetic is not necessary. The disadvantage is that the child is more likely to be born dead. Other methods are the application to the head of a Willett's forceps with a weight attached or the insertion of a De Ribes's bag.

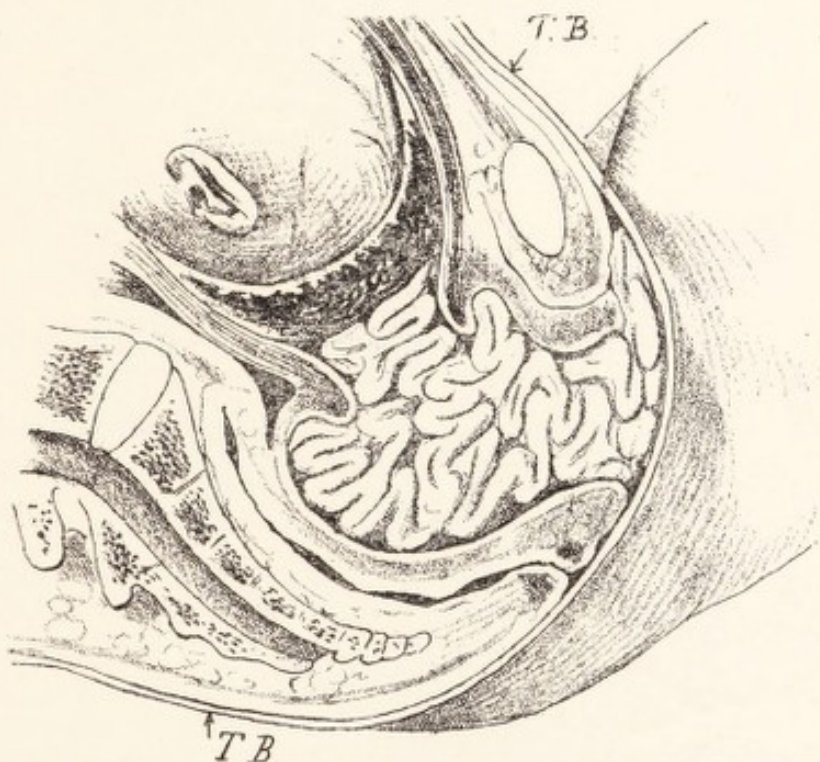


FIG. 67.—TREATMENT OF UNAVOIDABLE HÆMORRHAGE: PACKING THE VAGINA.

If the patient is being treated by a midwife pending the arrival of a doctor, the bleeding can be arrested by packing the vagina, after the membranes have been ruptured and the bladder emptied, until the cervix is sufficiently dilated to allow of the other measures being carried out. After the vagina has been packed, a T-bandage (*T.B.*) is applied to keep the packing from being expelled.

Packing the vagina is also a good method of treating accidental hæmorrhage before the cervix is dilated. If this method is chosen, the greatest care must be taken to ensure that the patient is not having an external accidental hæmorrhage converted into an internal accidental hæmorrhage by the presence of the plug. Such a thing will not occur if the uterine contractions are good.

To pack the vagina efficiently is a difficult procedure for a midwife. Moreover, unless the strictest antiseptic precautions are taken it is dangerous, the patient becoming infected and puerperal fever resulting. It should only be done before removal to a hospital, when the bleeding is serious.

FIG. 68.—TREATMENT OF UNAVOIDABLE HÆMORRHAGE: DE RIBES'S BAG.

One method of arresting the bleeding is to insert a De Ribes's bag into the amniotic cavity. The separated portion of the placenta is then pressed against the exposed placental site by the pressure of the bag. The advantage of using a De Ribes's bag is that there is more chance of delivering a living child than by the method of bringing down a leg (Fig. 66). If the pressure of the bag produced by the contractions of the uterus on to it is not sufficient to arrest the bleeding, a 2-pound weight can be attached to the bag.

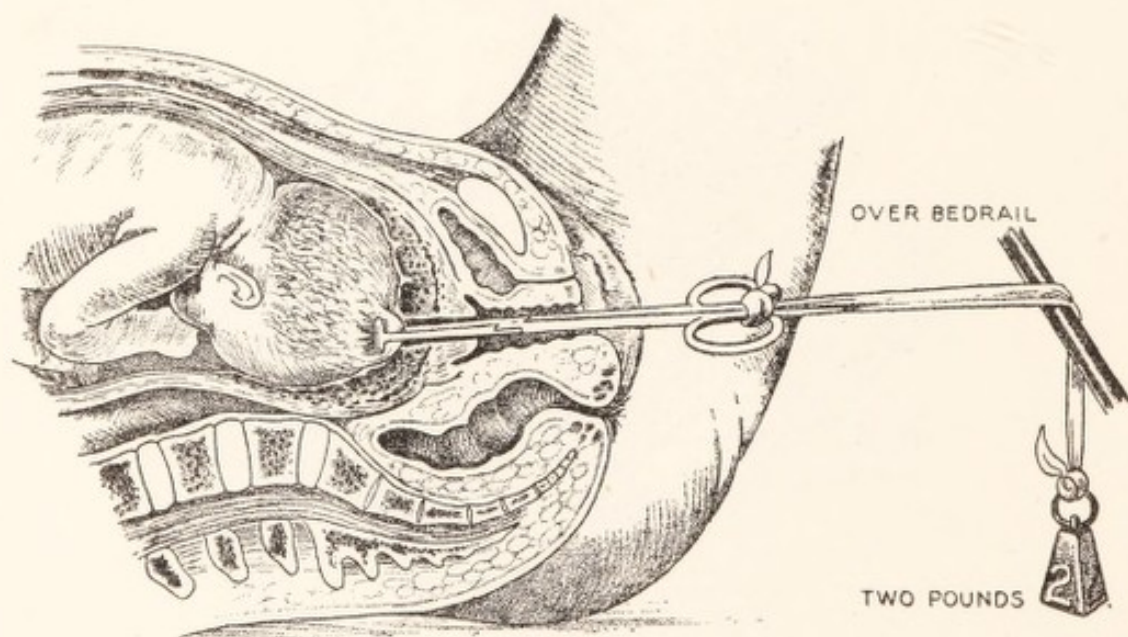
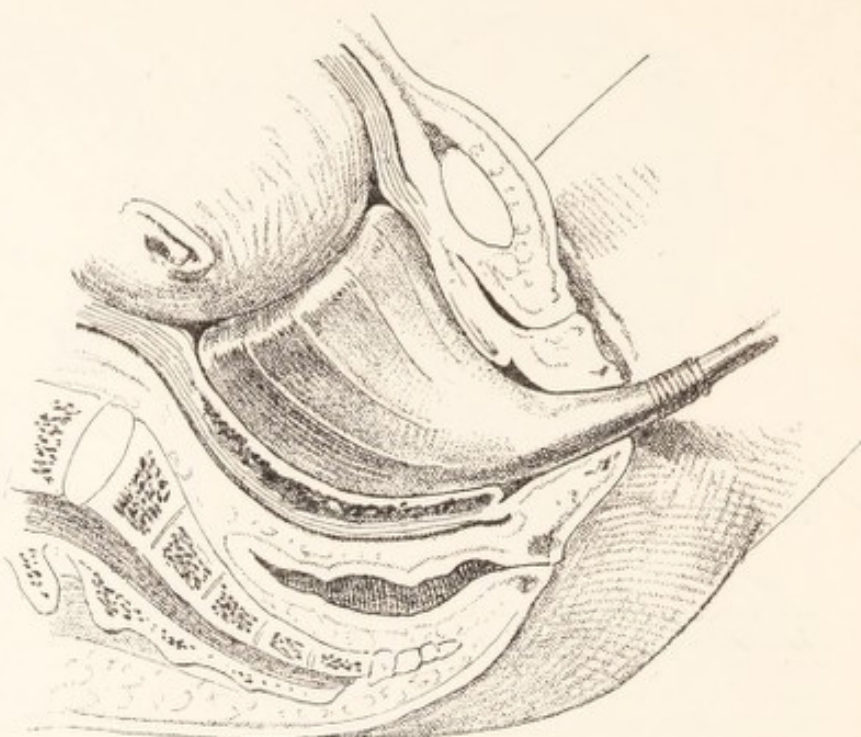


FIG. 69.—UNAVOIDABLE HÆMORRHAGE.

Showing Willett's forceps in position and making traction on the head of the child, so that its head presses on the placenta prævia and arrests the hæmorrhage.

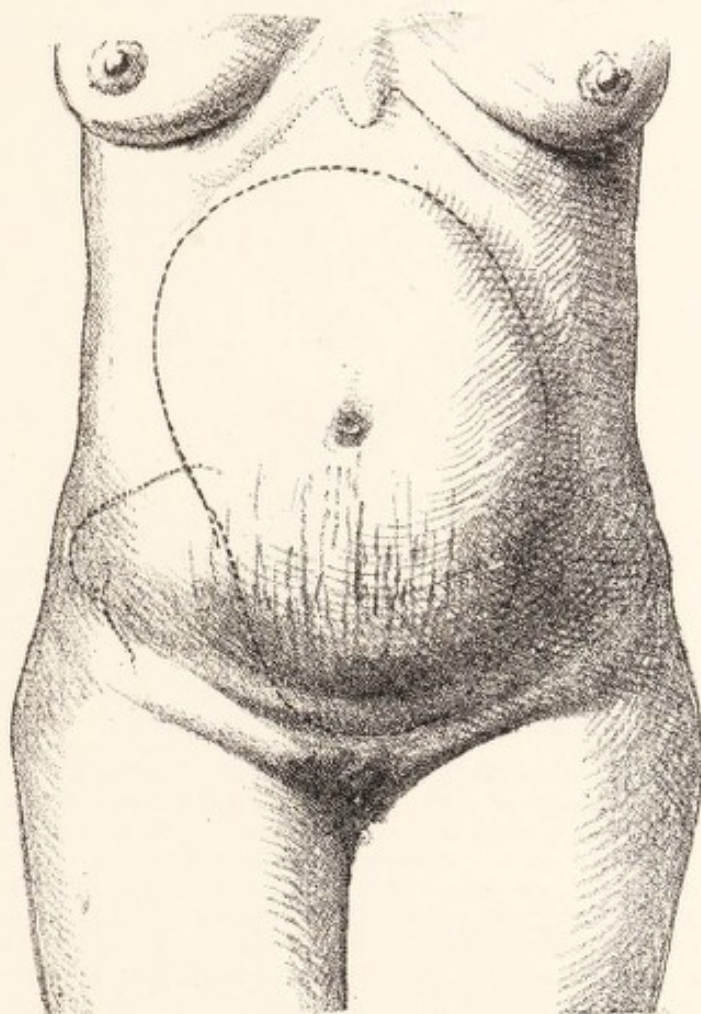


FIG. 70.—LATERAL OBLIQUITY OF THE UTERUS AT TERM.

At term the uterus lies somewhat obliquely in the abdominal cavity, leaning towards the right side of the patient.

On occasions this obliquity may be very marked, when it may be a factor in the causation of face presentation. Thus if the foetus lies with its back to the right, the uterine force, acting from right to left, will tend to push the occipito-spinal joint in the direction of the face; thus extension of the head may result.

In cases of occipito-posterior position in which the head of the child is not well flexed, by increasing the lateral obliquity of the uterus flexion of the head will be encouraged. Thus, if the position of the head is a 3rd vertex, the patient should be placed on her left side, and if a 4th vertex on her right side.

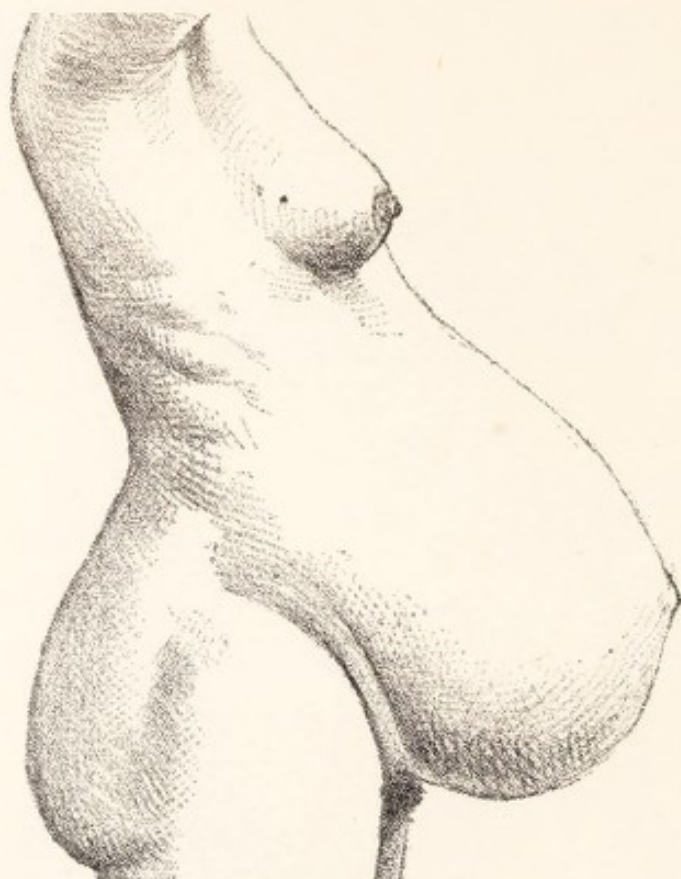


FIG. 71.—PENDULOUS ABDOMEN.

The pregnant uterus is abnormally anteverted and anteflexed. Pendulous abdomen is found most often in women who have had several children, the abdominal wall not supporting the uterus as it should do. In a primigravida a pendulous abdomen is an indication of the presence of a contracted pelvis. Even if the pelvis is normal a pendulous abdomen may cause delay in labour, because the head may be directed to one side or above the brim of the pelvis, thus preventing engagement. For the same reason descent of the umbilical cord will be favoured. Also, because of the alteration in the uterine axis, a malpresentation, generally a face, may result. In such cases the patient should be placed in bed on her back, and an abdominal binder applied. The malpresentation, if present, should if possible be corrected. Failure to treat a pendulous abdomen properly has resulted in rupture of the uterus.

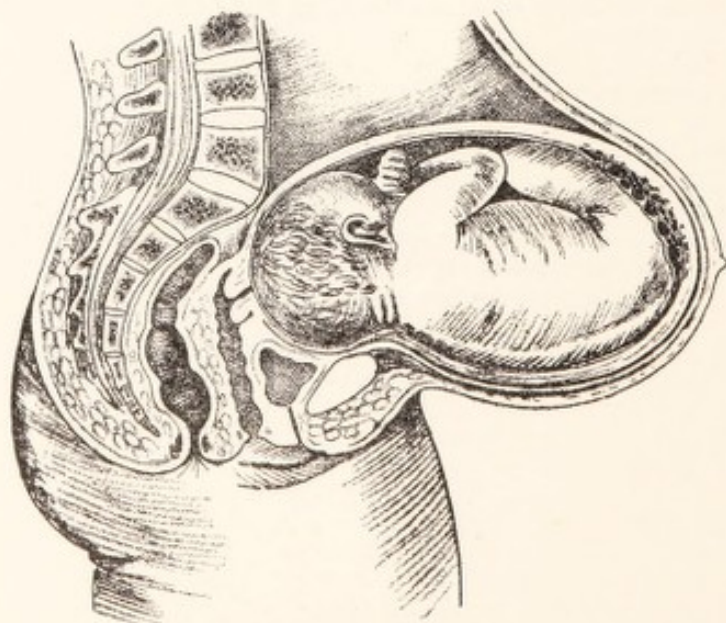


FIG. 72.—PENDULOUS ABDOMEN IN SECTION.

In this case due to contracted pelvis.

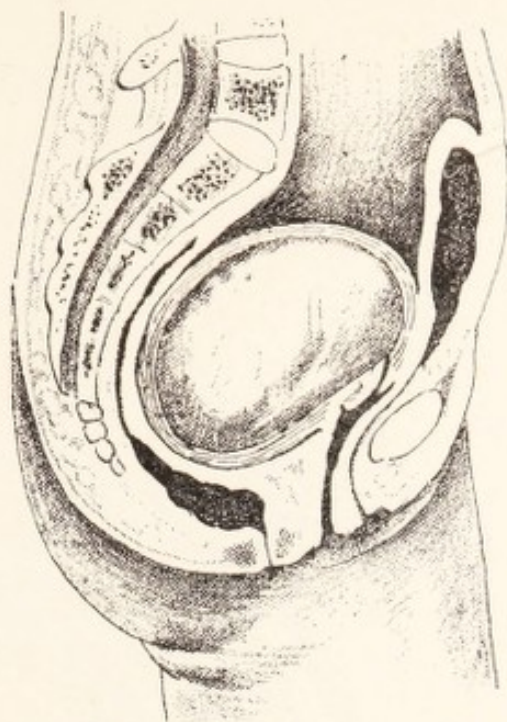


FIG. 73.—RETROVERSION AND RETROFLEXION OF A GRAVID UTERUS.

Showing the pregnant uterus displaced backwards. As a rule the uterus rights itself during the 3rd month. If the uterus does not right itself, it either empties itself (abortion), or about the 13th or the 14th week of pregnancy it becomes incarcerated, the first symptom of which is nearly always the frequent passage of a small quantity of urine (incontinence or retention).

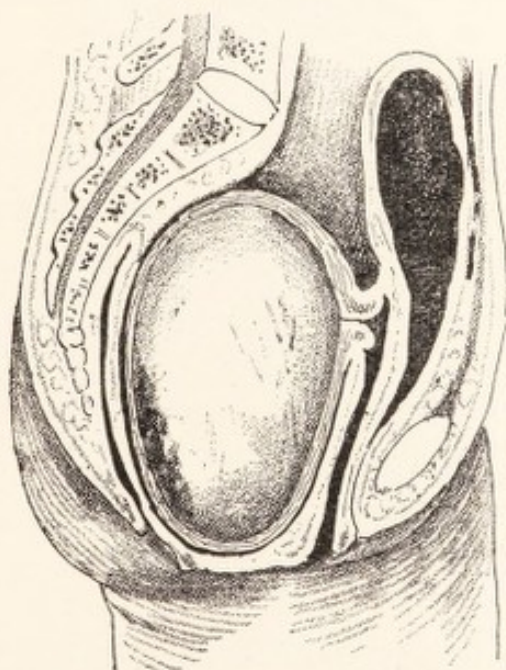


FIG. 74.—INCARCERATED AND RETROVERTED GRAVID UTERUS.

The body of the uterus is imprisoned in the hollow of the sacrum below its promontory. The neck of the uterus is pushed so far upwards and forwards that a vaginal examination, with the patient in the left lateral position, will fail to disclose the neck of the uterus. To feel the neck of the uterus in such a case, the patient must be examined on her back. As a result of this altered position of the cervix the urethra and vaginal wall are stretched, and retention of urine results.

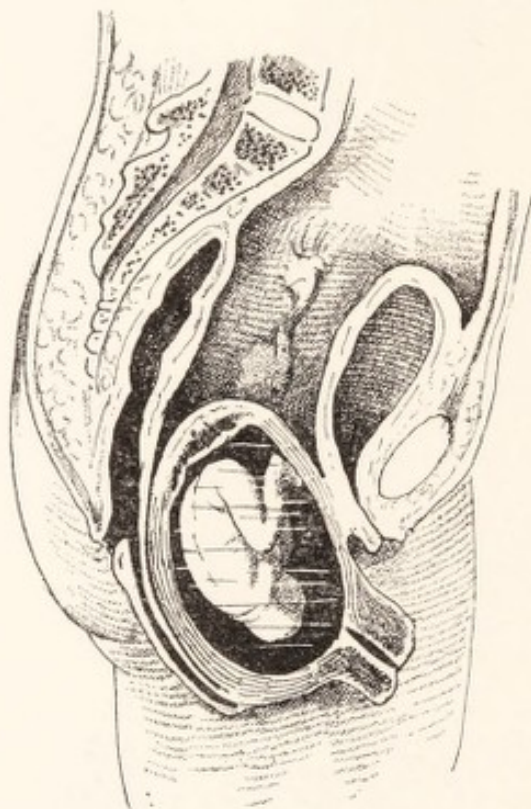


FIG. 75.—PROLAPSE OF THE GRAVID UTERUS.

The vaginal walls and the cervix protruding through the vulva; the cervix is swollen and congested. The uterus in such a case will empty itself (abortion), or, if the doctor has the opportunity, he will probably be able to replace it. When the uterus is replaced, the patient is kept in bed on her back and the foot of the bed is tilted. Later a ring pessary is inserted to prevent a repetition of the prolapse, until the pregnancy is so far advanced that prolapse cannot occur when the ring is removed.

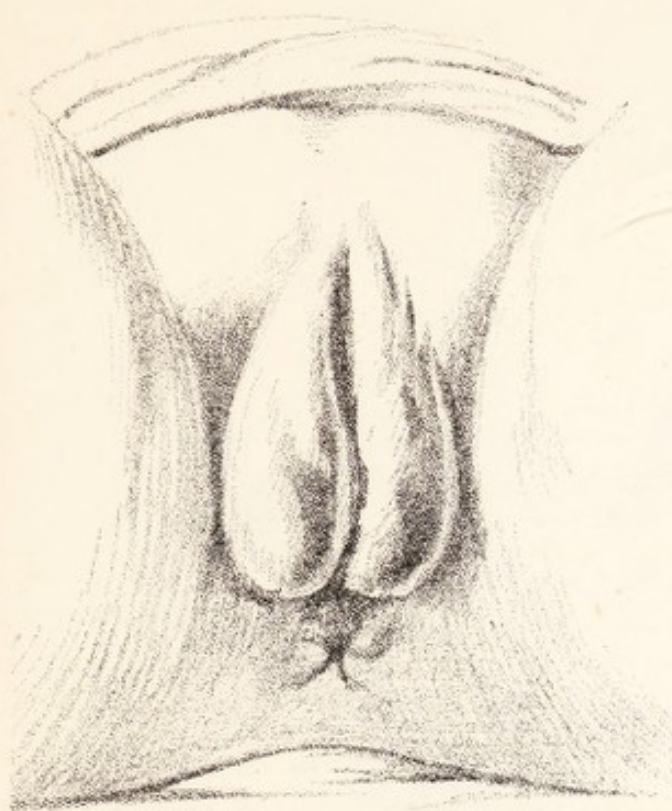


FIG. 76.—ŒDEMA OF THE VULVA.

Œdema of the vulva may precede labour, and may then be an indication of pregnancy toxæmia, chronic Bright's disease, or gonorrhœa. It may also occur during labour in those cases in which the head of the child is impacted in the pelvic cavity, because the head is too large or the pelvis is generally contracted.

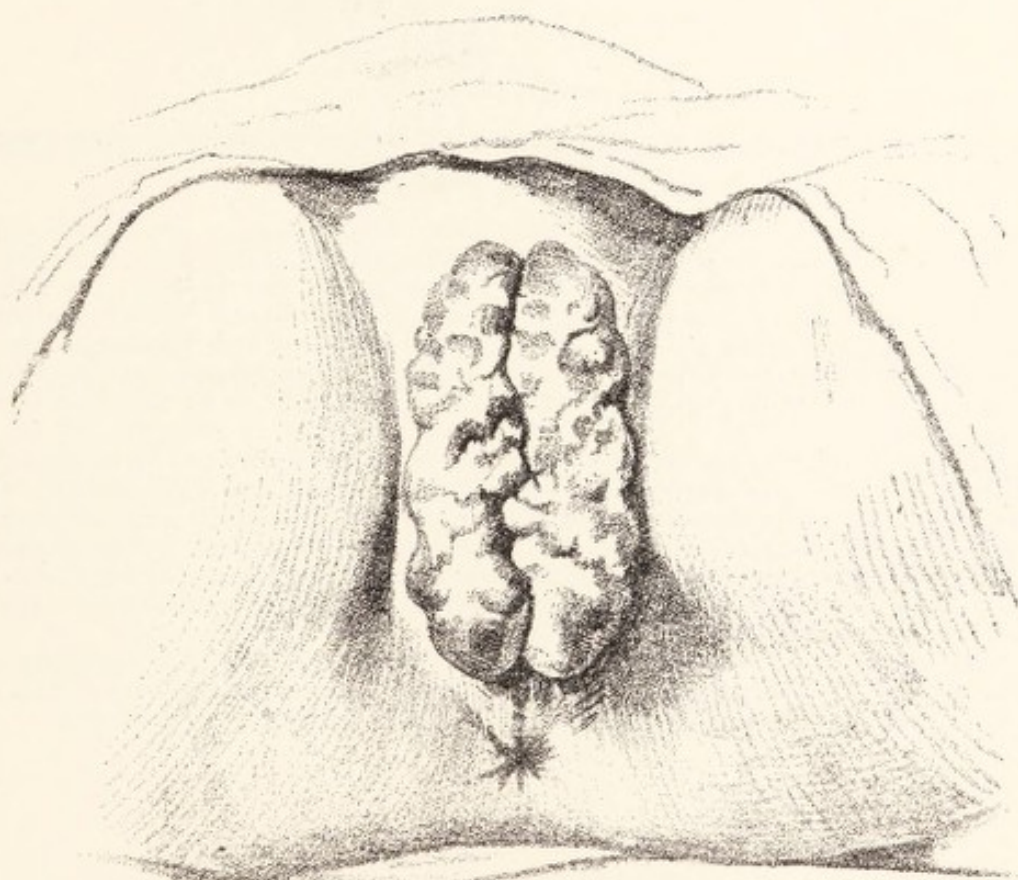


FIG. 77.—VARICOSE VEINS OF THE VULVA.

Such veins may rupture during the delivery of the child, and cause profuse external hæmorrhage, or the blood may collect under the skin and track along the side of the vagina (hæmatoma of the vulva and vagina). The hæmatoma may cause delay in the advance of the head or in the expulsion of the placenta. If the veins are very large the doctor may deem it advisable to induce labour before term. If the vein ruptures externally the bleeding can be at once stopped by pressure, if not it may be fatal. If it ruptures internally and before the birth of the child, the doctor will deliver the child as soon as he can with safety.

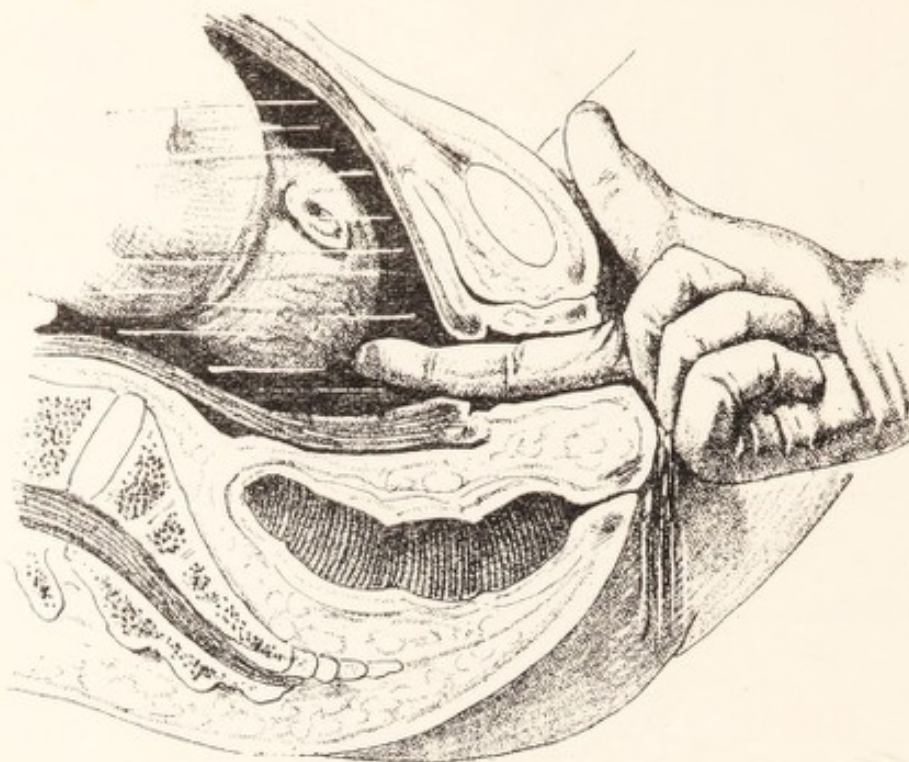


FIG. 78.—HYDRAMNIOS: PUSHING UP THE HEAD TO ALLOW THE LIQUOR AMNII TO ESCAPE.

There are two varieties of hydramnios, acute and chronic. The acute variety is rare, generally supervenes about the middle of pregnancy, and is frequently associated with uniovular twins. If the liquor amnii accumulates very quickly, the abdominal walls become oedematous and there is great pain and vomiting. Since the condition is a source of danger to the patient, impeding the action of the diaphragm and lungs, the pregnancy must forthwith be terminated. This can be accomplished by perforating the membranes, and then pushing up the head of the child so as to allow the liquor amnii to escape.

The chronic variety comes on later in pregnancy. The effect on the mother depends upon the amount of liquor amnii secreted. The symptoms and signs which are due to pressure do not, as a rule, cause much trouble; if they do, pregnancy must be terminated. The foetus is often deformed or dead. In the chronic variety labour is apt to be premature, malpresentation of the child or descent of the umbilical cord may result, the uterus may be sluggish or exhausted, leading to post-partum hæmorrhage if not correctly treated, and after-pains are marked.

A modern method of treatment is to reduce the amount of liquor amnii by passing a trochar through the abdominal wall and uterus into the amniotic cavity. In a certain number of cases this treatment is successful, and the patient goes to term.

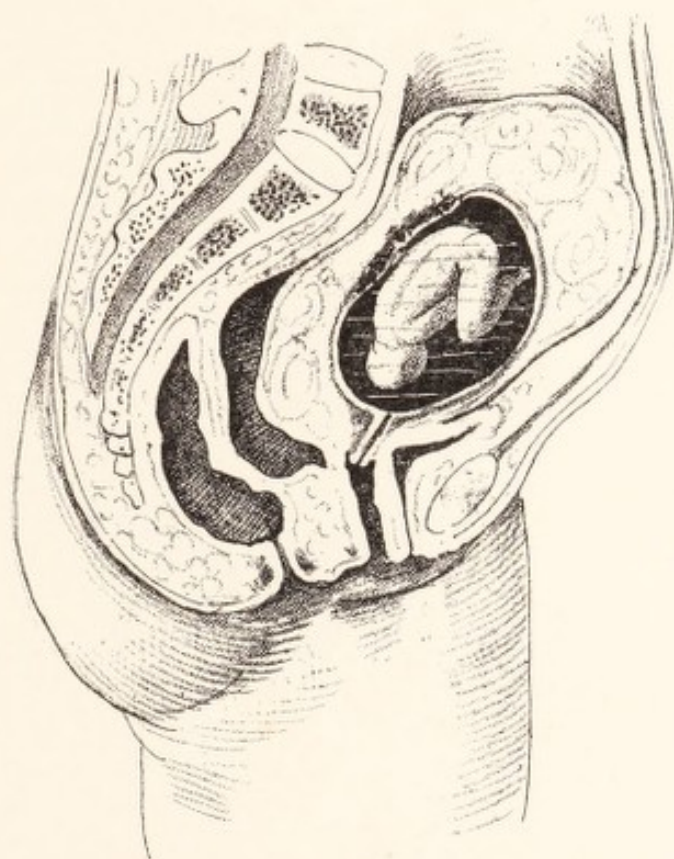


FIG. 79.—FIBROID TUMOURS IN A GRAVID UTERUS.

A fibroid tumour (or tumours) in a gravid uterus does not, as a rule, cause any trouble. Even if the tumour appears to be in such a position that the descent of the presenting part into the pelvis will be prevented, the tumour will in nearly all cases rise up out of the way as pregnancy advances. Occasionally, when it is situated in the cervix, a fibroid tumour may prevent the advance of the child, in which case Cæsarian section may be necessary. Rarely the tumour undergoes red degeneration, when it may have to be removed. It is surprising how seldom a fibroid is responsible for post-partum hæmorrhage. During the puerperium a fibroid may be the source of serious bleeding, or it may become septic.

SECTION III

LABOUR

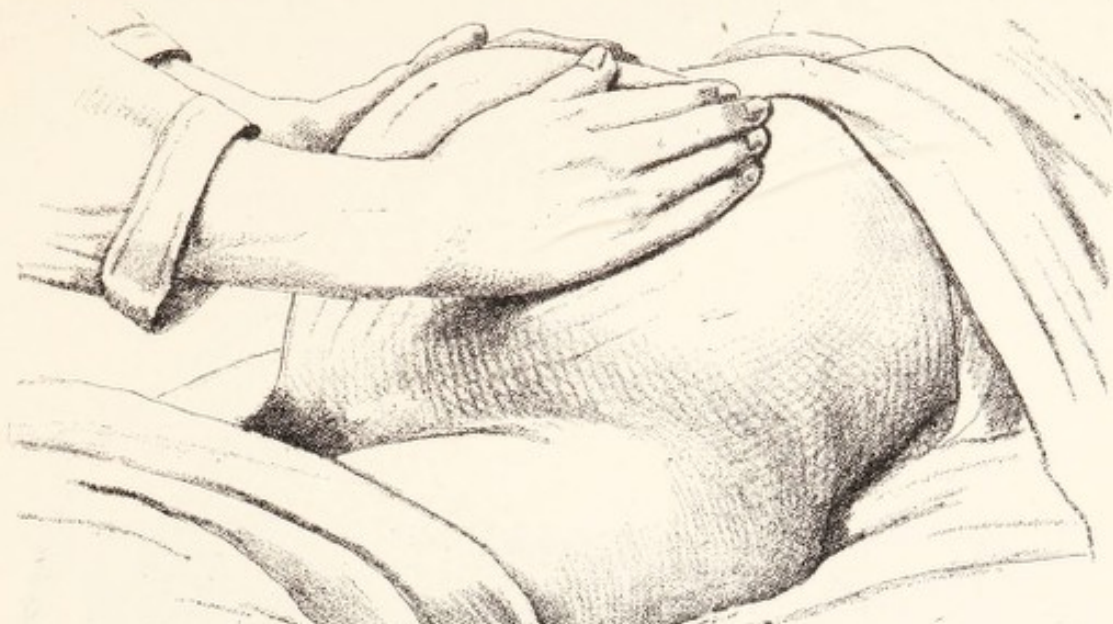


FIG. 80.—ABDOMINAL PALPATION—I.

The upper part of the uterus is palpated to ascertain which part of the child is at the fundus, since, unless the lie is an oblique one, it must be either the head or the breech. The patient is on her back, her nightgown is drawn up, and the examiner faces the head of the patient, standing on her right side. The head of the child is harder rounder, and smoother than the breech, and can be pushed from side to side without moving its body, because it is attached to the body by the neck. If the breech is at the fundus an irregular, soft body will be felt, apparently one with the back of the child, and which cannot be pushed from side to side.



FIG. 81.—ABDOMINAL PALPATION—II.

The sides of the uterus are next palpated, the examiner facing the head or feet of the patient and standing on her right side. If the lie of the child is longitudinal, greater resistance due to the back of the child will be found on one side than the other, and this will denote to which side the back is turned. On the side opposite to that of the greatest resistance irregular knobs will be felt, denoting the limbs. The diagnosis can be verified by placing one hand on the fundus of the uterus and pressing the sides of the abdomen with the other, when the fundus will move. It moves the most when pressure is applied to that side to which the back is directed. If the child is lying obliquely, a hard, round, smooth body indicating the head will be felt on one side, and a softer, irregular, and somewhat larger body indicating the breech on the other, at slightly different levels.

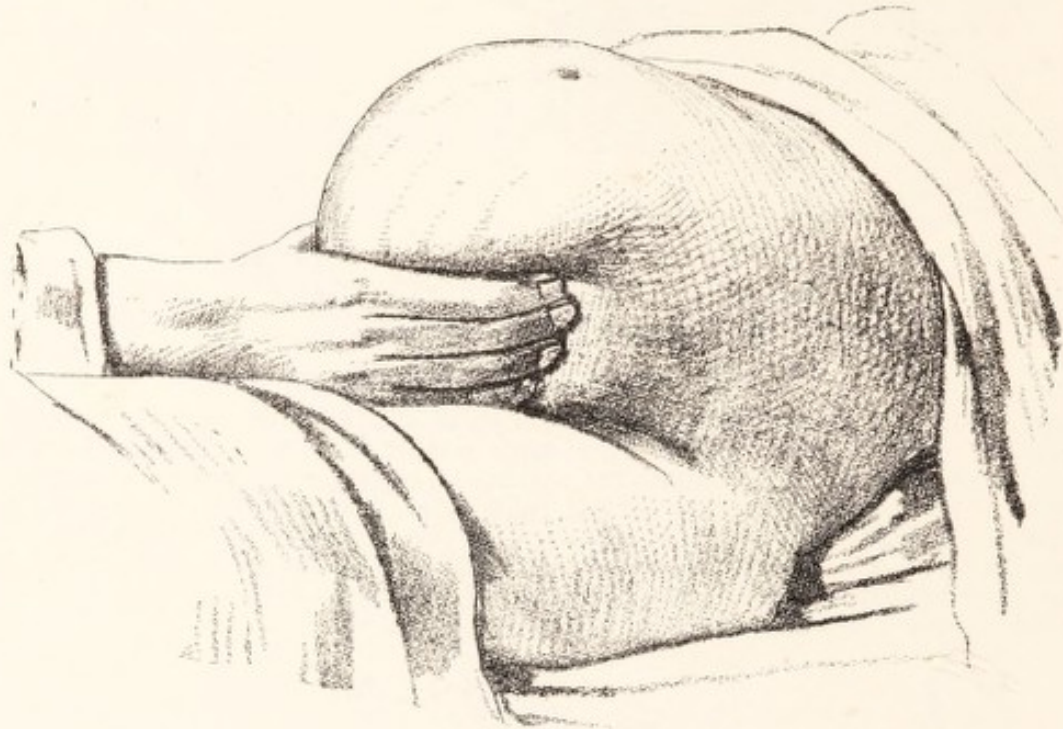


FIG. 82.—ABDOMINAL PALPATION—III.

Next the lower part of the uterus is examined, partly to confirm the impression that has already been obtained with respect to the lie and presentation of the child, and, presuming the lie is longitudinal, to ascertain the relation of the presenting part to the brim of the pelvis. The presenting part situated at the lower part of the uterus is grasped with the fingers and thumb of the right hand, the examiner facing the head of the patient and standing on her right side. If the presenting part can be moved from side to side, this is an indication that it has not entered the brim of the pelvis. In a primigravida, the head, as a rule, enters the brim of the pelvis at the 36th week or even before; in a multipara, often not until labour has started. The following conditions may prevent the presenting part entering the brim of the pelvis before or at the commencement of labour: most commonly a 3rd or 4th vertex position; otherwise a face, brow, or uncomplicated breech presentation, obliquity of the uterus, pendulous abdomen, placenta prævia, hydramnios, hydrocephalus, contracted pelvis, and an ovarian or fibroid tumour. The breech, unless the legs are extended, does not enter the brim of the pelvis before labour.

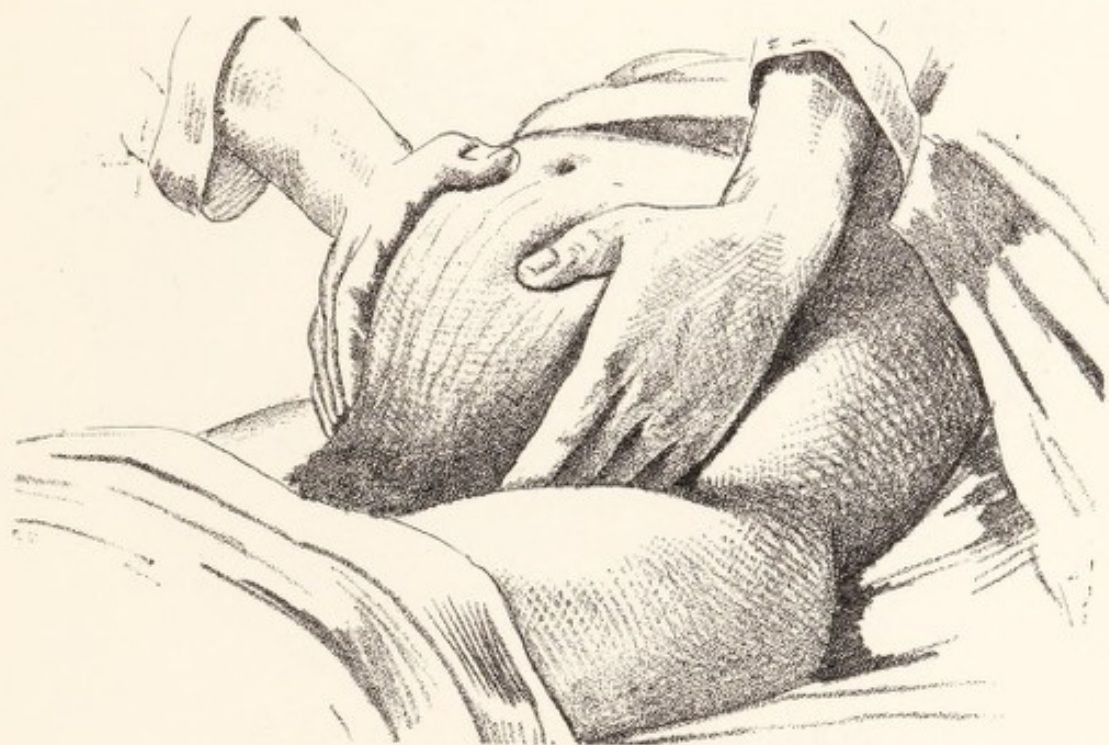


FIG. 83.—ABDOMINAL PALPATION—IV.

Lastly, the presentation situated at the lower part of the uterus is palpated. The examiner faces the feet of the patient, standing on her right side. The fingers of both hands are pressed down into the pelvis as far as possible. If the lie is longitudinal and the head of the child lowest, and the fingers of the hand which is over the child's back dip down the farthest, the presentation is a vertex; if they do not dip down so far, the presentation is a face or a brow, in which case a depression can be felt between the back of the child and its head.

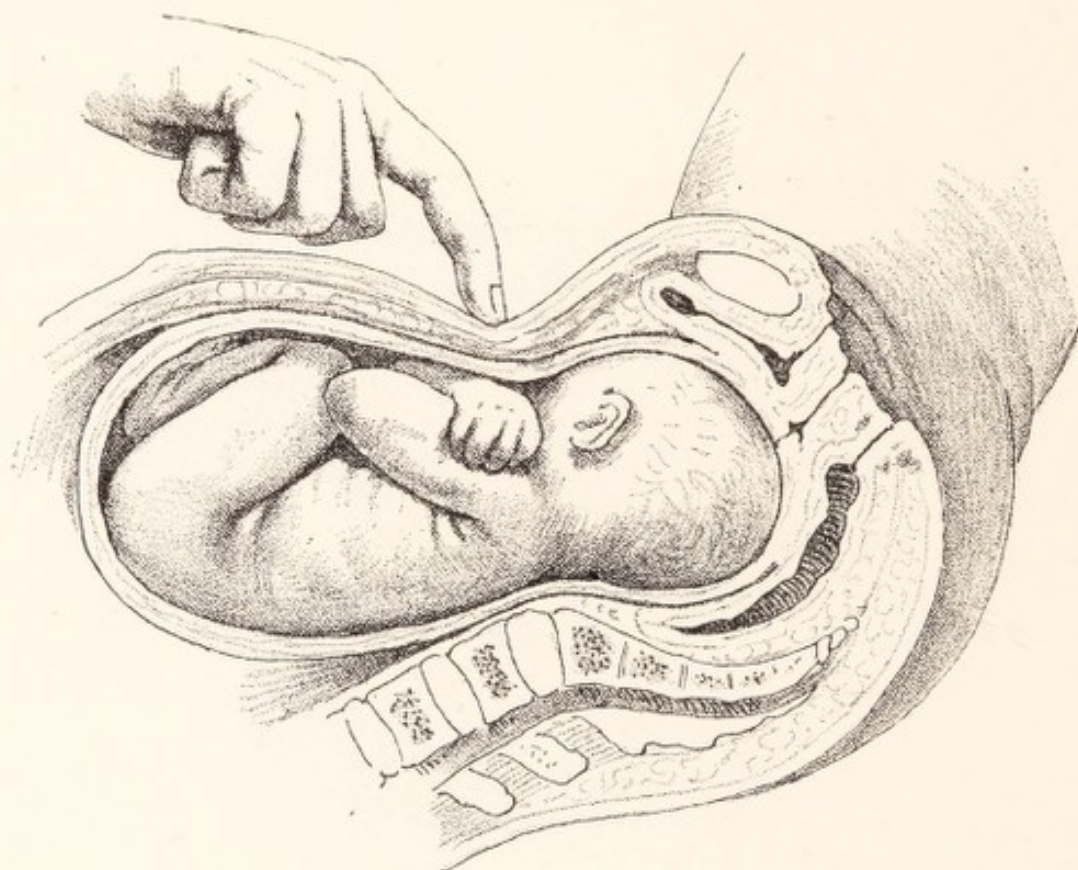


FIG. 84.—ABDOMINAL PALPATION—V.

As a rule, if the presentation is a vertex and the position a 1st or 2nd, the anterior shoulder can be felt by palpating with the index finger between the umbilicus and symphysis pubis. In a 3rd or 4th vertex, however, if the finger is pressed into the abdominal wall, it will sink deeply without meeting with any resistance. The reason is that the anterior shoulder is turned from the middle line. In appearance the abdomen is flatter, especially below the umbilicus.

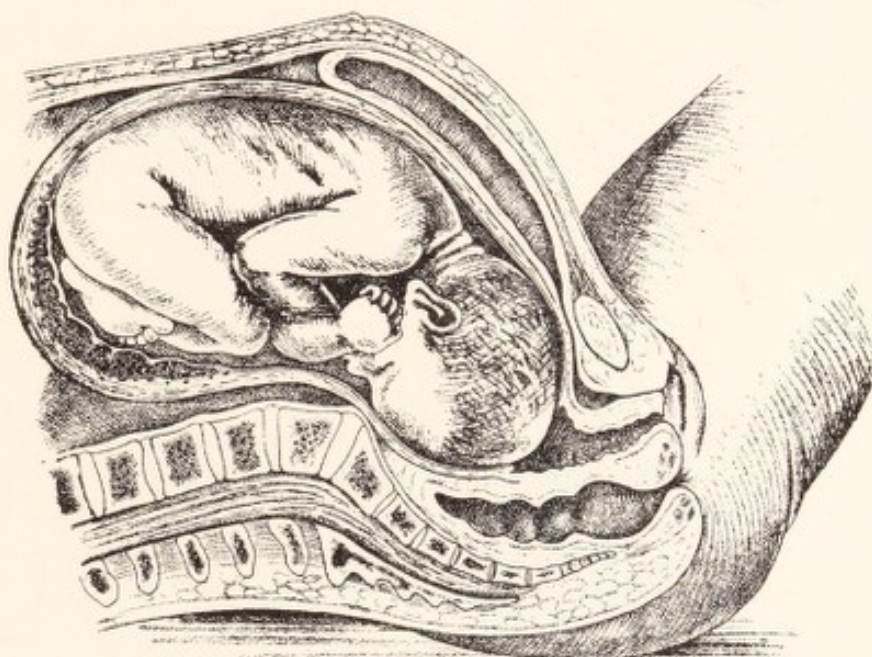


FIG. 85.—FULL BLADDER DURING LABOUR.

The midwife must be sure that the bladder is emptied during the 1st stage of labour. If not, there is a frequent desire to pass urine, and the normal contractions of the uterus are prevented (sluggish uterus). It will be noticed that if the hand is pressed on the abdomen above the navel a ridge caused by the full bladder is felt. This on occasions has been diagnosed as a case of obstructed labour because, the child not being expelled, the ridge is mistaken for the ring of Bano. An absurd diagnosis, since in obstructed labour the uterus will have been contracting very strongly for many hours and the general condition of the patient will be very serious. The bladder should be emptied by a soft rubber catheter.

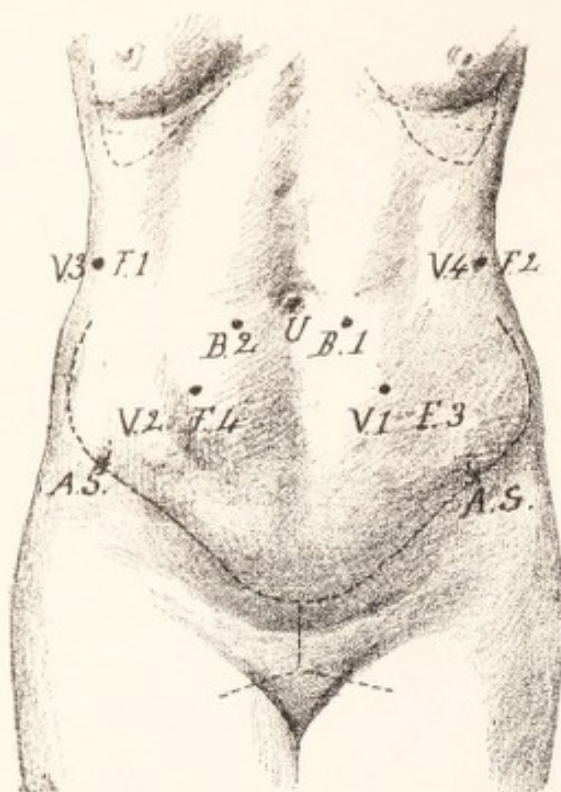


FIG. 86.—AUSCULTATION.

U. The umbilicus.

A.S. Anterior superior spine of ilium.

V. 1. F. 3. Half-way between the umbilicus and left anterior superior spine of ilium.

V. 2. F. 4. Half-way between the umbilicus and right anterior superior spine of ilium.

V. 3. F. 1. Between the ribs and crest of ilium on the right side.

V. 4. F. 2. Between the ribs and crest of ilium on the left side.

B. 1. Level with or a little above the umbilicus an inch or so to the left.

B. 2. Level with or a little above the umbilicus an inch or so to the right.

The foetal heart-sounds can first be heard between the 20th and 24th week of pregnancy, and then only with a stethoscope. During the last 2 months the foetal heart-sounds can be heard by resting the ear on the abdomen covered by a thin towel. The heart-sounds are heard distinctly through that part of the chest which is nearest the anterior wall of the uterus. Thus, in a 1st and 2nd vertex and a 1st and 2nd breech presentation they are heard distinctly in front through the back of the chest, and in a 3rd and 4th face presentation in front through the front of the chest. In a 3rd and 4th vertex, 1st and 2nd face, and 3rd and 4th breech presentation the chest is nearest the posterior wall of the uterus, and it is often very difficult to hear the heart-sounds, and if they are heard at all, in the 3rd and 4th vertex and the 1st and 2nd face presentation they will only be heard faintly well out in the flank between the ribs and crest of the ilium, and in a 3rd and 4th breech presentation in the flanks if at all. In a 1st and 2nd breech the heart-sounds are heard best on a level with, or a little above and external to, the umbilicus. In a 1st and 2nd breech presentation, with extended legs, the heart-sounds will be heard best below the umbilicus, the body of the child having sunk a little, because the breech is able to enter the pelvis before labour.

If the heart-sounds cannot be heard when and where they should be, the child may be dead or the woman may not be pregnant, but it not infrequently happens that the sounds can be heard only on repeated examination. In twins, two sets of heart-sounds should be heard. In order to be sure that there are twins, and that the attendant is not listening to the well-diffused sounds of one heart, the rate at different spots can be counted. It is true that the heart might have altered its rate of beat, but if the rate is again counted at the first spot and is found to be the same, this is presumptive evidence that there are two hearts. Another method is to listen at the point of maximum intensity and then gradually to move the stethoscope; if the heart-sounds first become fainter and then stronger as the second point of maximum intensity is approached, this will confirm the diagnosis. It is important to make a note of the foetal heart-rate when labour starts, and for every hour after during the 1st stage, and for every half-hour during the 2nd stage. Any danger to the life of the child from interference with its placental circulation will then be early recognized by a marked alteration in the rate. The most certain signs of a live child are the foetal heart-sounds. They must not be confused with the mother's heart-sounds, transmitted from the aorta, which can be checked by "taking the pulse" at her wrist. Other sounds which may be heard are the uterine souffle, foetal movements, and those of gases or fluids in the mother's intestines. It is stated that there is more chance of the child being a male if the foetal heart-rate is 120 or below. If there is any truth in this, it is perhaps due to the fact that the larger the child the slower and stronger will its heart beat.

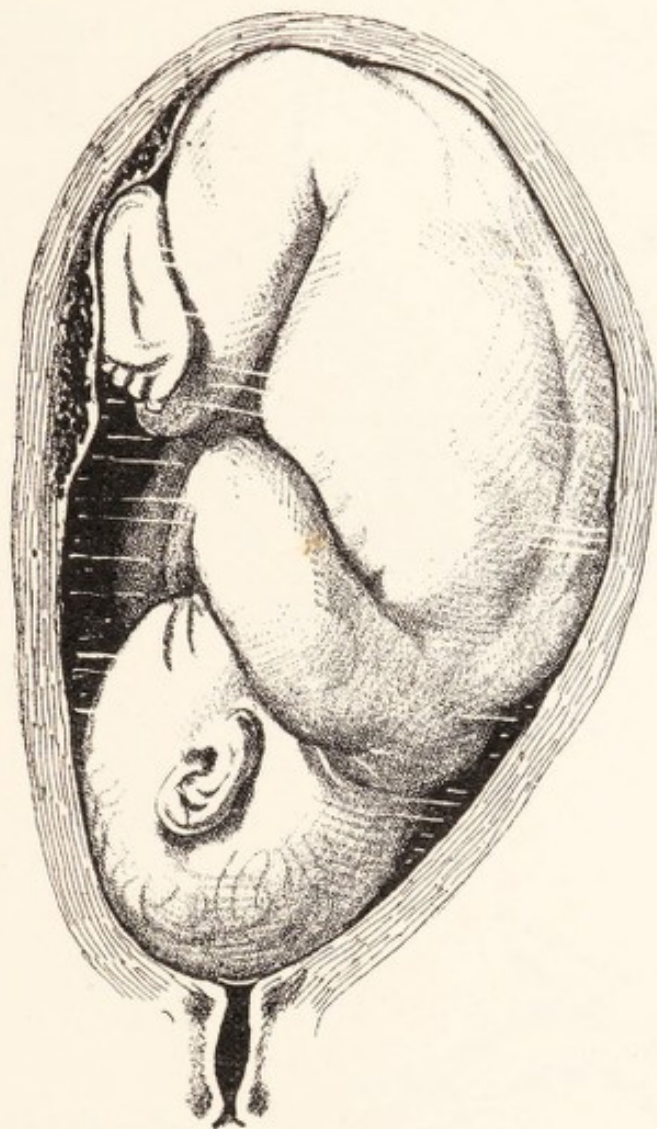
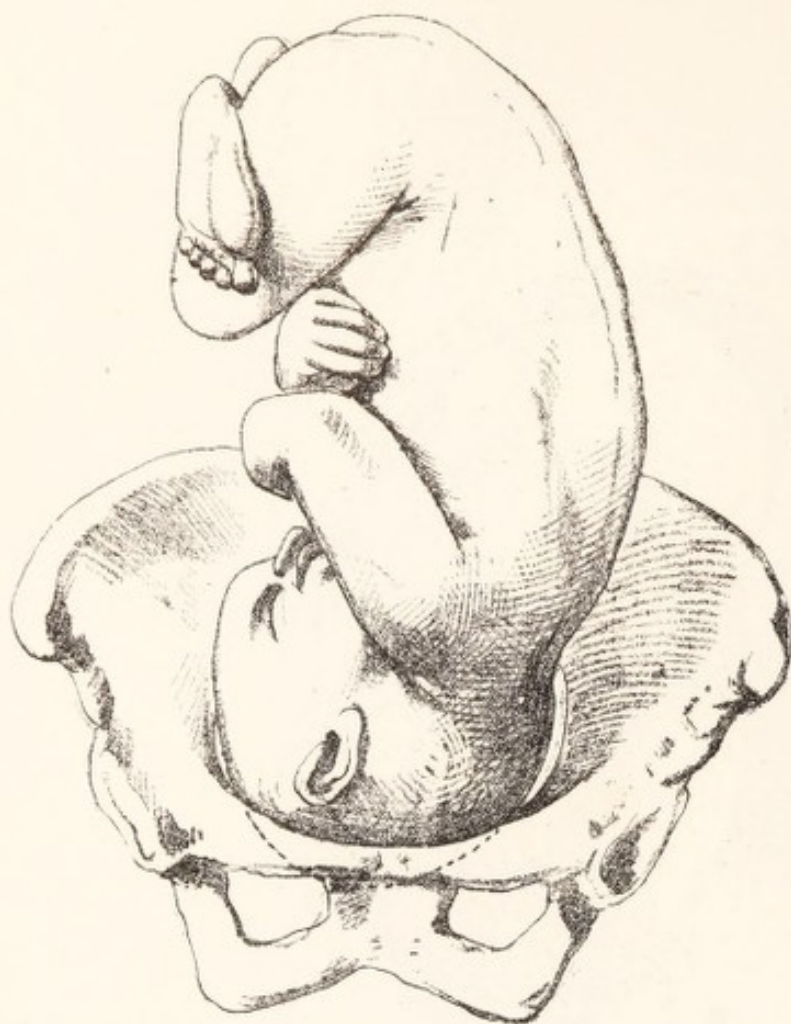


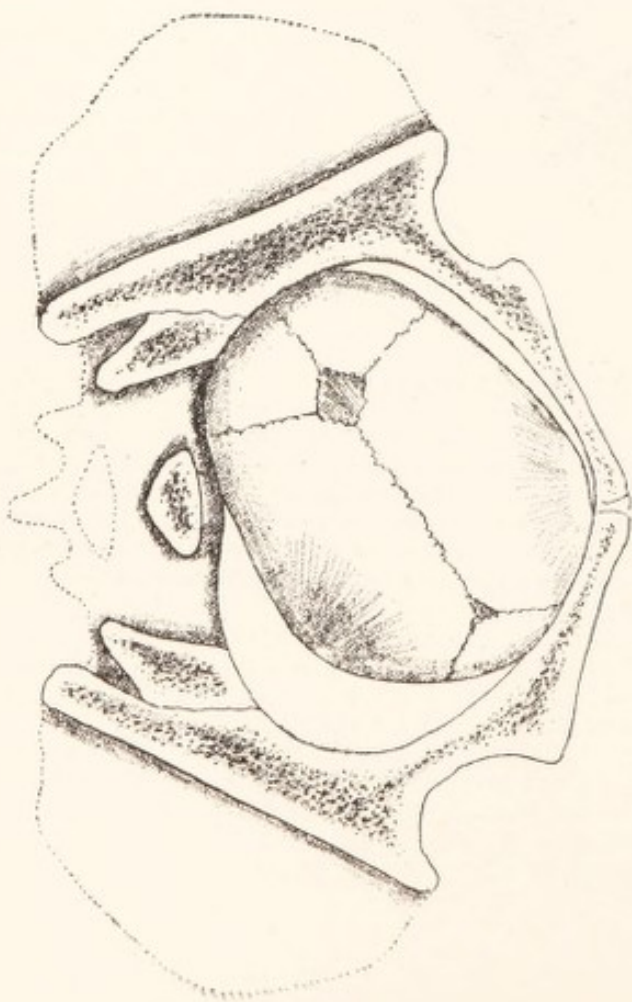
FIG. 87.—VERTEX PRESENTATION.

The lie of the child is longitudinal and the head is flexed on the trunk. The presenting part extends from the junction of the head with the neck to the centre of the anterior fontanelle, the diameter being the sub-occipito-bregmatic of $3\frac{1}{4}$ inches. In women at term, 95 per cent. of the children present by the vertex. This is due to the fact that the specific gravity of the head is greater than that of the breech, and the shape of the child when the head presents conforms more nearly to that of the uterus.



**FIG. 88.—FIRST VERTEX:
RELATION OF THE
CHILD TO THE PELVIS
AS SEEN FROM ABOVE.**

The lie is longitudinal, the head is flexed on the trunk and has entered the brim. The back of the child points to the left and is in front. The vertex is presenting. The occiput rotates forwards $\frac{1}{4}$ inch of a circle.



**FIG. 89.—RELATION OF THE PRE-
SENTING PART TO THE PELVIS
AS SEEN FROM BELOW.**

The position is a left occipito-anterior. The long diameter of the head, as recognized by the sagittal suture, is in the right oblique diameter of the pelvis. The occiput points forward and to the left. The posterior fontanelle is in front.

FIG. 90.—SECOND VERTEX: RELATION OF THE CHILD TO THE PELVIS AS SEEN FROM ABOVE.

The lie is longitudinal, the head is flexed on the trunk and has entered the brim. The back of the child points to the right and is in front. The vertex is presenting. The occiput rotates forwards $\frac{1}{8}$ of a circle.

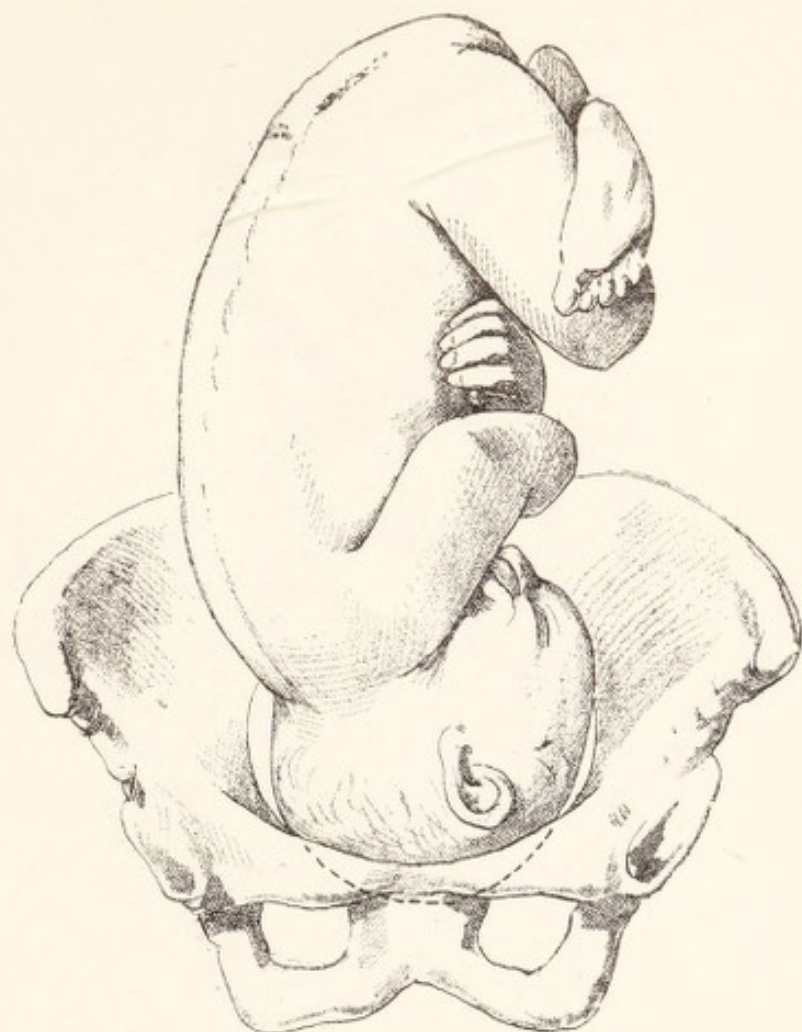


FIG. 91.—RELATION OF THE PRESENTING PART TO THE PELVIS AS SEEN FROM BELOW.

The position is a right occipito-anterior. The long diameter of the head, as recognized by the sagittal suture, is in the left oblique diameter of the pelvis. The occiput points forward and to the right. The posterior fontanelle is in front.

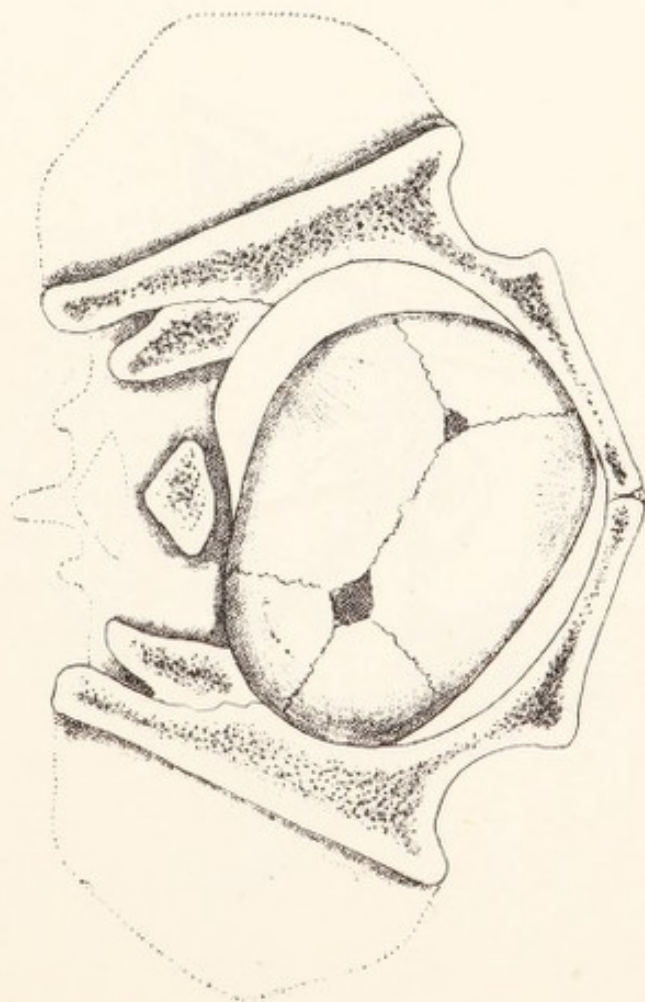




FIG. 92.—THIRD VERTEX: RELATION OF THE CHILD TO THE PELVIS AS SEEN FROM ABOVE.

The lie of the child is longitudinal, the head is flexed on the trunk and has entered the brim. The back of the child points to the right and is behind. The vertex is presenting. The head may not enter the pelvis, owing to deflexion, till labour has started. The occiput rotates forwards $\frac{1}{8}$ inch of a circle, except in cases of persistent occipito-posterior, when it has rotated $\frac{1}{8}$ inch of a circle back into the hollow of the sacrum.

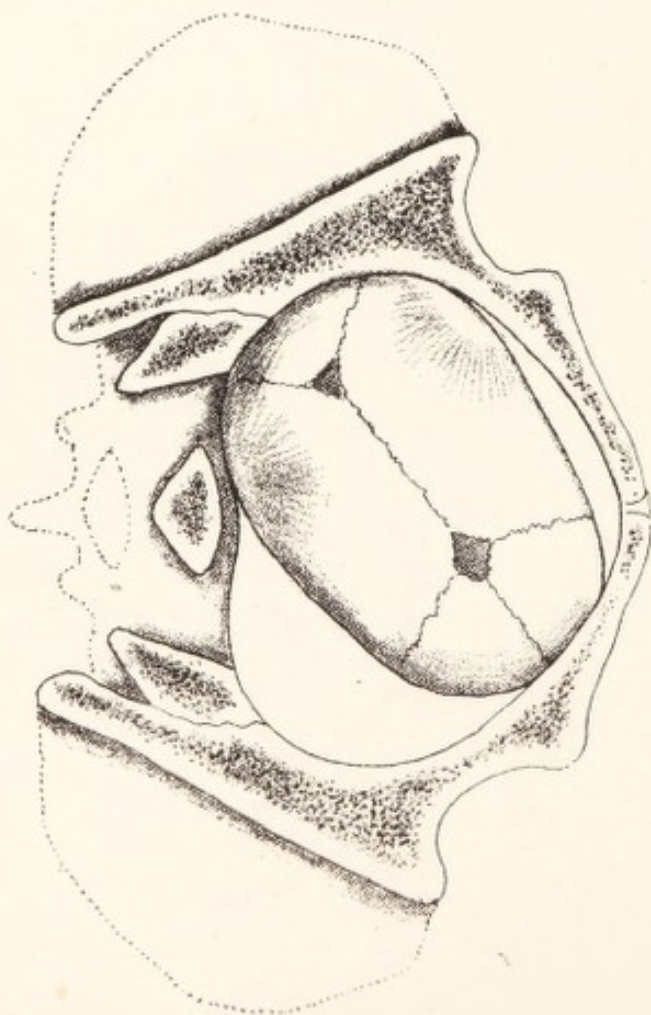


FIG. 93.—RELATION OF THE PRESENTING PART TO THE PELVIS AS SEEN FROM BELOW.

The position is a right occipito-posterior. The long diameter of the head, as recognized by the sagittal suture, is in the right oblique diameter of the pelvis. The occiput points backward and to the right. The posterior fontanelle is behind.

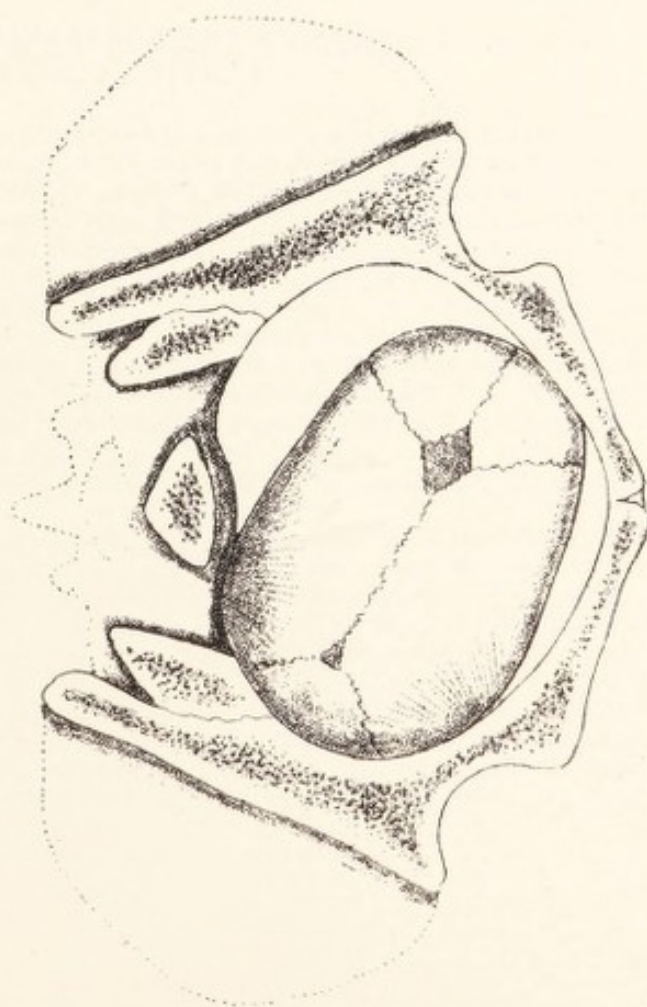
FIG. 94.—FOURTH VERTEX : RELATION OF THE CHILD TO THE PELVIS AS SEEN FROM ABOVE.

The lie of the child is longitudinal, the head is flexed and has entered the brim. The back of the child points to the left and is behind. The vertex is presenting. The head may not enter the pelvis, owing to deflexion, till labour has started. The occiput rotates forwards $\frac{1}{8}$ inch of a circle, except in cases of persistent occipito-posterior, when it has rotated back $\frac{1}{8}$ inch of a circle into the hollow of the sacrum.



FIG. 95.—RELATION OF THE PRESENTING PART TO THE PELVIS AS SEEN FROM BELOW.

The position is a left occipito-posterior. The long diameter of the head, as recognized by the sagittal suture, is in the left oblique diameter of the pelvis. The occiput points backward and to the left. The posterior fontanelle is behind.



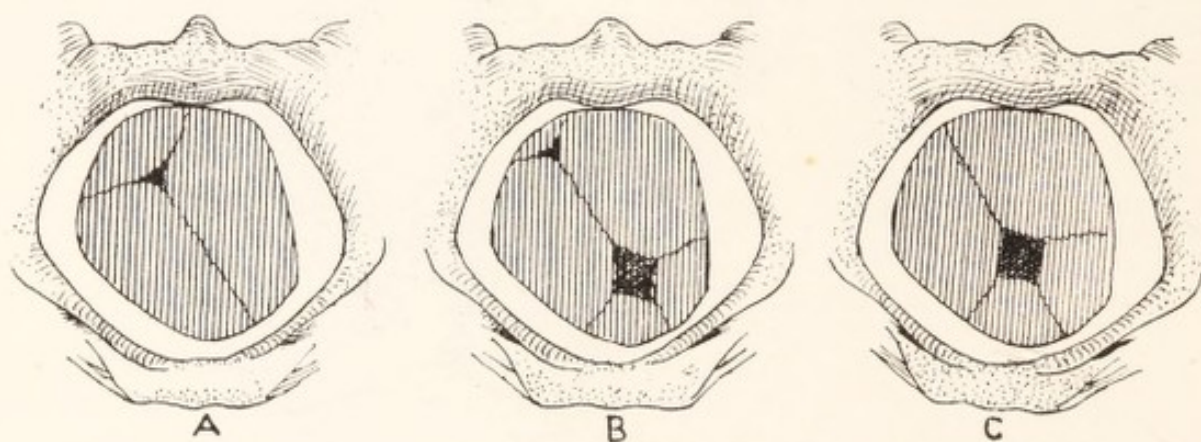


FIG. 96.—POSITION OF THE FONTANELLES IN A VERTEX POSITION IN VARYING CIRCUMSTANCES.

- A. When the head is completely flexed.
- B. When the flexion of the head is deficient.
- C. Deflexion. The head has become unflexed, and the occipito-frontal is engaging, the position leading to an unreduced occipito-posterior position.

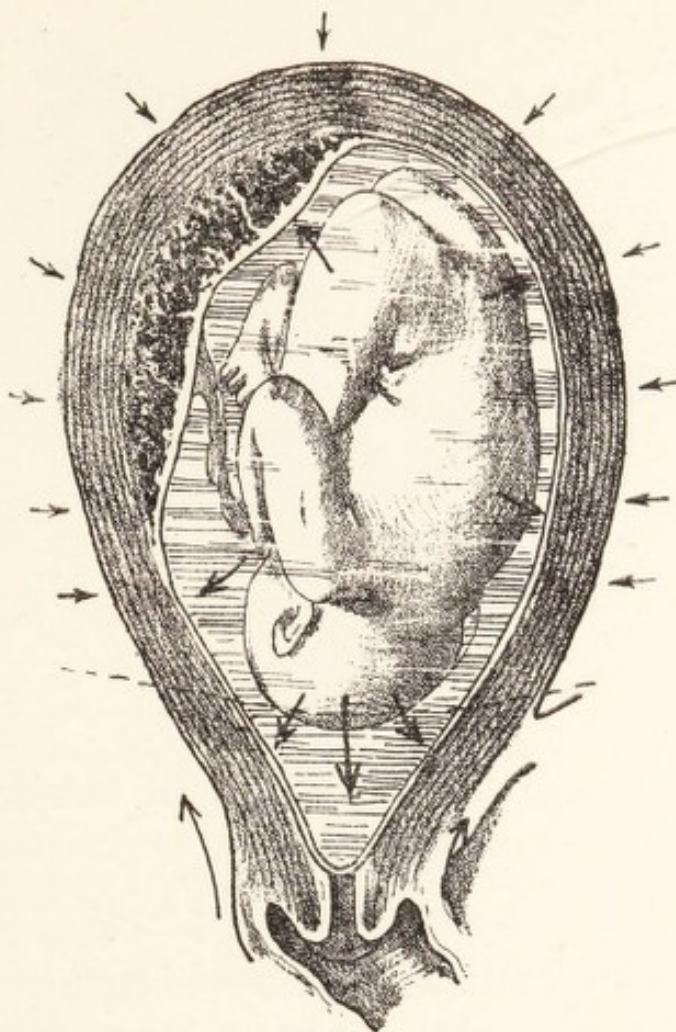


FIG. 97.—GENERAL INTRA-UTERINE PRESSURE.

The general intra-uterine pressure is acting in the 1st and 2nd stages of labour. It is the pressure of the uterus on the liquor amnii. In the 1st stage it assists in dilating the cervical canal. The three lower arrows inside the uterus show how the pressure is principally exerted on the lower part of the amnion and chorion, with the result that this portion becomes detached and forms the bag of membranes. The commencement of this separation is indicated by the show, which is composed of blood from the blood-vessels between the decidua and the chorion, which have been torn, and the mucus which was in the cervical canal. The two lower arrows outside the uterus show how the dilatation of the cervical canal is assisted by retraction of the longitudinal muscles. In normal labour the membranes rupture when the cervix is fully dilated. This usually takes in a primipara 16 hours, and in a multipara 12 hours.

In the 2nd stage of labour the general intra-uterine pressure acts as a guiding force, keeping the child in the best position for delivery.

This illustration also shows how the liquor amnii protects the placental circulation from undue interference during labour.

Premature rupture of the membranes may delay labour by the supervention of the complication known as the sluggish uterus, due to the fact that the presenting part does not stretch the cervix so well as the bag of membranes. In addition, descent may be hindered by the anterior lip of the cervix being nipped between the head of the child and the symphysis pubis of the mother and becoming oedematous, when it must be pushed over the head in an interval of a pain. The cervix may also be badly lacerated with, perhaps, serious bleeding. A further disadvantage is that the placental circulation is disturbed more often than normal by the stronger and more numerous contractions of the uterus, and so the child runs the risk of being asphyxiated. The guiding force is also lost, which increases the risk of a ruptured perineum.

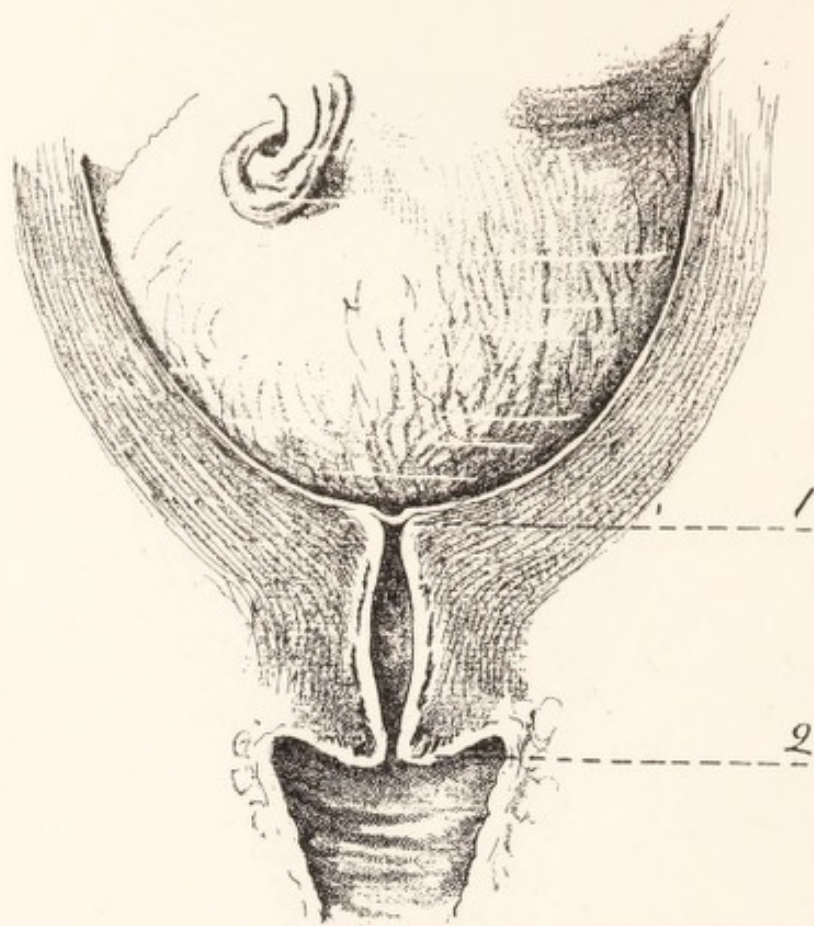


FIG. 98.—COMMENCING DILATATION OF THE CERVIX IN A PRIMIPARA.

When labour starts in a primipara, the distance between the internal os and the external os is 1 inch (1 to 2).

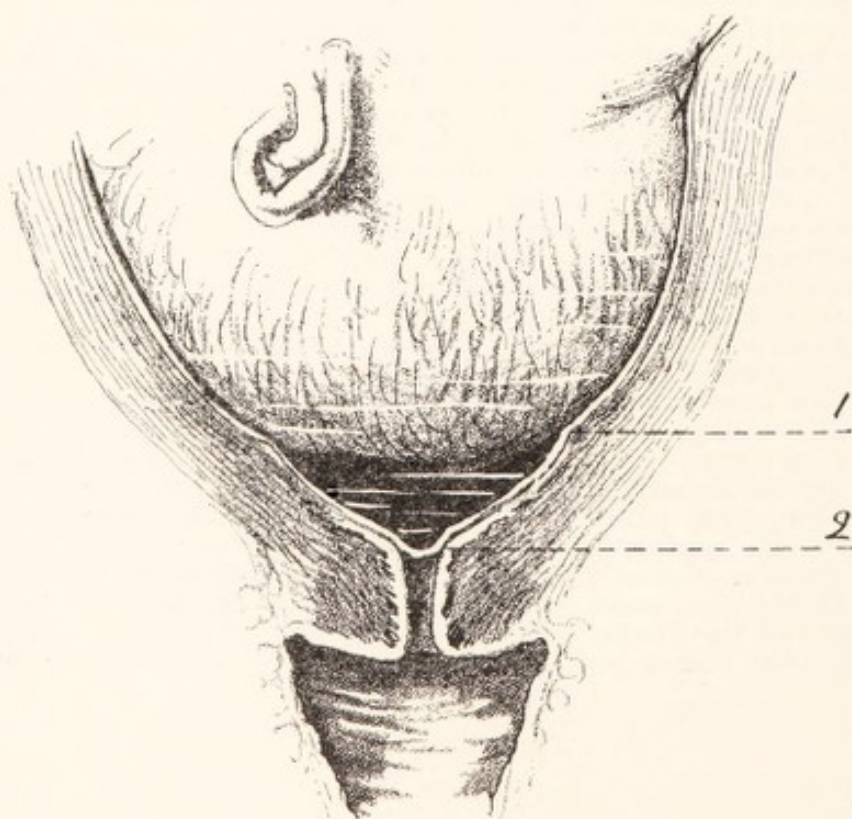


FIG. 99.—FURTHER DILATATION OF THE CERVIX IN A PRIMIPARA.

As labour progresses the internal os becomes partially dilated owing to the relaxation of the circular muscle fibres in its vicinity and the retraction of the longitudinal muscle fibres dragging upon the edges. As a result the upper part of the cervical canal, 1 to 2, becomes dilated, the lower part remains the same. This is known as shortening of the cervix.

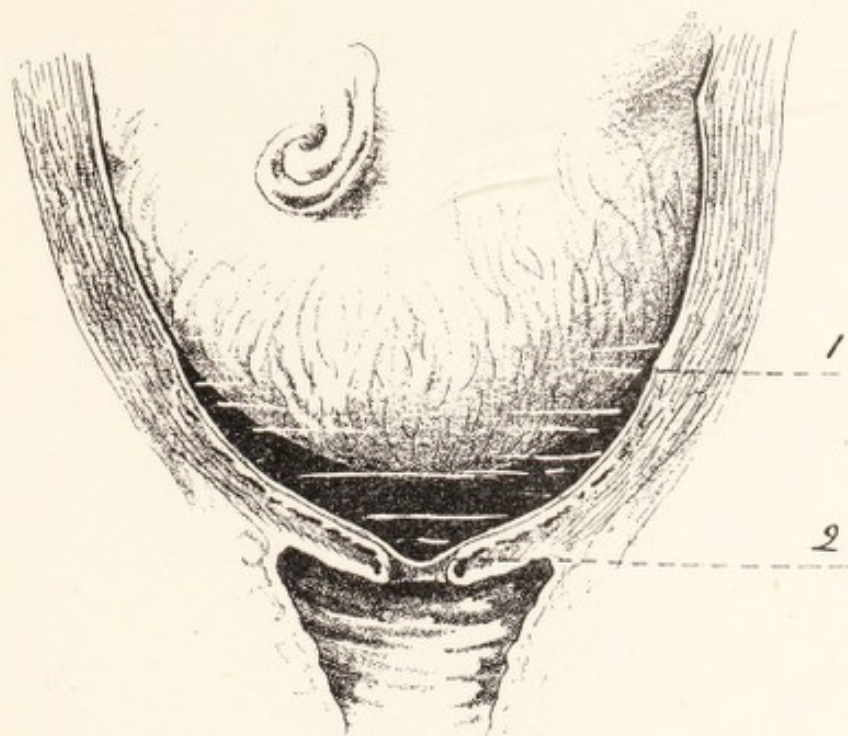


FIG. 100.—FURTHER DILATATION OF THE CERVIX IN A PRIMIPARA.

As this process continues the cervical canal is somewhat obliterated, forming part of the uterus (1 to 2). As a result, the cervix still further shortens till at last all that can be felt is a ring of thickened material containing the external os, there being no portion of the cervix, as such, projecting into the vagina.

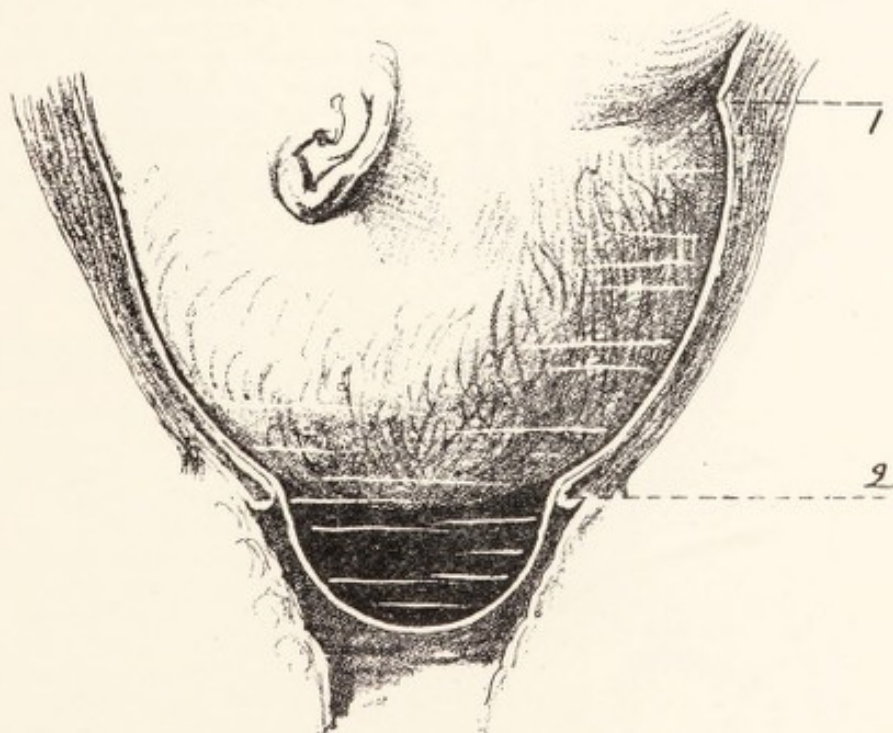


FIG. 101.—FULL DILATATION OF THE CERVIX IN A PRIMIPARA.

At the end of the 1st stage of labour the cervical canal is fully dilated, including the external os, so that now the cervical canal has disappeared.

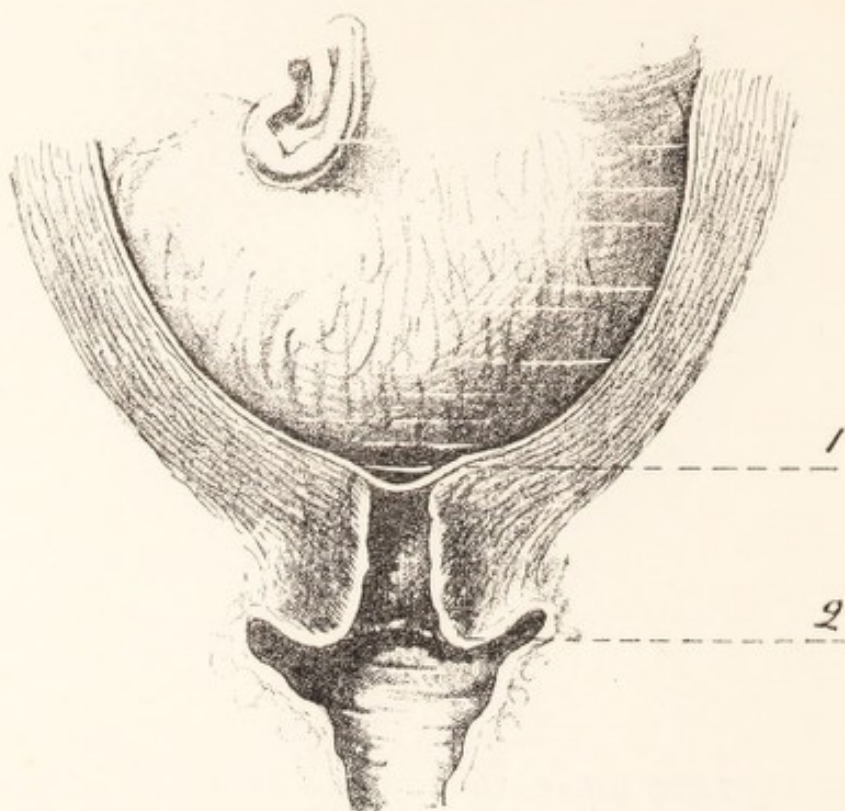


FIG. 102.—CERVICAL CANAL IN A MULTIPARA BEFORE LABOUR.

In a multipara the cervical canal is often so dilated before labour starts that the finger can be passed along the cervical canal (1 to 2) and the membranes palpated.

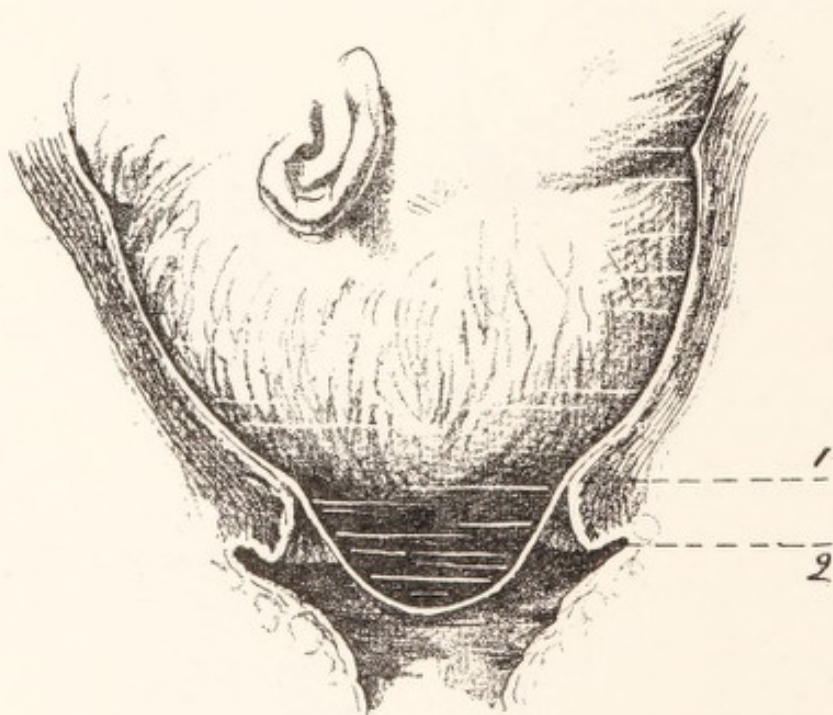


FIG. 103.—CERVICAL CANAL IN A MULTIPARA AT THE COMMENCEMENT OF LABOUR.

In a multipara, at the commencement of labour, the cervical canal is often obliterated (1 to 2).

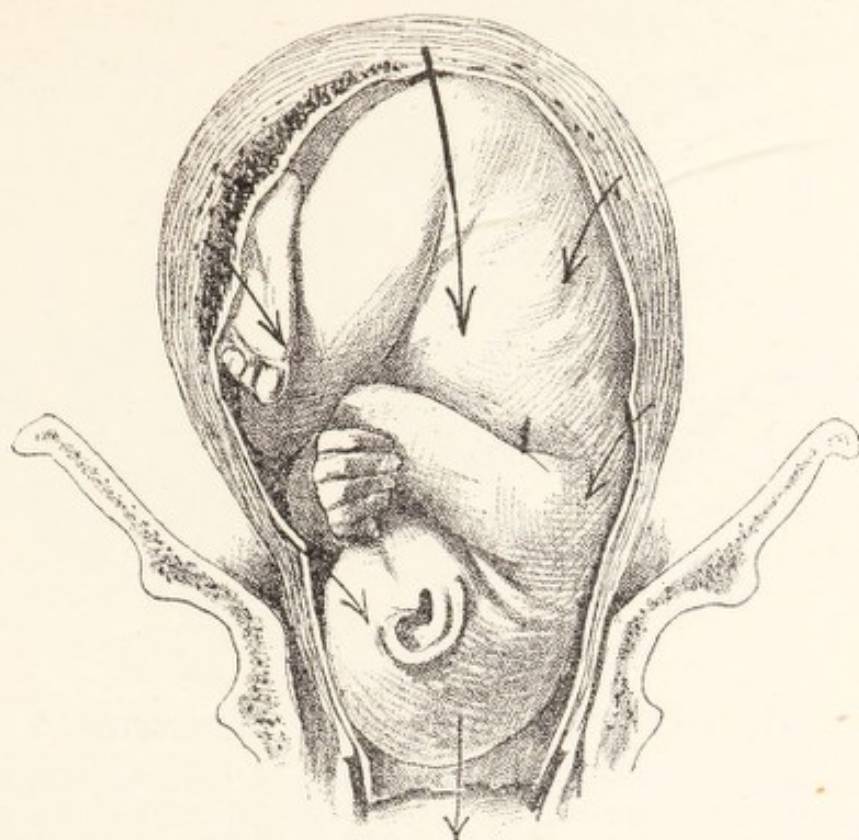
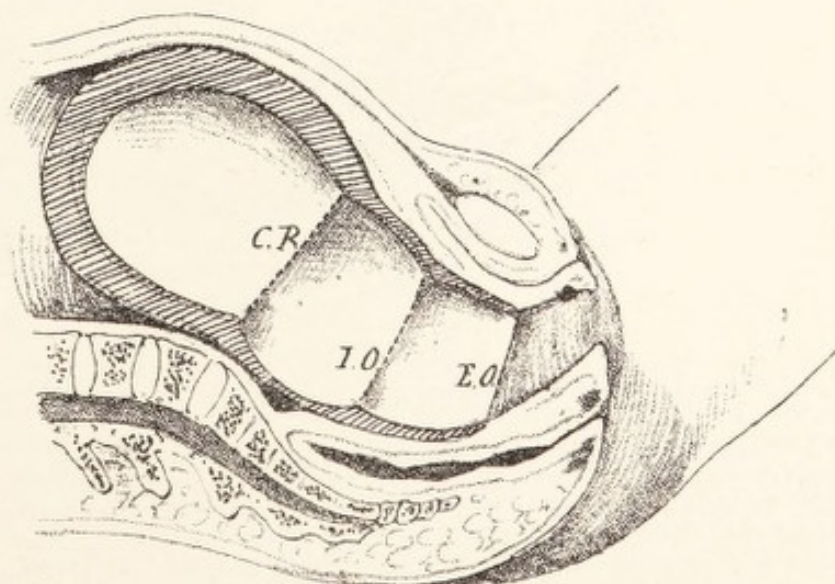


FIG. 104.—DIRECT UTERINE PRESSURE.

In normal labour the direct uterine pressure comes into action during the 2nd and 3rd stages of labour. It is the force principally concerned with the expulsion of the child and after-birth. If the membranes rupture before the cervical canal is fully dilated, the direct uterine pressure completes the dilatation by forcing the presenting part through the external os. In normal labour the direct uterine pressure acts principally on the breech and upper part of the child, the liquor amnii still present preventing such pressure on other parts. If labour is obstructed and all the liquor amnii has drained away, the direct uterine pressure acts on most of the child, and is thus a contributing cause to asphyxia neonatorum or even death of the child. Since the direction of this force is acting in the axis of the pelvic brim, such a direction is of importance in assisting the presenting part to enter. When the presenting part has entered the pelvic cavity, then this force can only act as an expulsive force, the guiding being taken on by the general intra-uterine pressure. Consequently, if the membranes rupture early, and the general intra-uterine pressure disappears, the head is pushed into the perineum and the chance of its rupture is increased.

FIG. 105.—THE UTERUS IN SECTION.

The upper segment, or the part of the uterus that retracts during labour, becomes thick. The lower segment, or the part that stretches during labour, becomes thin. *C.R.* Junction of the upper and lower uterine segments; the situation where the retraction ring (Bandl's ring) forms in obstructed labour. *I.O.* Internal os. *E.O.* External os. The distance between the internal and external os in the illustration is too great. The lower uterine segment at the commencement of labour is comprised of that portion 3 inches from the internal os.



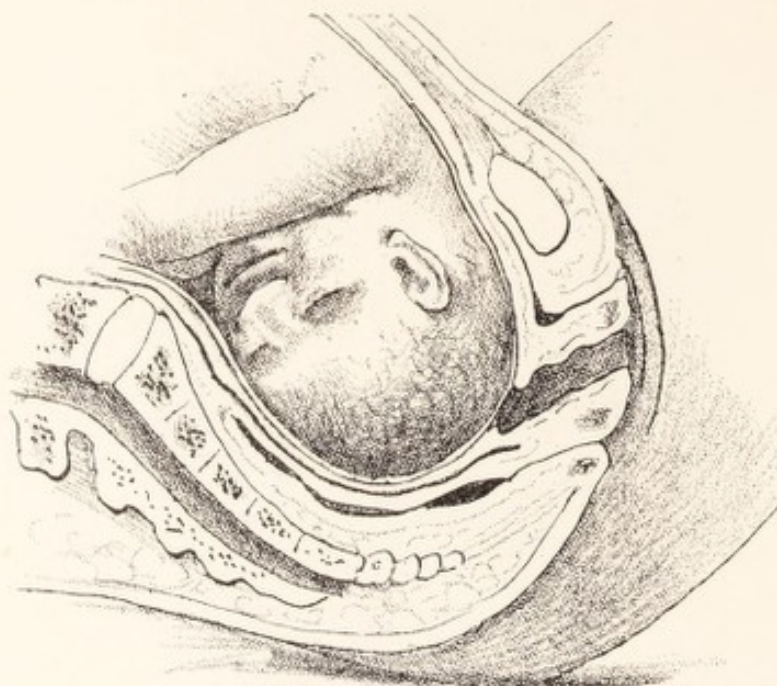


FIG. 106.—FLEXION IN A VERTEX DELIVERY.

The head in vertex presentations should pass through the pelvis well flexed. This enables the occipito-frontal diameter of $4\frac{1}{2}$ inches to be converted into the sub-occipito-bregmatic diameter of $3\frac{1}{4}$ inches. By flexion also the occiput becomes lower than the forehead, and so touches the pelvic floor first. As the pelvic floor tends to rotate forwards any part of the child touching it first, the occiput is turned to the front.

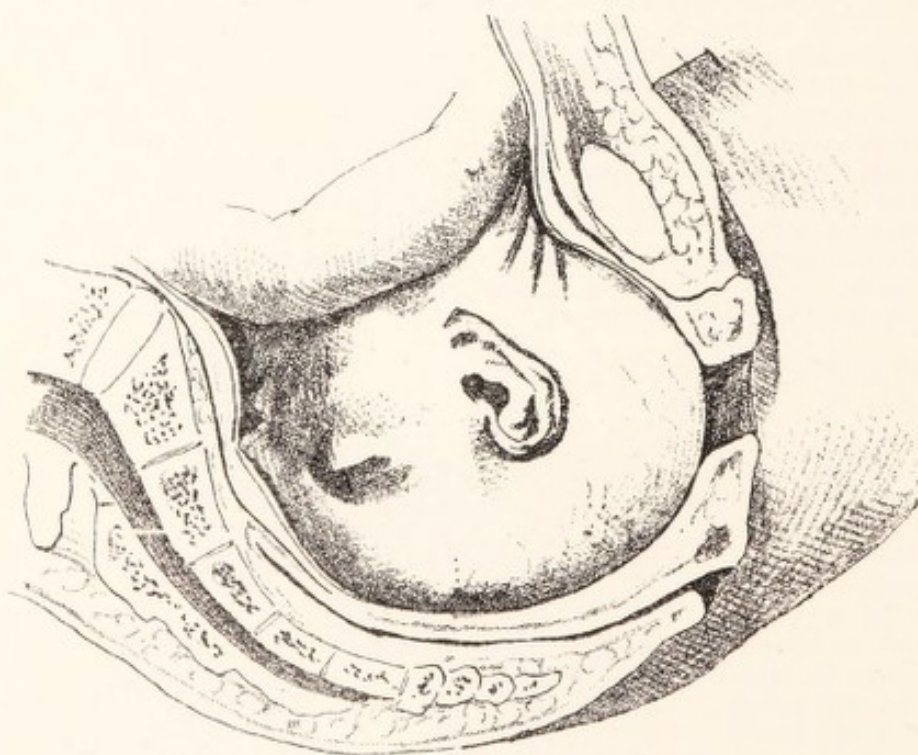


FIG. 107.—INTERNAL ROTATION IN A VERTEX DELIVERY.

The head rotates inside the pelvis, the occiput turning $\frac{1}{4}$ of a circle in a 1st and 2nd vertex position. The occiput, touching the pelvic floor first, is rotated by it forwards. The longest diameter of the outlet being the antero-posterior, the long diameter of the head has to fit into it, and is enabled to do this by the rotation. In the case of a 3rd or 4th vertex position, the occiput, being behind, has to rotate $\frac{3}{4}$ of a circle.



FIG. 108.—EXTENSION IN A VERTEX DELIVERY.

The head having rotated into the antero-posterior diameter is then acted upon by two forces. One, the direct uterine force and abdominal muscles which push the head downwards and backwards; the other, the general uterine force, pelvic floor and perineum, which push it upwards and forwards. Since the forces which act upwards and downwards balance each other, there is left the forward drive. If there was no symphysis pubis the head would be born flexed, but owing to this resistance the nape of the neck becomes fixed under the pubic arch and the head is born by extension, the vulval orifice being stretched by the sub-occipito-frontal diameter of 4 inches. If the head is expelled before the nape of the neck has escaped below the pubic arch, extension occurs in the region of the occipital protuberance, when the vulval orifice is stretched by the occipito-frontal diameter $4\frac{1}{2}$ inches, greatly increasing the risk of a ruptured perineum.



FIG. 109.—EXTERNAL ROTATION IN A VERTEX DELIVERY.

The head rotates outside the pelvis in the opposite direction to which it did when it was rotating inside the pelvis. This rotation is caused by the long diameter of the shoulders entering the opposite oblique diameter of the pelvis to that which the long diameter of the head entered. The anterior shoulder is rotated forwards, and as this rotation is from right to left, whereas the occiput rotated from left to right, the external rotation of the head must necessarily be in the opposite direction to its internal rotation.

RESTITUTION is the undoing of the twist in the neck directly the head is free outside the pelvis.

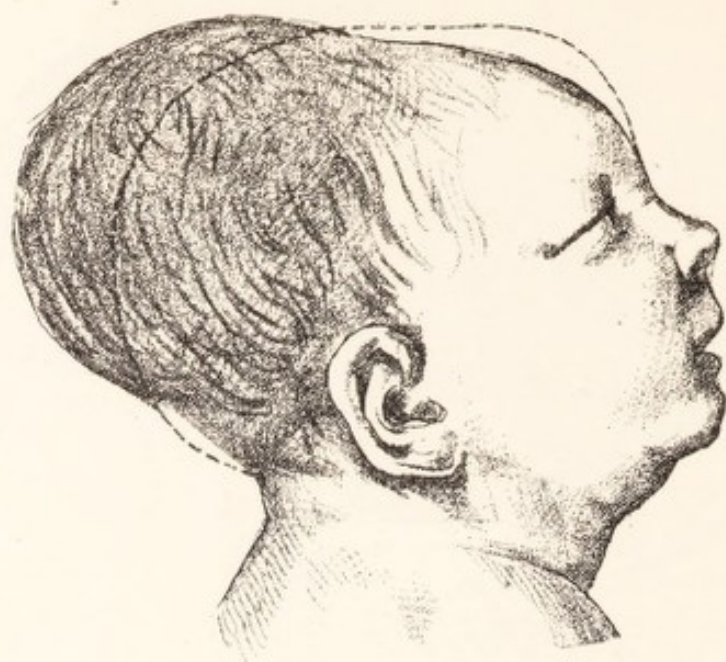


FIG. 110.—MOULDING OF THE HEAD IN A NORMAL VERTEX DELIVERY.

The sub-occipito-frontal diameter (4 inches) or the sub-occipito-bregmatic ($3\frac{1}{2}$ inches) is diminished in length, and the vertico-mental diameter ($5\frac{1}{2}$ inches) is increased. The dotted line indicates the original shape of the head.



FIG. 111.—MOULDING OF THE HEAD IN DELIVERY OF A PERSISTENT OCCIPITO-POSTERIOR POSITION.

The dotted line shows the shape of the head before moulding. The occipito-frontal diameter of $4\frac{1}{2}$ inches has been compressed, and so the head has been lengthened in a vertical direction. The forehead is high, and the back of the head is flattened.

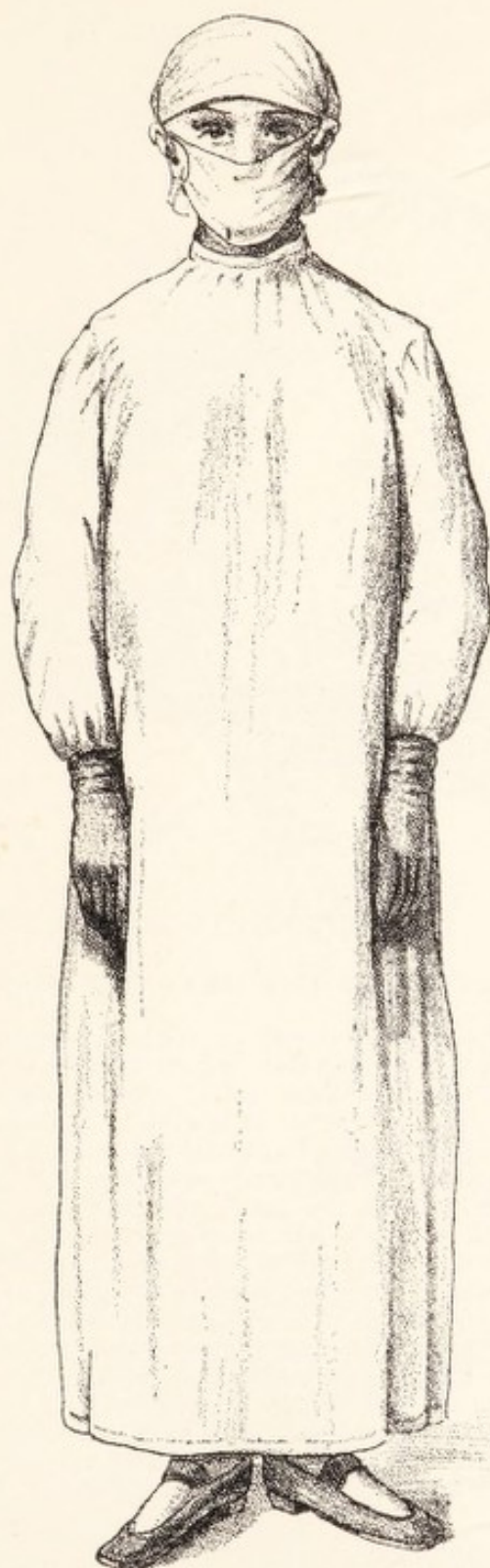


FIG. 112.—CORRECT DRESS FOR DELIVERING A PATIENT.

A sterilized gown reaching down to the ankles. Indiarubber gloves into which the ends of the arms of the gown are tucked. A cap, or veil, to cover the head, and a mask to prevent droplet infection. Indiarubber boots, or linen boot-overalls, are used in hospitals.

The midwife, and also a doctor, should wear a mask and gloves when attending a patient in her confinement. Such articles form an efficient protection to the patient from the risk of infection, so far as the midwife and doctor are concerned. Moreover, the laity are now well aware that such articles should be used and, consequently, if they have not been used, and infection occurs, there is a risk of legal proceedings. There have been several such of late years.

NOTE.—The mask should cover the nose as well as the mouth. It is not uncommon to see nurses and doctors with the mask covering the mouth only.

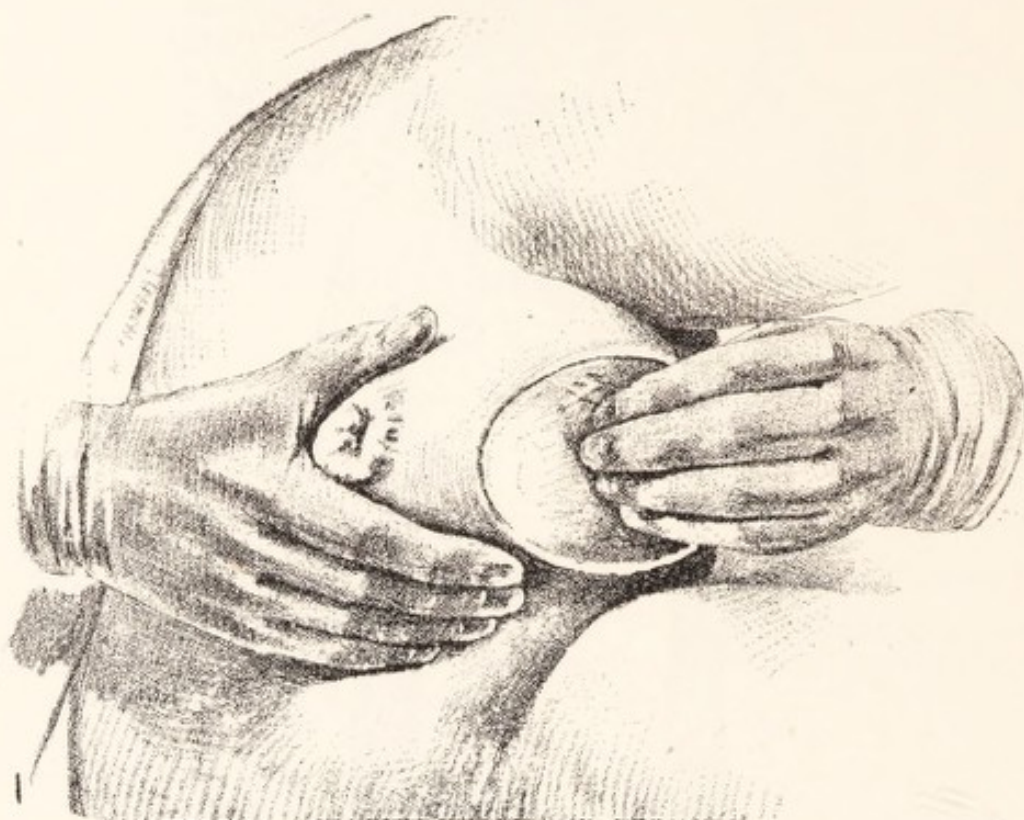


FIG. 113.—DELIVERY OF THE HEAD AND SHOULDERS.

The head of the child is born by extension. This extension should not commence until the occiput has escaped under the pubic arch in order that the sub-occipito-frontal diameter (4 inches) may distend the vulval orifice. On occasions the head commences to extend before the occiput is free, while it is still in contact with the back of the symphysis pubis. In this case the occipito-frontal diameter ($4\frac{1}{2}$ inches) will distend the vulval orifice, and the chance of a ruptured perineum will be much greater. The correct management of the birth of the head, therefore, is concerned with the prevention of extension until the occiput has escaped under the pubic arch and the biparietal diameter is free of the vulval orifice by pressing on the forehead of the child with the right hand. The palm of the left hand is stretched over the perineum, which should be covered with a sterile swab or towel, and presses the head forward.

After the head has been born, and external rotation is taking place, it is important that the internal rotation of the shoulders should be complete, since if they are born in an oblique position the perineum may be ruptured although it has escaped injury during the birth of the head. If, therefore, the birth of the shoulders is delayed and the child's face becomes dusky, the head should be gently rotated so as to complete the rotation of the shoulders, the latter being assisted, if necessary, by a finger inserted into the vulva.

NOTE.—The anterior shoulder should then be delivered by depressing the head and neck towards the perineum. A finger can be passed, if absolutely necessary, into the axilla to assist in the delivery of the shoulder, but in this case must be taken not to use much force, as otherwise the arm may be paralyzed by injury to nerves in the brachial plexus in the axilla. Sometimes it is easier to get the posterior shoulder out first, in which case the head and neck of the child should be raised. If an assistant is available, the fundus of the uterus should be pressed down meanwhile.



FIG. 114.—ATTENTION TO THE EYELIDS OF THE CHILD.

Immediately after the birth of the head of the child, and before its eyes are opened, the eyelids and surrounding skin should be swabbed with some boric acid solution. The swab should be held in the left hand, and the eyelids should be swabbed away from the nose. The right hand is well employed pressing on the head to prevent the shoulders being born too quickly, otherwise the perineum may be badly lacerated. After the child is born and separated, the eyelids should be opened and a few drops of boric acid solution instilled into each eye. If there has been a vaginal discharge, 1 or 2 drops of a fresh solution of silver nitrate, 1 per cent., should be instilled into each conjunctival eye.



FIG. 115.—DELIVERING THE POSTERIOR SHOULDER.

The shoulders should not be allowed to escape until the bis-acromial diameter is antero-posterior. If it is not, the head of the child must be gently rotated till it is, since if the shoulders escape obliquely the perineum may be badly ruptured. The rotation of the shoulders being complete, the neck of the child is pressed against the perineum, and this will allow the anterior arm to be born first. The head of the child is then lifted towards the mother's abdomen to aid the escape of the posterior shoulder. Thus the shoulders are born separately, and a smaller diameter than the bis-acromial will distend the vulval orifice. See also description under Fig. 113.

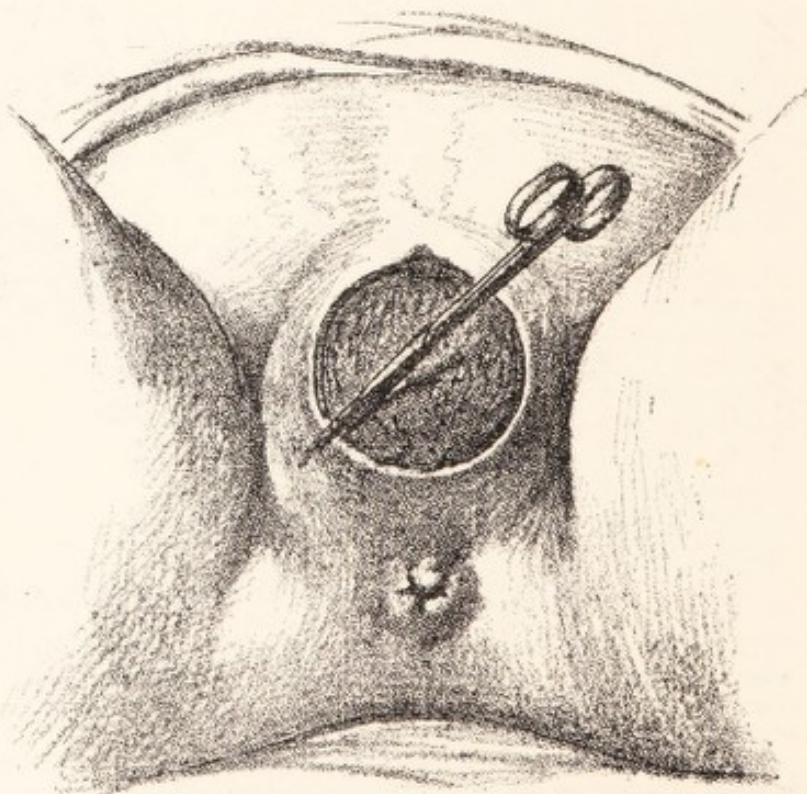


FIG. 116.—DELIVERY OF THE BODY OF THE CHILD.

The child should be supported by its head and pelvis during the birth of its legs. The fingers and thumb of the left hand must hold the pelvis and not the abdomen, as in the latter case, if undue pressure is used, the liver or spleen may be injured.

FIG. 117.—EPISIOTOMY.

This consists in making a small lateral incision on each side of the perineum, so as to prevent a deep tear in the middle. Its best indication is in a primipara over thirty years of age, in whom the perineum and the pelvic floor are very rigid. In such cases the head may be delayed at the vulval orifice for a long time, necessitating the use of the forceps, or if the pains are very strong a serious laceration may occur. In such circumstances, to prevent the use of the forceps or a serious laceration, episiotomy is usefully employed.



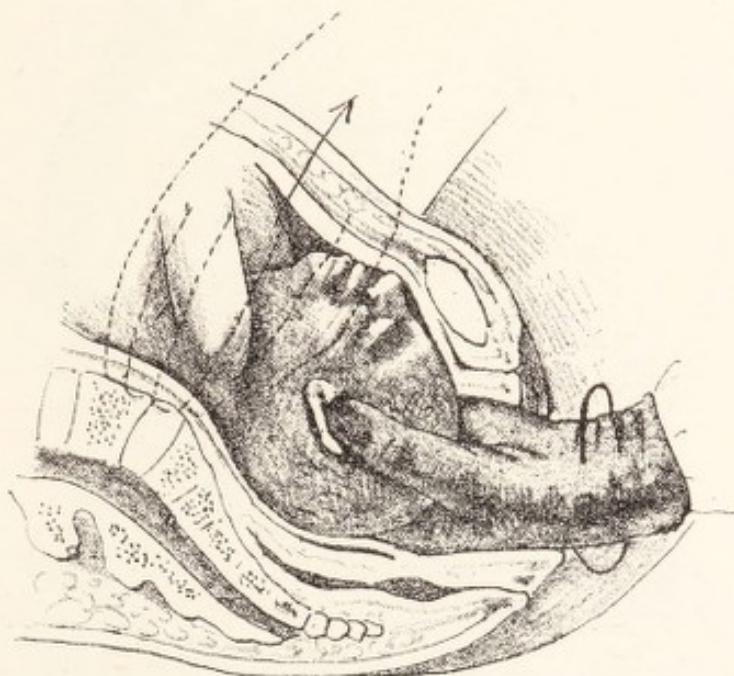


FIG. 118.—MANUAL ROTATION OF THE HEAD IN PERSISTENT OCCIPITO-POSTERIOR POSITION.

If in a 3rd or 4th vertex position the head is deflexed and remains so, the forehead may touch the pelvic floor first, and it is then rotated forwards so that the occiput rotates back $\frac{1}{2}$ inch of a circle into the hollow of the sacrum. This is termed a persistent occipito-posterior position. Unless this abnormal position is remedied, the head is driven down till the root of the nose impinges against the symphysis pubis. The occiput then escapes over the perineum, and the rest of the head is born by extension. If the head is small, it may be born without rupturing the perineum. As a rule, a bad rupture occurs, often back into the rectum, because the occipito-frontal diameter of $4\frac{1}{2}$ inches distends the vulval orifice, because the bi-parietal diameter is behind, and because the largest circumference of the head is distending the orifice.

The left hand inside the vagina is turning the head round. The dotted lines indicate the fingers of the right hand pushing the shoulder round from the abdomen of the mother. If this is not done and the head alone rotated, the latter will turn back again after the internal hand is removed. The head and the shoulders are rotated in the direction of the arrows. The patient should be lying on her back with her legs drawn up.

It may be necessary to push the shoulders up first, and rarely the head can only be got to rotate by passing the hand up to the shoulders and rotating them.



FIG. 119.—EXPULSION OF THE PLACENTA INTO THE VAGINA AFTER SEPARATION.

The placenta is separated by the retraction of the placental site since the placenta cannot shrink with the placental site, so that it must become separated. When the placenta has left the uterus and is in the vagina, it pushes up the uterus so that the top of the fundus is an inch higher than before separation. This is one way of determining whether the placenta has separated. The hand, in this illustration, shows how the fundus of the uterus should be held, with the thumb in front and the fingers behind. When the placenta has been expelled into the vagina, the uterus becomes harder, its size is smaller, its shape is more round, and it is more movable. If nature fails to expel the after-birth from the vagina, the attendant should apply pressure to the fundus of the uterus during a pain. Such pressure must not be applied until the placenta has separated and is in the vagina, except in cases of post-partum hæmorrhage. The pupil will have learnt, from her textbook, the signs indicating that the placenta has separated from the placental site. To apply pressure before this may lead to a part of the placenta being separated, thus anticipating nature, when post-partum hæmorrhage may occur because nature's *retraction* has not yet had time to close the vessels in that part of the placental site from which part of the placenta has separated.

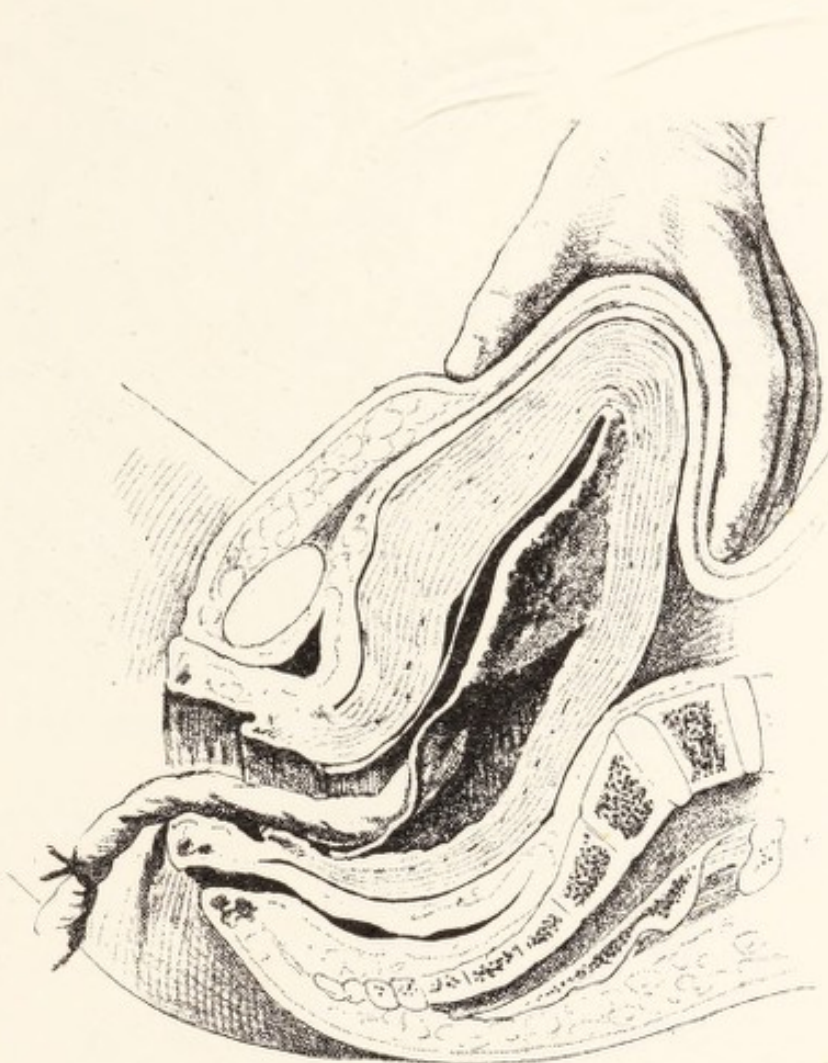


FIG. 120.—ARTIFICIAL SEPARATION OF THE PLACENTA AND ITS EXPRESSION.

Artificial separation of the placenta is required in two circumstances: the first if, at the end of an hour after the birth of the child, the placenta is still attached to the placental site, when medical assistance should be obtained if possible. The second if, after the birth of the child, part of the placenta has separated, and there is post-partum hæmorrhage, and massage of the uterus does not arrest it. The uterus is squeezed with the thumb in front and the fingers behind (Crede's method) so as to separate the placenta, after which the uterus is pushed downward and backward to get the placenta out of the uterus, and then downward and forward to get it out of the vagina. In the picture it will be noticed that, although the placenta has not separated, the second ligature on the cord has moved from the vulva. This is due to the fact that the uterus has been pushed down. If the attendant takes her hand off the uterus, the second ligature will slip back. If the placenta had separated, it would not slip back. This is another method of determining if the placenta has separated. The same effects may be obtained by telling the patient to bear down.

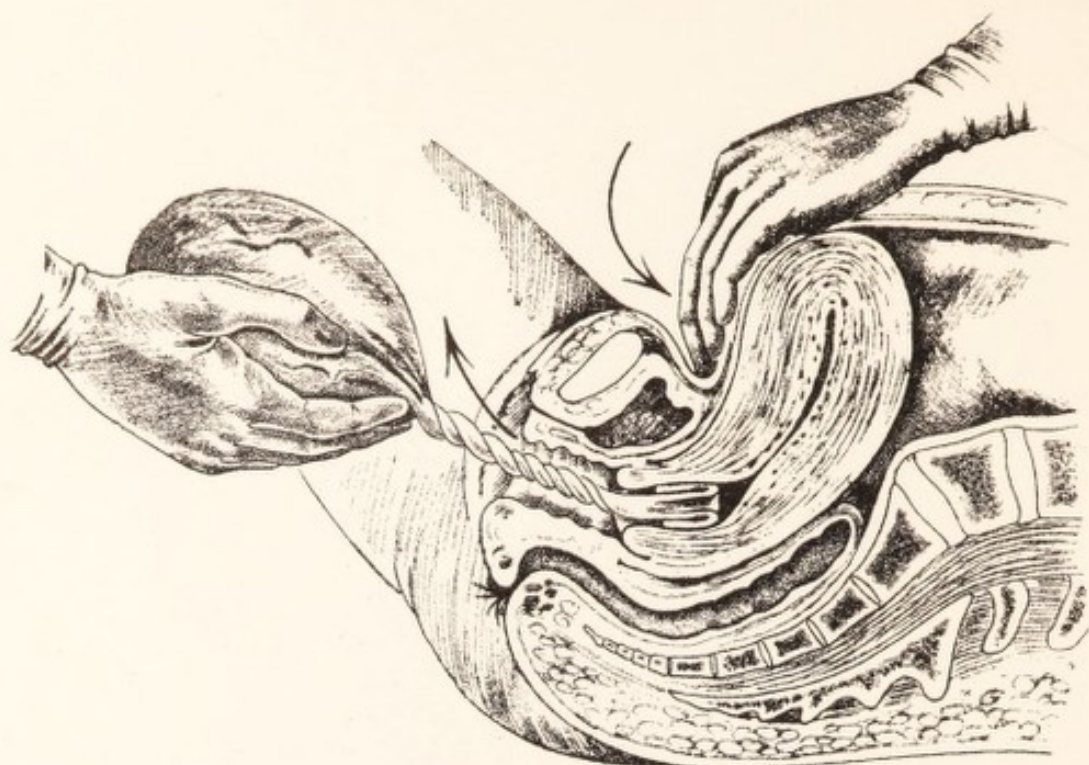


FIG. 121.—REMOVAL OF THE MEMBRANES BY TORSION AND ABDOMINAL MANIPULATION.

Showing rotation of the membranes and a hand on the abdomen pulling the uterus up, which facilitates their expulsion.

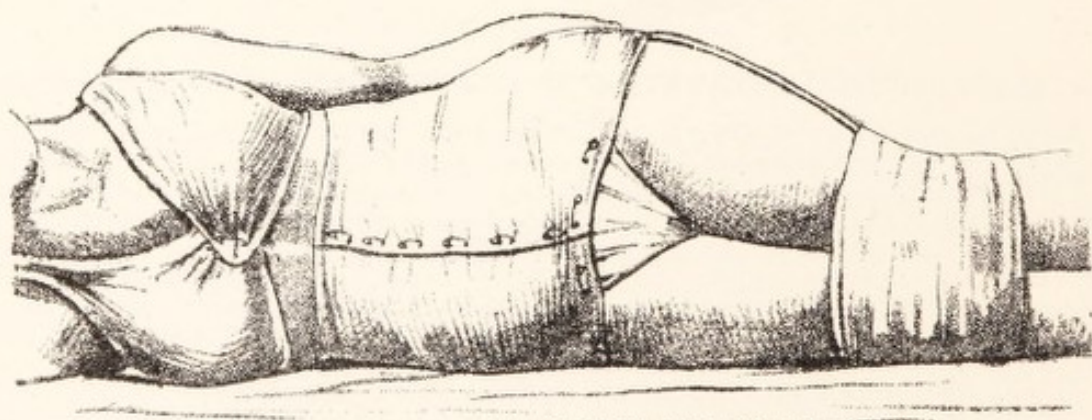


FIG. 122.—BREAST SUPPORT, ABDOMINAL BINDER, AND THE BANDAGE KEEP IN POSITION THE VULVAL PAD.

If the perineum has been ruptured, it is wise to bind the knees together for a few days.

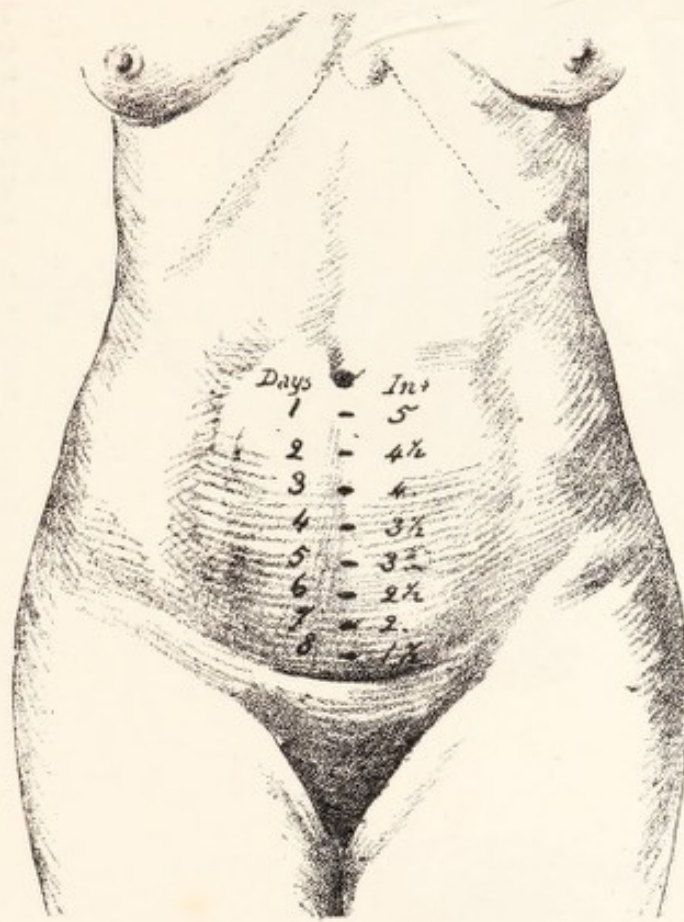
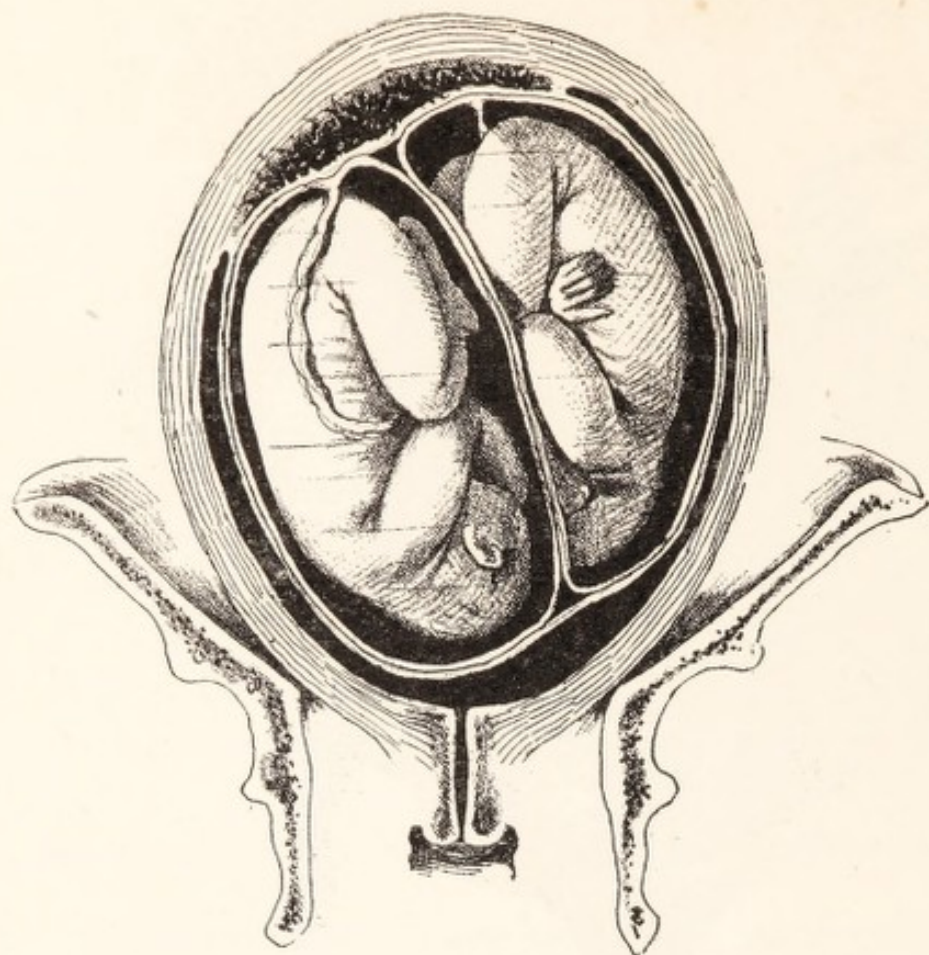


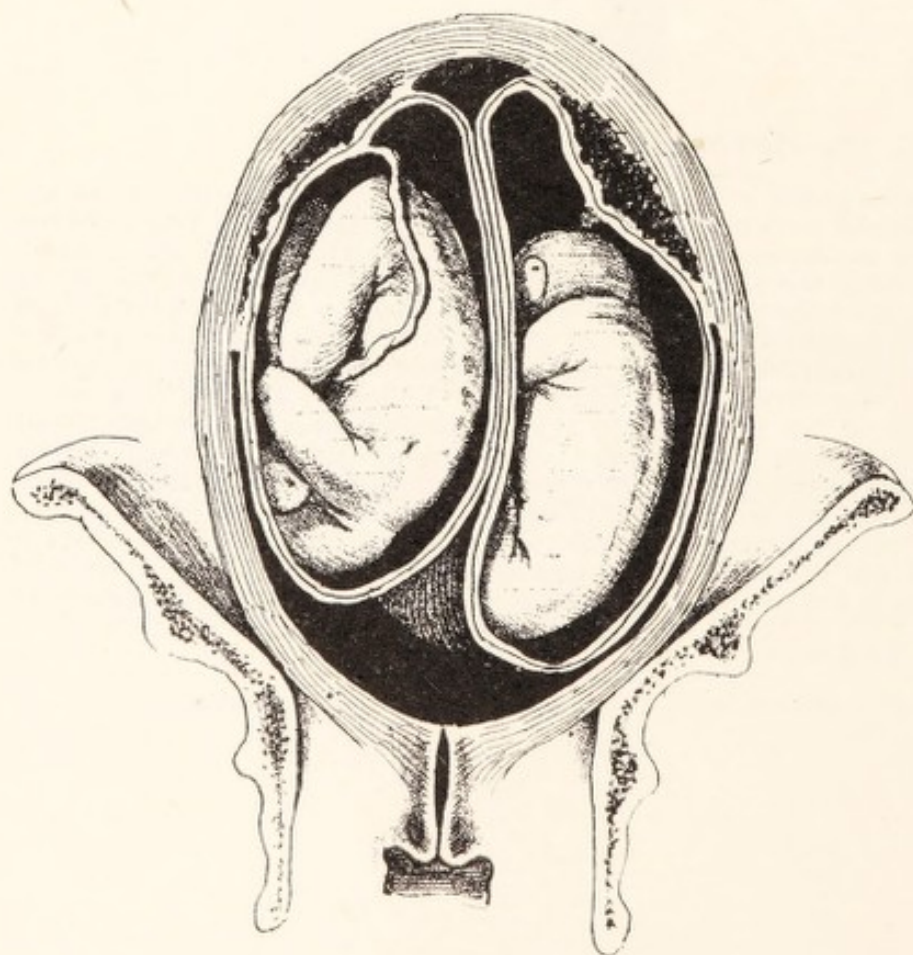
FIG. 123.—INVOLUTION OF THE UTERUS.

The rate of involution of the uterus is ascertained by resting a foot-rule on the top of the symphysis pubis and noticing the height of the top of the fundus by the inches on the foot-rule. The measurement should be taken after the bowels and bladder have been emptied. After the expulsion of the placenta and membranes, the top of the uterus is 5 inches above the pubes, and it weighs 32 ounces. At the end of 7 days it reaches 2 inches, and weighs 12 ounces. At the end of 14 days it reaches 1½ inches above the pubes. The greatest loss in size and weight is during the first week, due to decreased amount of blood circulating in the uterus. Following this the diminution in the size and weight of the uterus, until it measures 3 inches and weighs about 3 ounces, is due to the muscle tissue being converted into soluble substances which are then absorbed (auto-digestion). Such a measurement should be taken daily, since one important cause of the uterus not involuting is a piece of retained placenta. In this case the uterus will be tender over that part to which the piece of placenta is attached. The lochia will be excessive and offensive; after-pains may be severe, and if the piece of placenta is not removed the patient will become septic if the portion of placenta is dead.



**FIG. 124. — UNI-
OVULAR TWINS.**

In this case the twins are developed from a single zygote with two nuclei. There are two placenta which join as they develop, one chorion, two amnions (two lots of liquor amnii). The sex of the children is always the same, and the children are exactly alike. In some cases the two layers of amnion separating each amniotic sac rupture, with the result that the amniotic cavity is common. One child may be twice the weight of the other, the smaller one often dying at the 5th month. Premature labour not uncommonly occurs.



**FIG. 125. — BIN-
OVULAR TWINS.**

In this case the twins are developed from two zygotes. There are two placenta, two chorions, two amnions (two lots of liquor amnii). Children of the same or different sexes and usually about the same weight. This is the commonest variety of twins; they are generally healthy, and often the pregnancy goes to term.

FIG. 126.—HEAD PRESENTATIONS.

Both children presenting by the head. The commonest form of presentation.

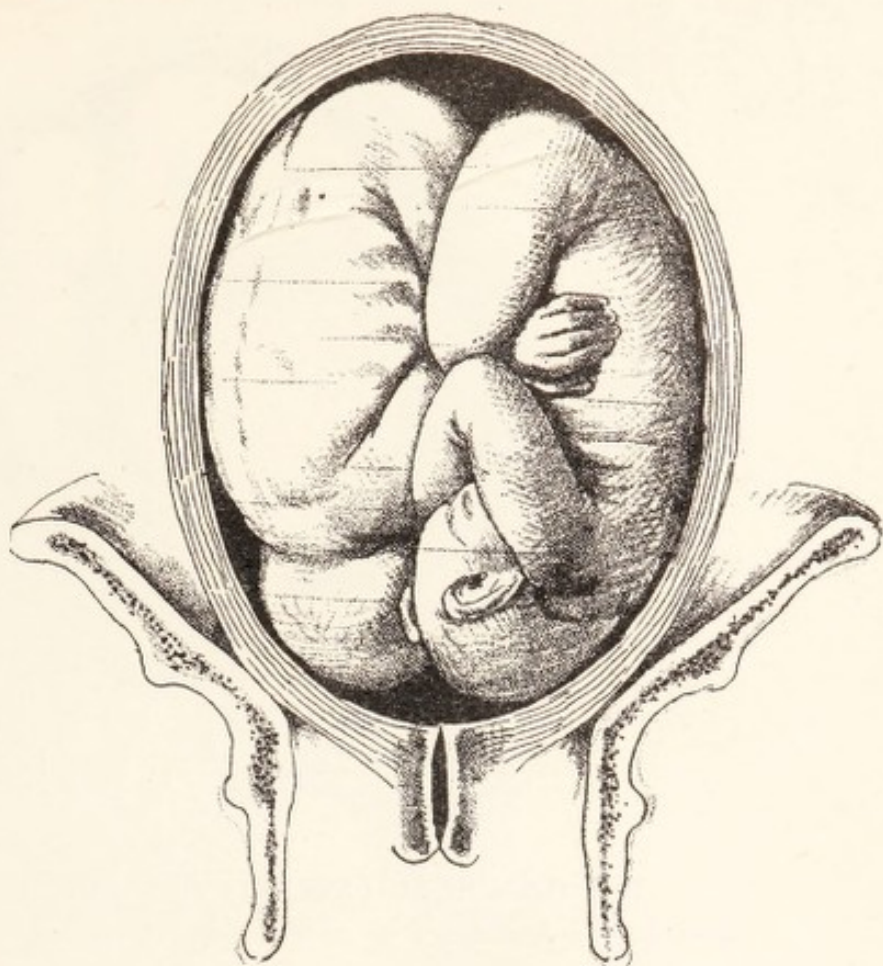
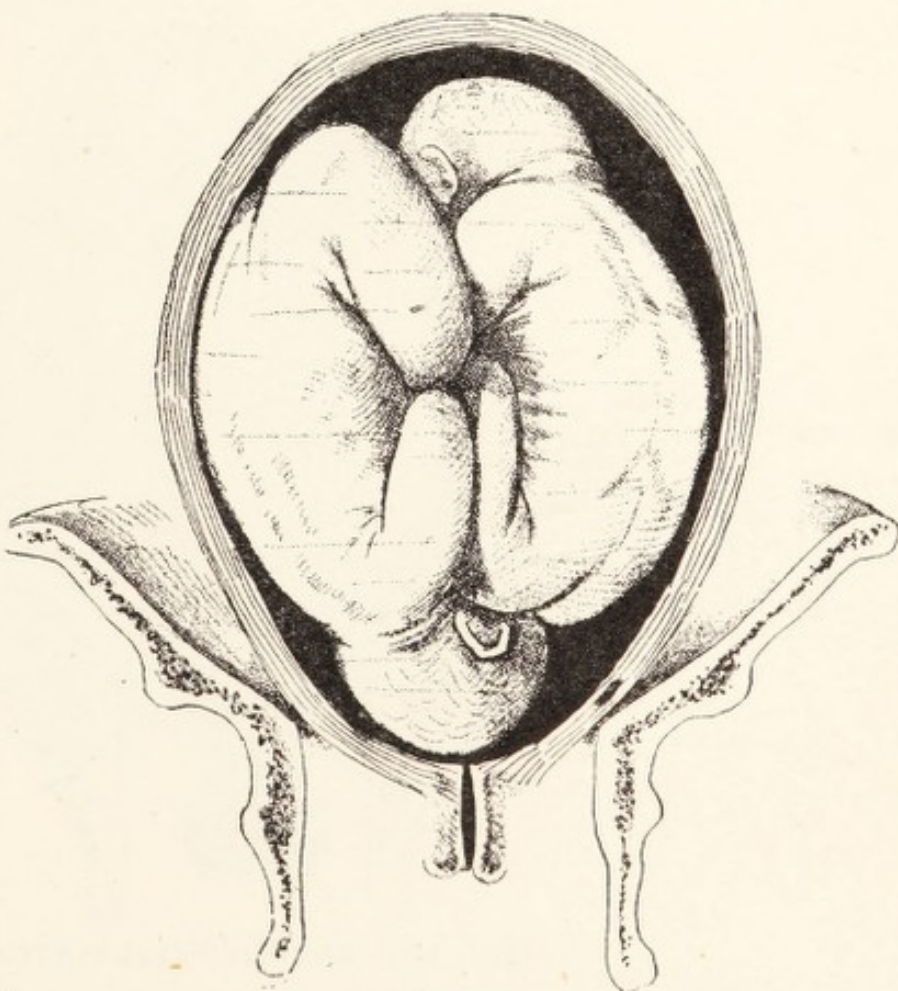


FIG. 127.—HEAD AND BREECH PRESENTATIONS.

One child presenting by the head, the other child presenting by the breech.



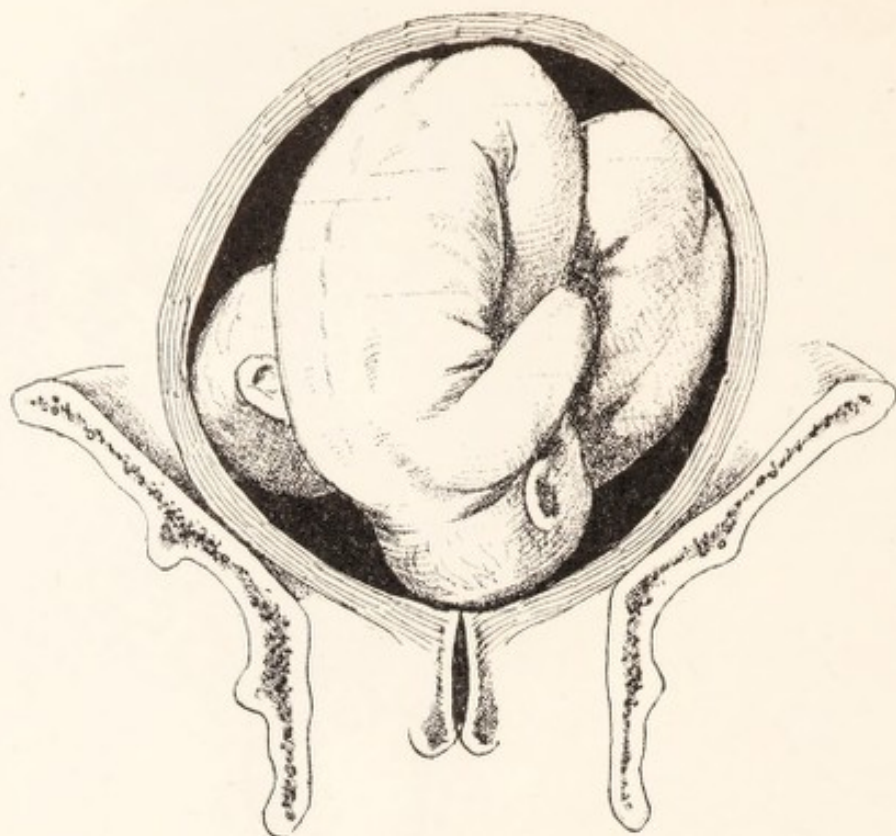


FIG. 128.—HEAD PRESENTATION AND OBLIQUE LIE.

One child presenting by the head, the lie of the other child being oblique.

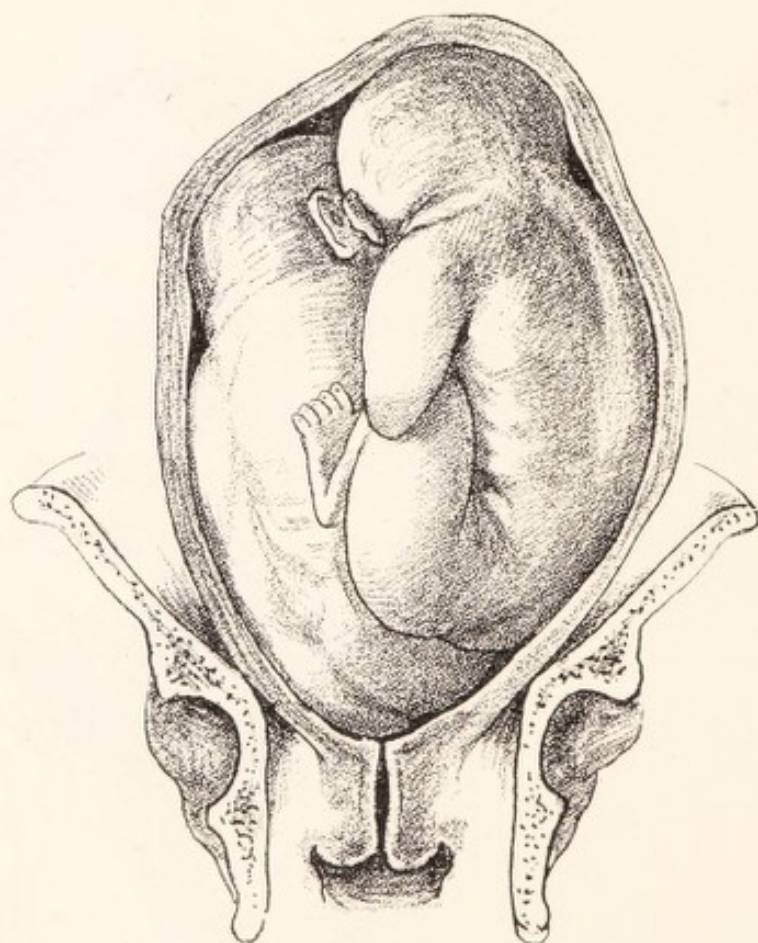


FIG. 129.—BREECH PRESENTATIONS.

Both children presenting by the breech.

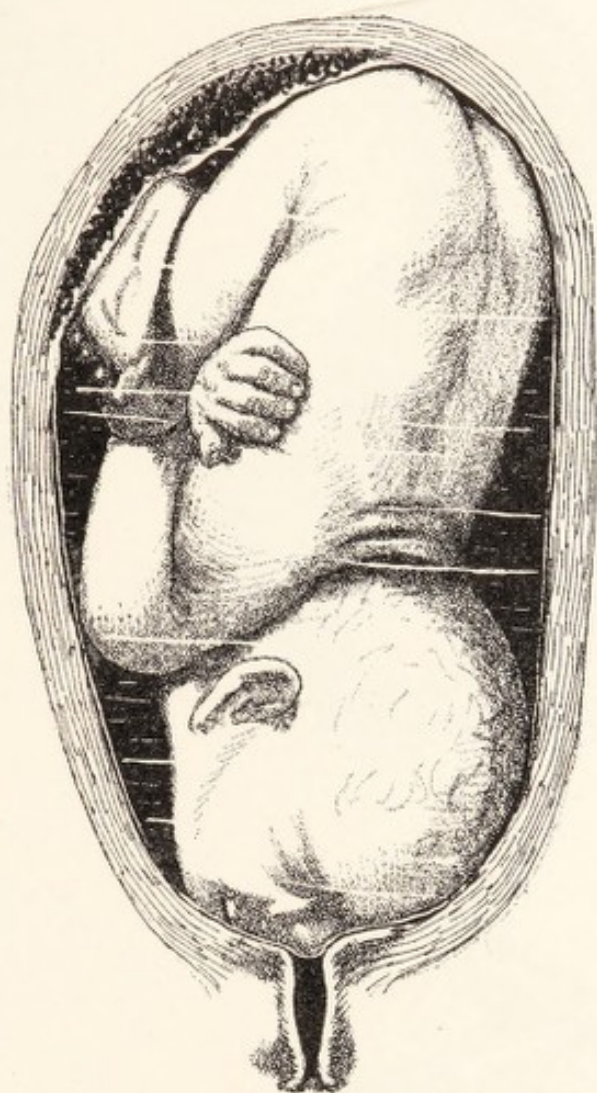


FIG. 130.—FACE PRESENTATION.

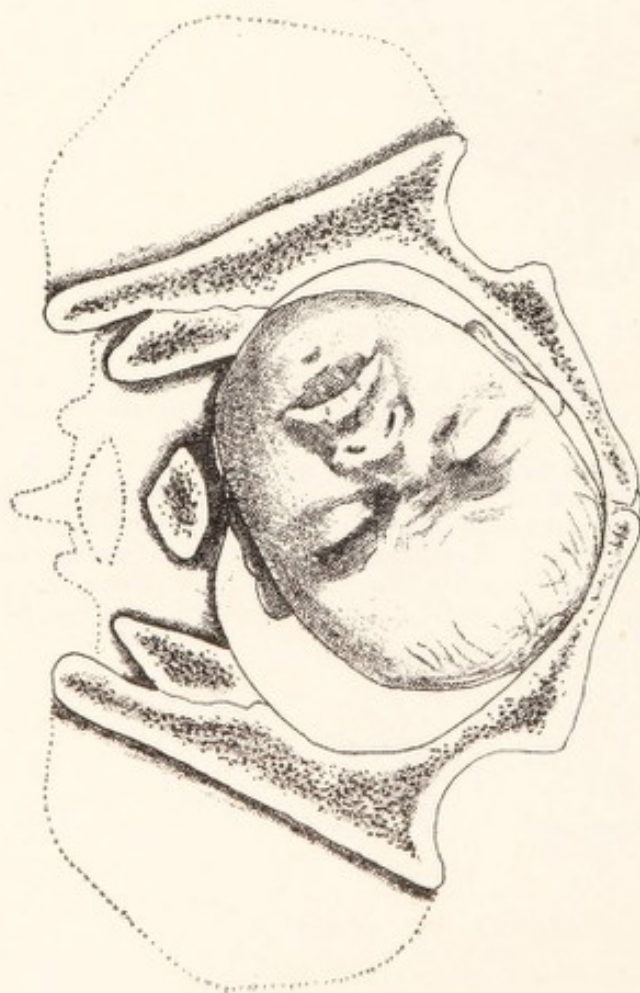
The lie of the child is longitudinal, and the head is extended on the trunk. The presenting part extends from the chin to the bregma, the diameter being the sub-mento-bregmatic of $3\frac{1}{2}$ inches.

Face presentation may be due to obliquity of the uterus, to a flattened pelvis, to a 3rd or 4th vertex position, the head being above the brim at the commencement of labour, there being in such cases a certain amount of deflexion in which the head extends instead of flexing, and placenta prævia, to death, prematurity or malformation of the fœtus. Face presentation occurs about once in 300 cases, and is more frequent in multiparæ. The membranes are likely to rupture early because the face does not fill the lower uterine segment so accurately as the vertex.



**FIG. 131.—FIRST FACE :
RELATION OF THE
CHILD TO THE PEL-
VIS, AS SEEN FROM
ABOVE.**

The lie is longitudinal, the head is extended on the trunk, and the face has entered the brim. The back of the child points to the left and is in front. The face is presenting. The chin rotates forwards $\frac{3}{8}$ inch of a circle, except in rare cases of persistent mento-posterior, when it has rotated back $\frac{1}{8}$ inch of a circle into the hollow of the sacrum.



**FIG. 132.—FIRST FACE :
RELATION OF THE PRESENTING
PART TO
THE PELVIS, AS SEEN FROM
BELOW.**

The position is a right mento-posterior. The long diameter of the face is in the right oblique diameter of the pelvis. The chin points backwards and to the right.

**FIG. 133.—SECOND FACE:
RELATION OF THE
CHILD TO THE PELVIS,
AS SEEN FROM ABOVE.**

The lie is longitudinal. The head is extended on the trunk and has entered the brim. The back of the child points to the right and is in front. The face is presenting. The chin rotates forwards $\frac{3}{4}$ inch of a circle, except in cases of rare persistent mento-posterior, when it has rotated back $\frac{1}{4}$ inch of a circle into the hollow of the sacrum.



**FIG. 134.—SECOND FACE : RELATION
OF THE PRESENTING PART TO
THE PELVIS, AS SEEN FROM
BELOW.**

The position is a left mento-posterior. The long diameter of the face is in the left oblique diameter of the pelvis. The chin points backwards and to the left.





**FIG. 135.—THIRD FACE:
RELATION OF THE
CHILD TO THE PELVIS,
AS SEEN FROM ABOVE.**

The lie is longitudinal. The head is extended on the trunk and has entered the brim. The back of the child points to the right and is behind. The face is presenting. The chin rotates forwards $\frac{1}{4}$ inch of a circle.

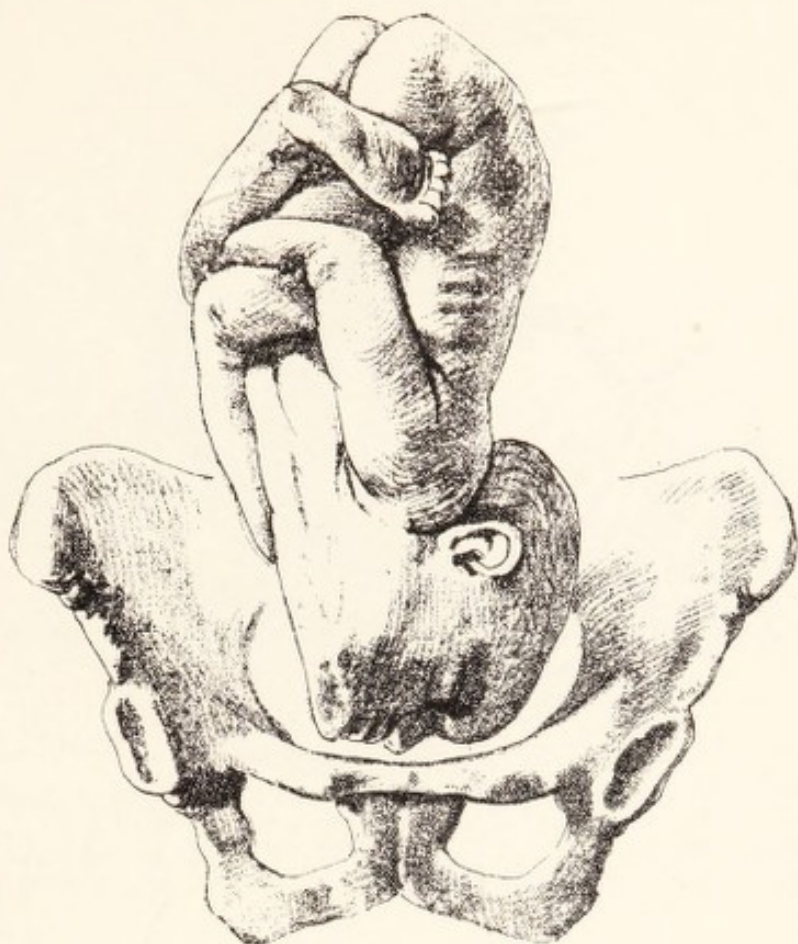


**FIG. 136.—THIRD FACE: RELATION
OF THE PRESENTING PART
TO THE PELVIS, AS SEEN FROM
BELOW.**

The position is a left mento-anterior. The long diameter of the face is in the right oblique diameter of the pelvis. The chin points forwards and to the left.

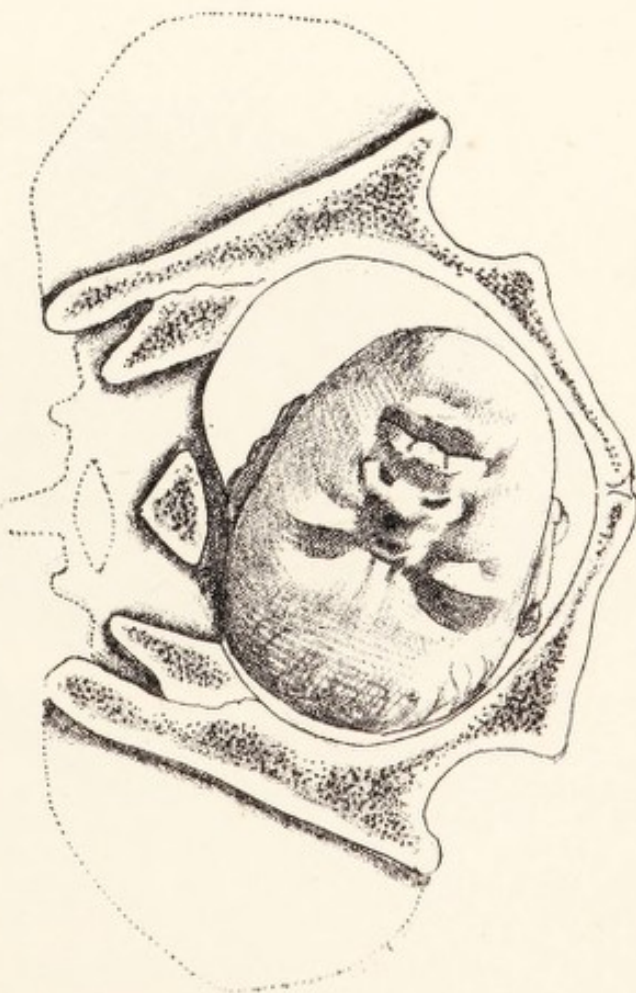
**FIG. 137.—FOURTH FACE:
RELATION OF THE
CHILD TO THE PEL-
VIS, AS SEEN FROM
ABOVE.**

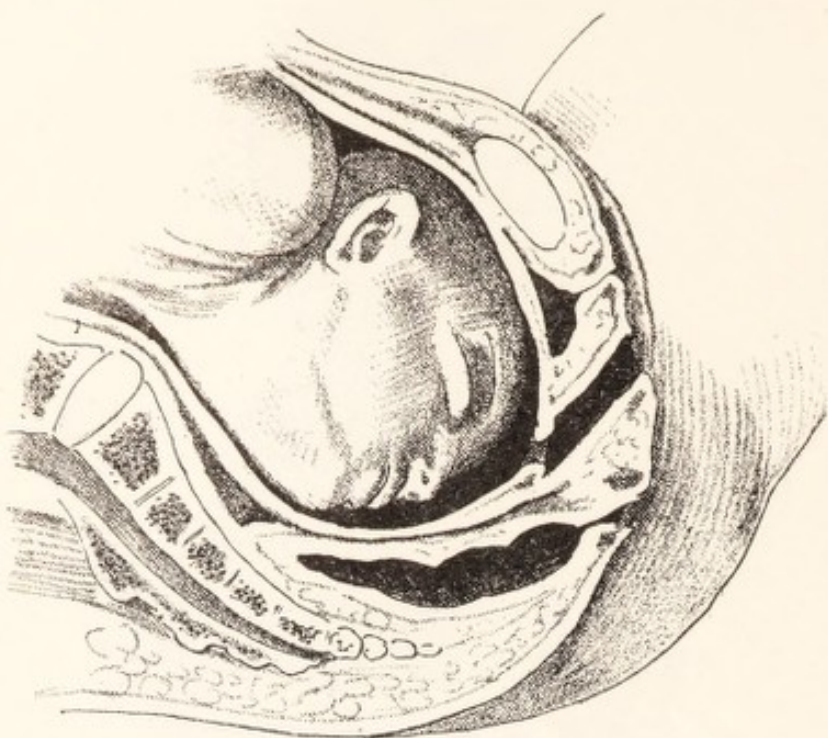
The lie is longitudinal. The head is extended on the trunk and has entered the brim. The back of the child points to the left and is behind. The face is presenting. The chin rotates forwards $\frac{1}{8}$ inch of a circle.



**FIG. 138.—FOURTH FACE: RELATION
OF THE PRESENTING PART TO
THE PELVIS, AS SEEN FROM
BELOW.**

The position is a right mento-anterior. The long diameter of the face is in the left oblique diameter of the pelvis. The chin points forwards and to the right.





**FIG. 139. — EXTENSION
IN A FACE DELIVERY.**

The head in face presentations passes through the pelvis fully extended. This enables the submento-vertical diameter of $4\frac{1}{2}$ inches to be converted into the submento-bregmatic diameter of $3\frac{1}{4}$ inches. By extension also the chin becomes lower than the forehead, and so touches the pelvic floor first.



**FIG. 140. — INTERNAL
ROTATION IN A FACE
DELIVERY.**

As the pelvic floor tends to rotate forward any part of the child touching it first, the chin is turned to the front. The head rotates inside the pelvis, the chin turning in a 1st and 2nd face $\frac{3}{4}$ of a circle, and in a 3rd and 4th face $\frac{1}{4}$ of a circle. The longest diameter of the outlet being the antero-posterior, the long diameter of the face has to fit into it, and is enabled to do this by the rotation.



FIG. 141.—FLEXION IN A FACE DELIVERY.

The chin, being now in front, descends with the head still extended until the chin escapes under the pubic arch. Flexion of the head then occurs and the head is born.

External rotation and restitution of the head now takes place, the causes being similar to those of external version and restitution in a vertex delivery. See Note under Fig. 113.



FIG. 142.—MOULDING OF THE HEAD IN FACE DELIVERY.

The sub-mento-vertical diameter of $4\frac{1}{2}$ inches, or a diameter between it and sub-mento-bregmatic diameter of $3\frac{3}{4}$ inches, is decreased, and the occipito-frontal diameter of $4\frac{1}{2}$ inches is increased. In a face presentation the face is much swollen when born, especially the lips and eyes, and the mother should not be shown her child until the worst part of the disfigurement has passed off. This swelling may take a day or two to disappear entirely.

The dotted line represents the normal shape of the head.

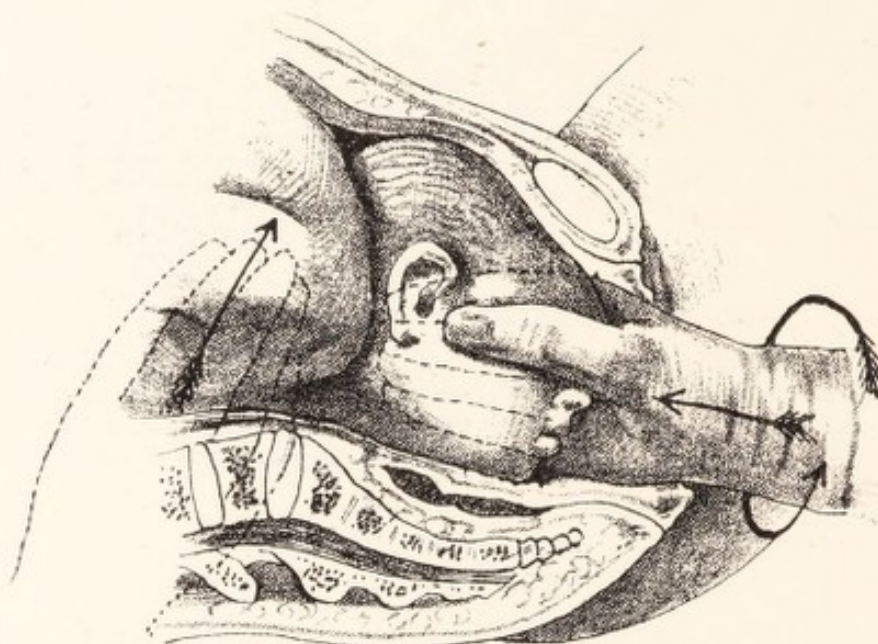


FIG. 143.—MANUAL ROTATION OF A PERSISTENT MENTO-POSTERIOR POSITION.

This is a rare occurrence when, if in a 1st or 2nd face the head is not properly extended, the forehead, touching the pelvic floor first, is rotated forwards $\frac{1}{2}$ of a circle, and the chin passes back into the hollow of the sacrum. If the chin remains posterior, unless the child is very small it cannot be born, as the neck and shoulders have entered the brim and the vertex is pressed against the symphysis, a wedge being thus formed. With this complication, therefore, the head must be rotated, since otherwise, if the head cannot advance, it will have to be delivered by the forceps or perforated. The method of rotating the head is similar to that described for Fig. 118.



FIG. 144.—BREECH PRESENTATION.

The lie of the child is longitudinal. The legs and thighs are flexed, and the feet are near the buttocks. The presenting part is the breech. Breech presentation, which occurs in about 1 in 40 labours, may be due to the fact that the head of the child cannot enter the pelvis because the latter is contracted, because a placenta prævia is present, or because of obliquity of the uterus. In a fifth of the cases of twin labour, one child is born by the breech. If the head of the child is larger than normal, as in hydrocephalus, it will fit into the upper segment of the uterus better than into the lower segment, or if there is an excess of liquor amnii the child moves about more easily; also in cases of premature labour the presentation may be a breech. These are causes of breech, but in many cases a cause cannot be found.



FIG. 145.—FIRST BREECH: RELATION OF THE CHILD TO THE PELVIS, AS SEEN FROM ABOVE.

The lie is longitudinal. The breech has entered the brim. The back of the child points to the left and in front. The breech is presenting. The anterior buttock rotates forwards $\frac{1}{8}$ of a circle. After the shoulders are born the occiput rotates forwards $\frac{1}{8}$ of a circle.

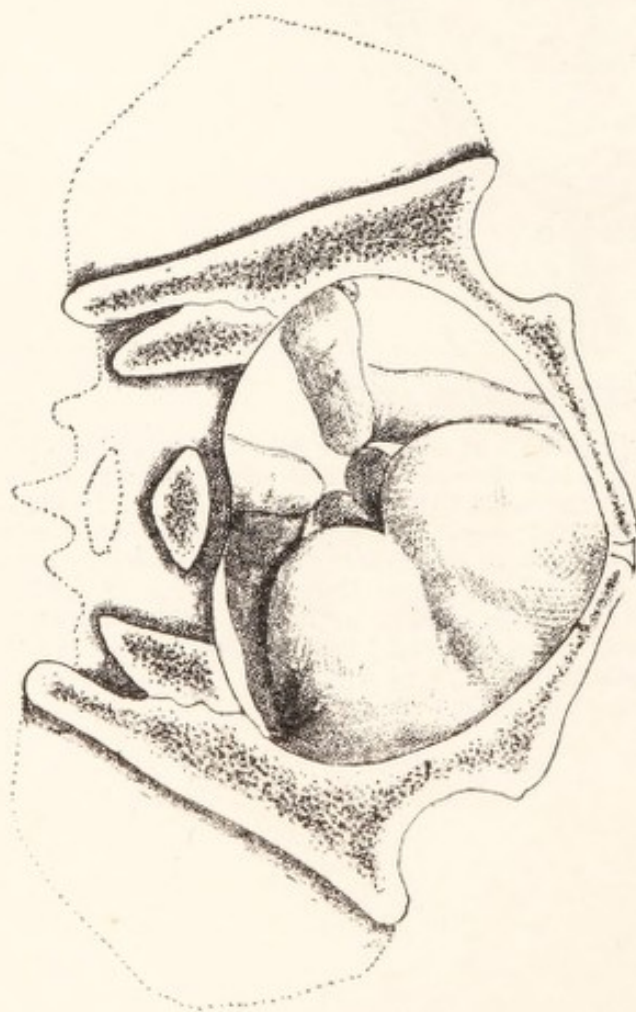


FIG. 146.—FIRST BREECH: RELATION OF THE PRESENTING PART TO THE PELVIS, AS SEEN FROM BELOW.

The position is a left sacro-anterior. The bis-iliac diameter lies in the left oblique diameter of the pelvis. The sacrum points forwards and to the left.

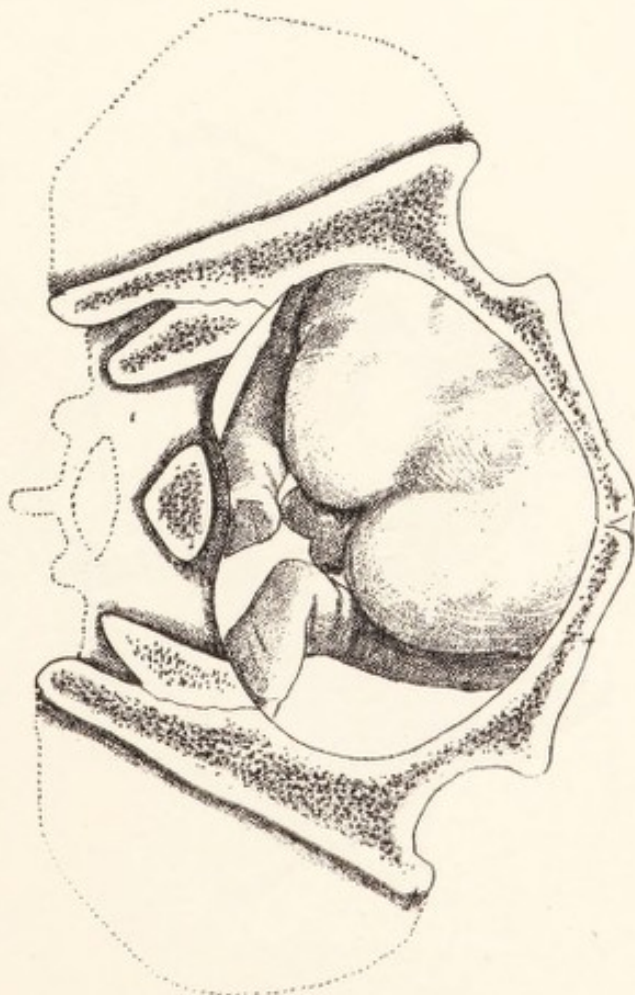
FIG. 147. — SECOND BREECH: RELATION OF THE CHILD TO THE PELVIS, AS SEEN FROM ABOVE.

The lie is longitudinal. The breech has entered the brim. The back of the child points to the right and in front. The breech is presenting. The anterior buttock rotates forwards $\frac{1}{8}$ of a circle. After the shoulders are born the occiput rotates forwards $\frac{1}{8}$ of a circle.



FIG. 148. — SECOND BREECH: RELATION OF THE PRESENTING PART TO THE PELVIS, AS SEEN FROM BELOW.

The position is a right sacro-anterior. The bis-iliac diameter is in the right oblique diameter of the pelvis. The sacrum points forwards and to the right.



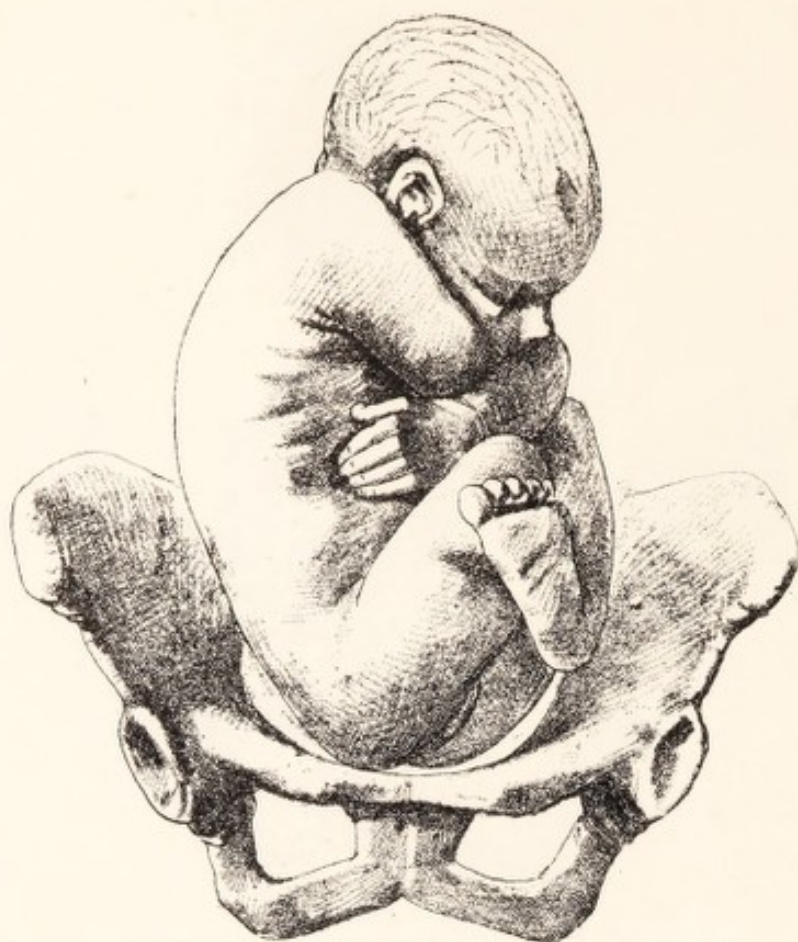


FIG. 149.—THIRD BREECH: RELATION OF THE CHILD TO THE PELVIS, AS SEEN FROM ABOVE.

The lie is longitudinal. The breech has entered the brim. The back of the child points to the right and behind. The breech is presenting. The anterior buttock rotates forwards $\frac{1}{4}$ of a circle. The amount of rotation and direction of the occiput depends on the amount of rotation of the shoulders. If, during the rotation of the breech, the shoulders are well rotated so that its bis-iliac diameter enters the same oblique as that formerly occupied by the bis-iliac diameter, the occiput may be carried round so that the long diameter of the head reaches the transverse diameter of the pelvis. If, then, the head is well flexed, the occiput entering the pelvis will rotate forwards $\frac{1}{4}$ of a circle. If, however, the head is not well flexed, the occiput will be posterior to the transverse diameter, in which case the head, if small, may slip through the pelvis, or otherwise the occiput will rotate back $\frac{1}{4}$ of a circle into the hollow of the sacrum and remain posterior.

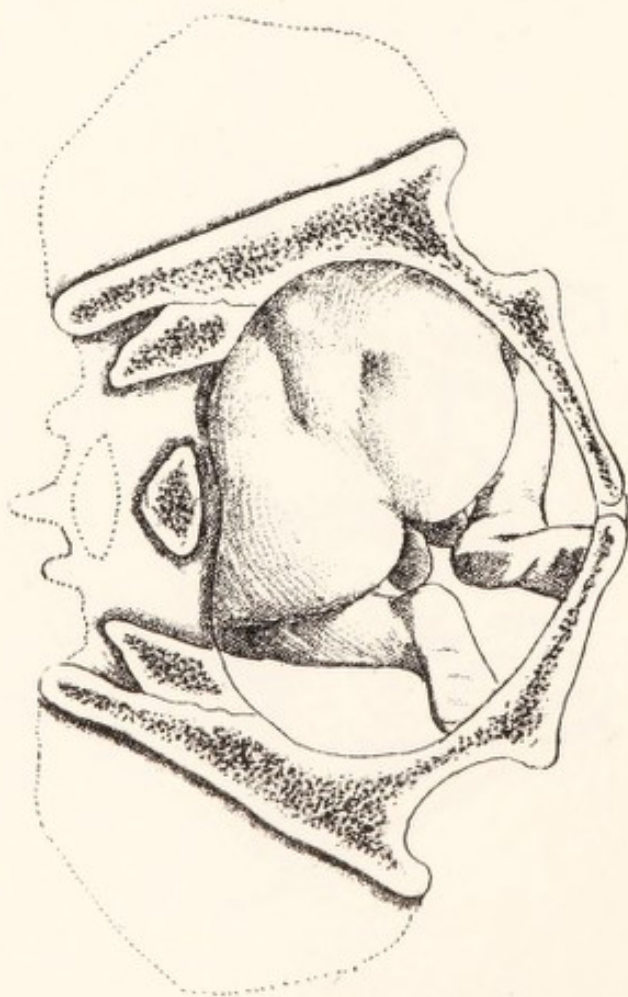


FIG. 150.—THIRD BREECH: RELATION OF THE PRESENTING PART TO THE PELVIS, AS SEEN FROM BELOW.

The position is a right sacro-posterior. The bis-iliac diameter is in the left oblique diameter of the pelvis. The sacrum points backwards and to the right.

FIG. 151.—FOURTH BREECH: RELATION OF THE CHILD TO THE PELVIS, AS SEEN FROM ABOVE.

The lie is longitudinal. The breech has entered the brim. The back of the child points to the left and behind. The breech is presenting. The anterior buttock rotates forwards $\frac{1}{8}$ of a circle. See description under Fig. 149.



FIG. 152.—FOURTH BREECH: RELATION OF THE PRESENTING PART TO THE PELVIS, AS SEEN FROM BELOW.

The position is a left sacro-posterior. The bis-iliac diameter is in the right oblique diameter of the pelvis. The sacrum points backwards and to the left.

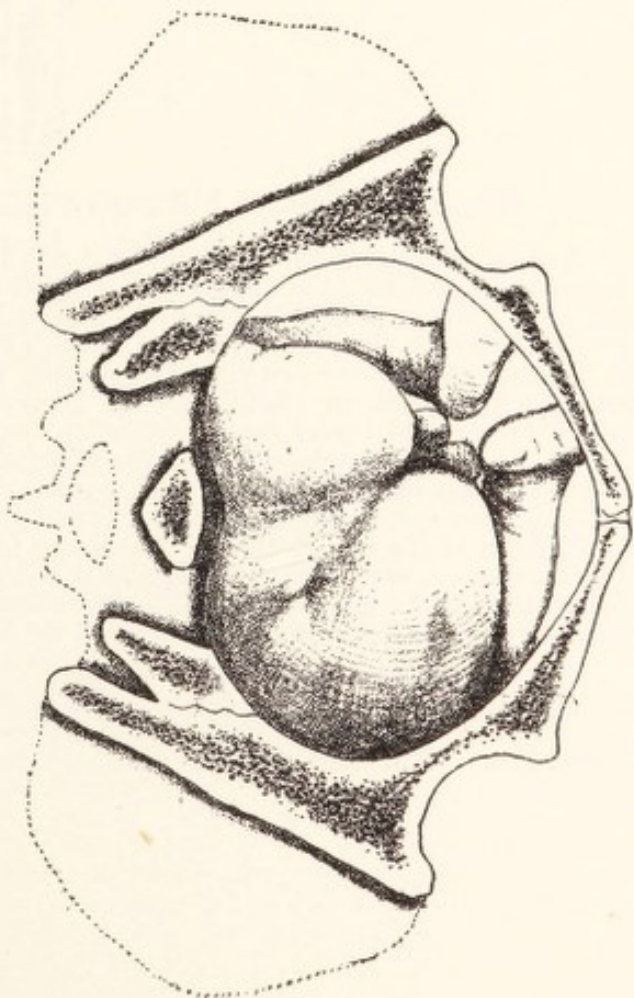




FIG. 153.—BREECH PRESENTATION : EXTENSION OF THE LEGS.

A small or premature child may be born in such a position. The birth of the child may be arrested, because the body of the child cannot undergo lateral flexion if the legs are at the sides, or if they are in front the head and feet form a diameter too large to pass through the brim of the pelvis. The complication may be expected if early in labour, there is undue rigidity on each side of the abdomen, if the breech has entered the pelvis, in which case the heart-sounds will be on a lower level than an otherwise normal breech, and if later on vaginal examination the feet cannot be felt. In the majority of cases, especially in multiparæ or when the child is premature, or the pelvis is larger than normal and the uterine contractions are strong, given time the child will be born spontaneously. This complication may be suspected, apart from other indications, if the breech is very low down in the pelvis and, in spite of good uterine contractions, is arrested. If the child is not being born naturally the usual method of treatment is to bring down a leg or, that failing, to pass a finger over the posterior and anterior groins alternately and thus pull the breech down.

NOTE.—In these cases the body of the child being more flexed than in an uncomplicated breech, on vaginal examination the hard sacrum is felt. Unless the lie and presentation of the child has been carefully verified by abdominal examination, the hard sacrum may be mistaken for the vertex—a mistake which is not uncommon.

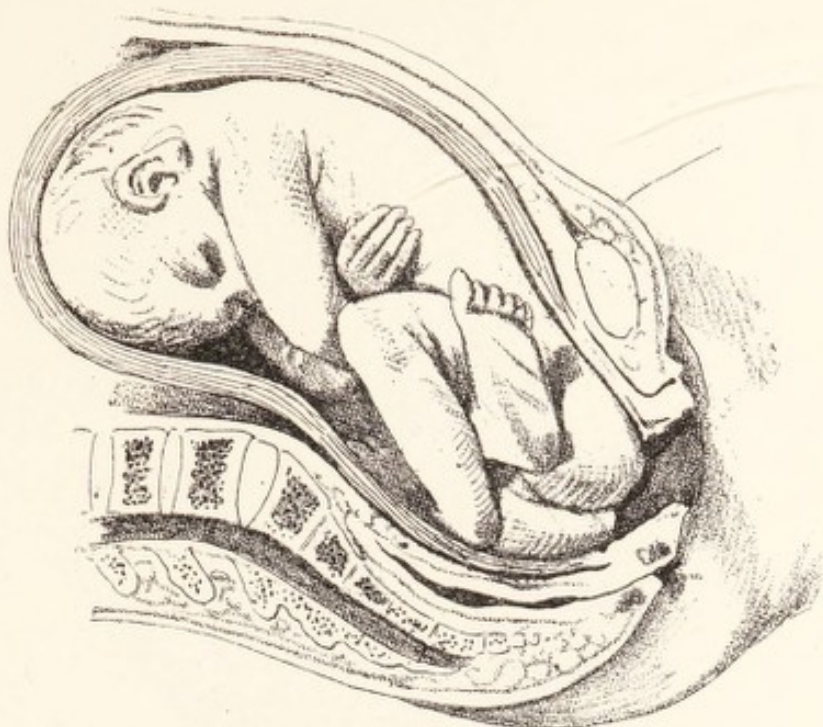


FIG. 154.—INTERNAL ROTATION OF THE BREECH.

The breech rotates inside the pelvis; the anterior buttock, touching the pelvic floor first, is rotated by it forwards $\frac{1}{2}$ of a circle. The longest diameter of the outlet being the antero-posterior, the bis-iliac diameter has to fit into it, and is enabled to do this by the rotation.

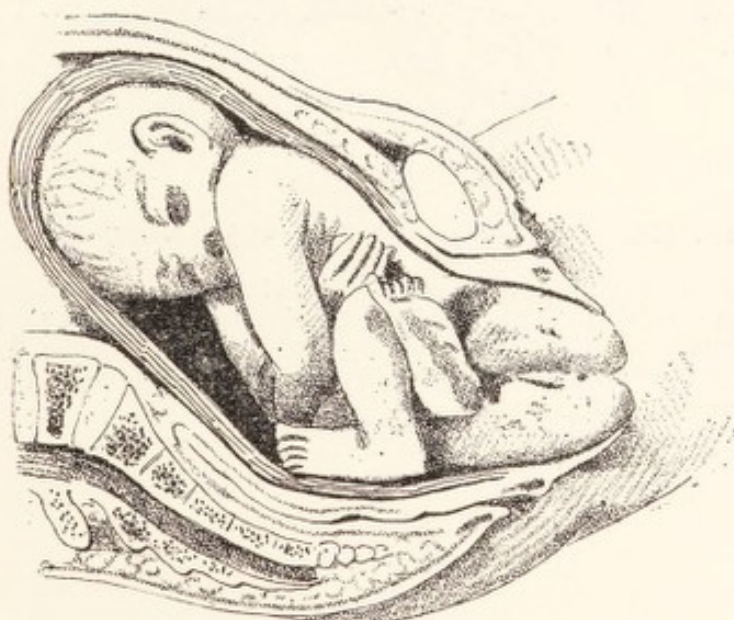


FIG. 155.—LATERAL FLEXION OF THE BODY.

The anterior buttock being now in front, the breech continues to descend, till the anterior buttock has escaped under the pubic arch. The side of the child being now resisted by the pubic arch, the body flexes laterally and the posterior buttock is born.

The breech then undergoes external rotation to allow the shoulders to enter the brims which are then born. Lastly, the head is born flexed, rotating $\frac{1}{2}$ or $\frac{3}{4}$ of a circle for ward, according to whether the occiput is in front or behind. See note to Fig. 149.



FIG. 156.—DELIVERY OF THE POSTERIOR ARM.

When the shoulders are lying in an antero-posterior position, the child being rotated if necessary to ensure this, the body of the child is carried forward by the legs towards the mother's abdomen. When the posterior scapula is well clear of the vulval orifice, but not before, the index finger of the left hand is slipped over the posterior arm, which is then delivered.

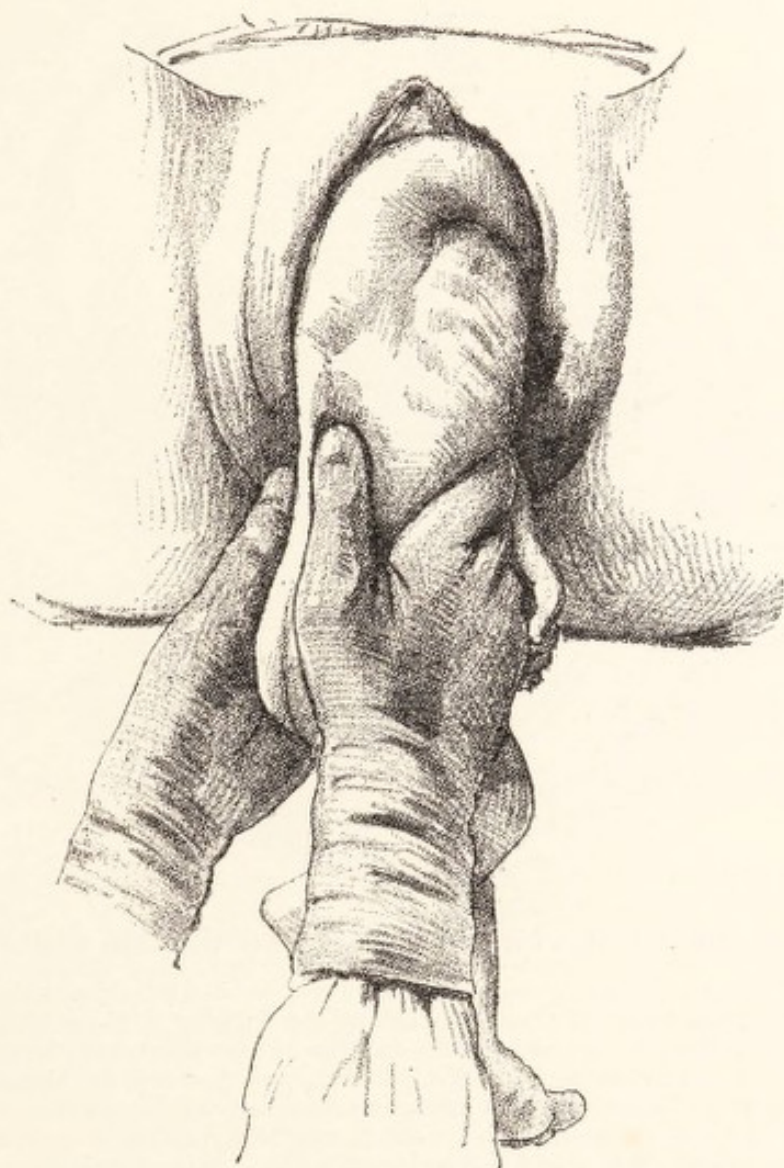


FIG. 157.—DELIVERY OF THE ANTERIOR ARM.

The body of the child, being held by its pelvis so that the abdominal viscera may not be injured, is carried back towards the perineum, when the anterior shoulder slips out.

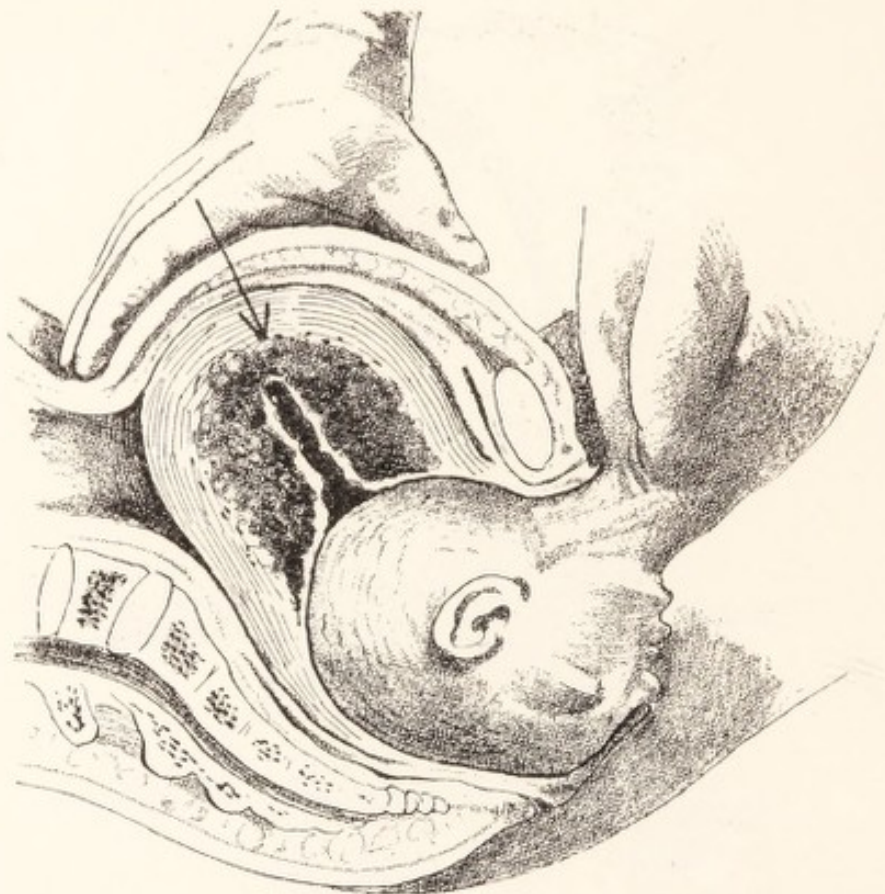


FIG. 158.—DELIVERY OF THE HEAD OF THE CHILD.

The nape of the neck having escaped under the pubic arch, the body of the child is gently lifted upwards towards the abdomen of the mother. Meanwhile the midwife, or better still an assistant, presses on the fundus of the uterus (1) to assist in the expulsion of the head, (2) to keep up the flexion of the head which has already taken place, and (3) to prevent, so far as possible, the premature separation of part of the placenta. This last point has reference to the fact that, unlike a vertex presentation, when the head has left the uterus, this organ is empty—that is, it is in a condition resembling the 3rd stage of labour—and retraction of the placental site now sets in. The moulding of the head is not marked.

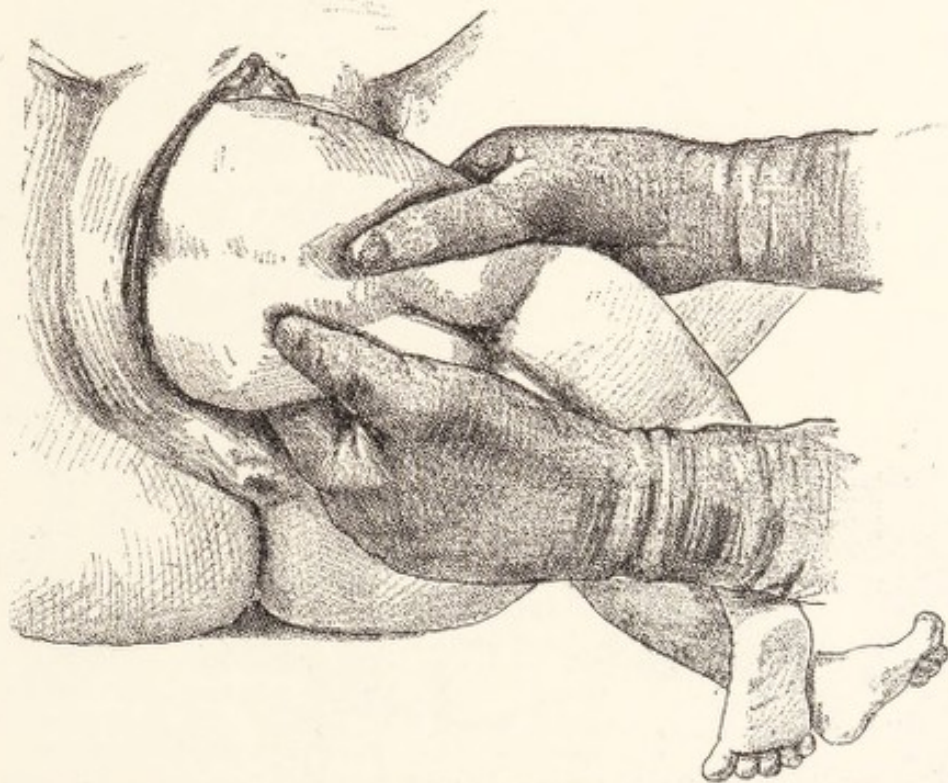


FIG. 159.—EXTENSION OF THE ARMS IN A BREECH DELIVERY : BRINGING DOWN THE SHOULDERS.

Extension of the arms is generally due to the breech or legs having been pulled upon to assist delivery. The arms may also become extended if the breech slips through the cervix before it is fully dilated. Rarely it is due to a contracted pelvis. The birth of the child is delayed, and the arms cannot be felt folded over the chest when a vaginal examination is made.

The body of the child being held by the pelvis, so as not to injure the abdominal viscera, it is pulled down in the axis of the brim of the pelvis so as to get the shoulders as low as possible. There being more room behind than in front to insert the hand, the posterior arm is brought down first. The midwife grasps the legs of the child, which have been covered with a sterilized towel, and pulls the body of the child as low as possible and then forwards. The fingers of the left hand having been passed along the posterior arm till the elbow is reached, the forearm is held between the middle and index fingers, which thus act as a splint and diminish the risk of fracture. The forearm is then swept across the face and brought down. The body of the child is now rotated so that the anterior arm becomes the posterior. The anterior arm is then brought down in the same way as depicted above.

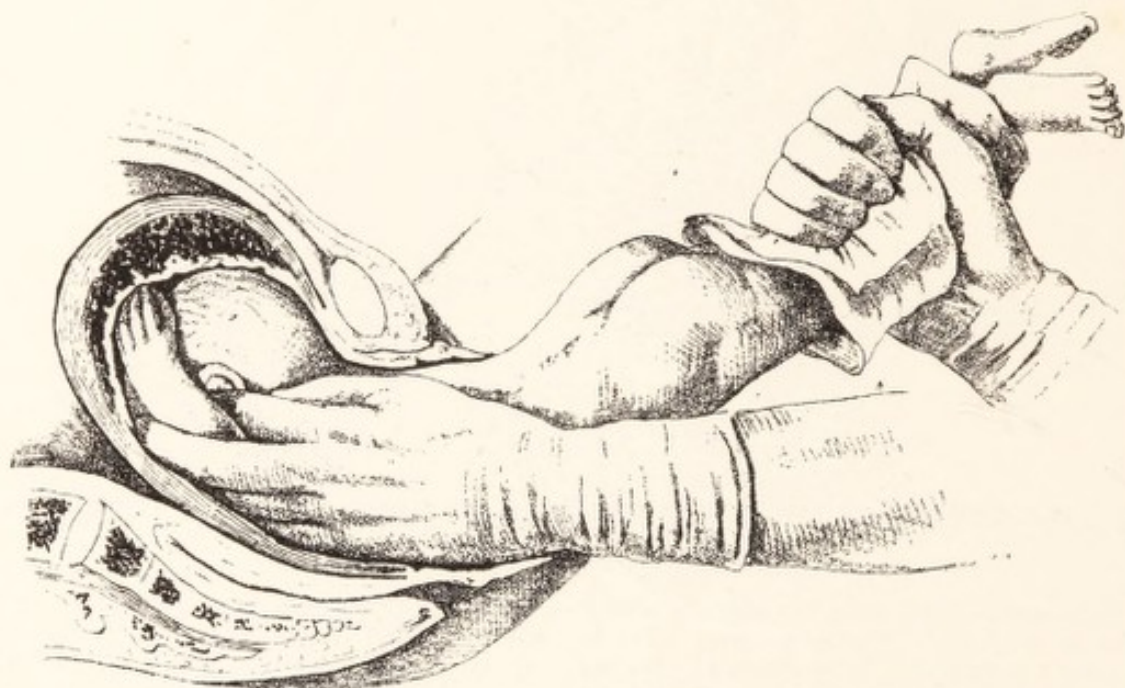


FIG. 160.—BRINGING DOWN THE EXTENDED ARMS.

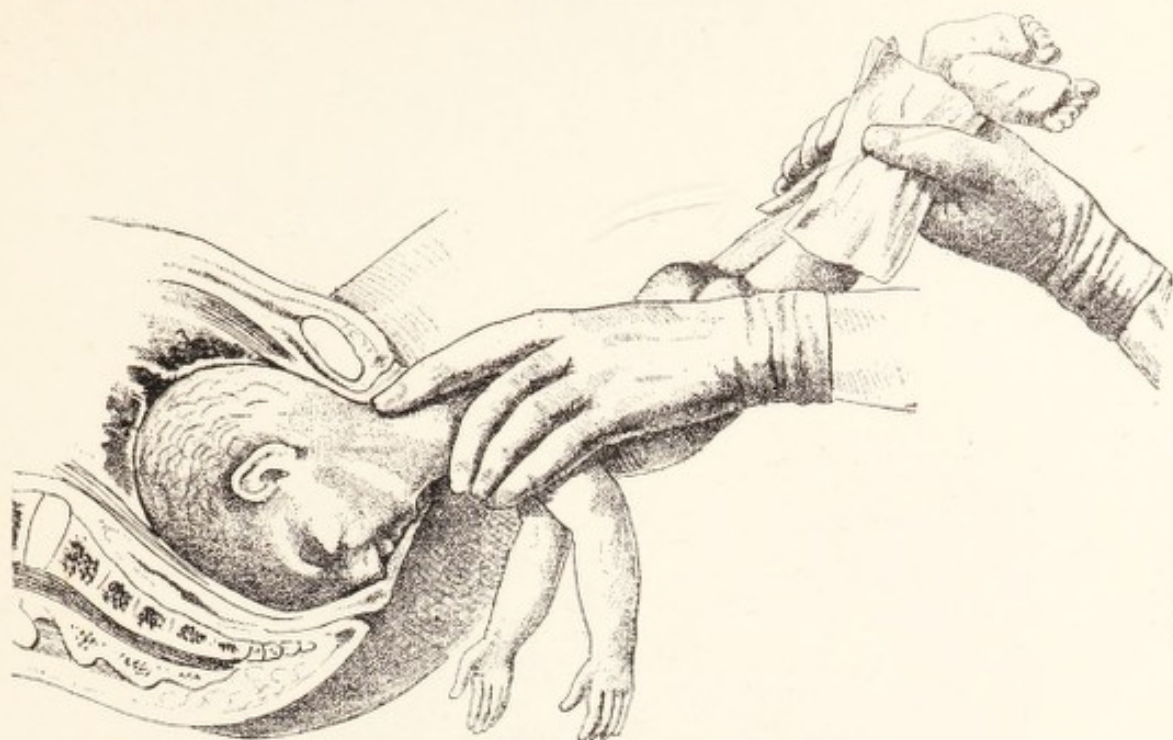


FIG. 161.—PRAGUE METHOD OF DELIVERY.

If the head becomes extended in a breech delivery, the occipito-mental diameter of $4\frac{1}{2}$ inches or the occipito-frontal diameter of 4 inches is thrown across the pelvis instead of the sub-occipito-bregmatic of $3\frac{1}{2}$ inches. The result is that the expulsion of the head is delayed. In such a case, if the head is in the pelvic cavity, it can be delivered by the Prague method of delivery, or by face flexion and suprapubic pressure, or by face flexion and shoulder traction.

The midwife grasps the legs of the child, which have been covered with a sterilized towel, with her right hand, and draws them forwards over the abdomen of the mother. She then places the first and second fingers of her left hand each side of the neck of the child. With these aids to traction she delivers the head of the child, an assistant, if available, meanwhile pushing hard on the fundus of the uterus. This manœuvre must never be attempted till the head of the child is through the brim and the nape of its neck is under the pubic arch, otherwise the respiratory centre of the child will be injured.



FIG. 162.—FACE FLEXION AND SUPRAPUBIC PRESSURE.

If the head is being delivered by face flexion and suprapubic pressure, strong pressure is applied to the head through the abdominal wall with one hand, and, with the fingers of the other hand in the child's mouth and its body resting on the arms straddlewise, the head is extracted, the body being carried upwards. This is the best method to deliver the head when arrested in the cavity of the pelvis.

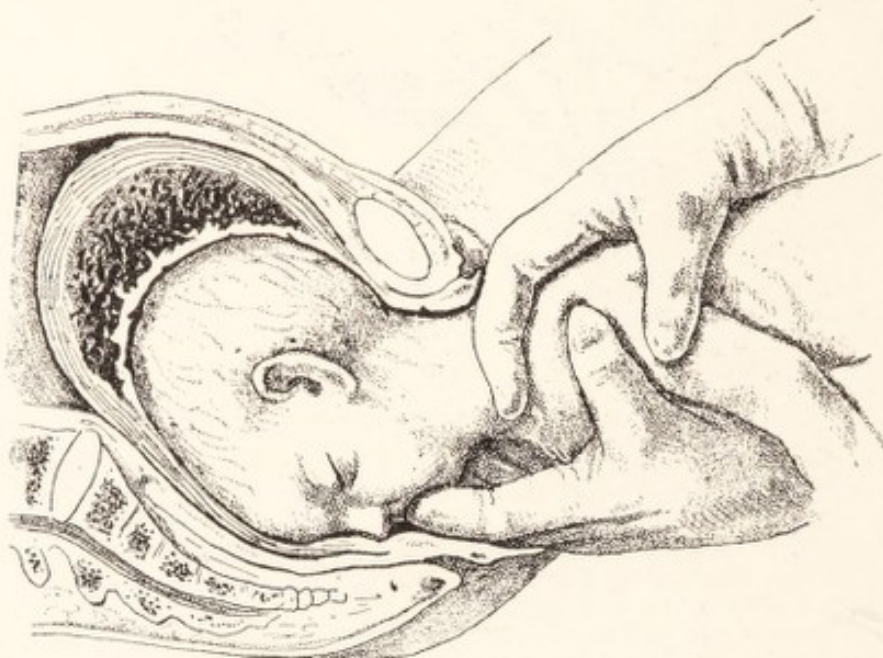


FIG. 163.—FACE FLEXION AND SHOULDER TRACTION WITH THE HEAD ABOVE THE BRIM OF THE PELVIS.

An assistant, if available, should press on the top of the uterus by the abdomen.

The head is delivered by suprapubic pressure and traction from below, preferably by the hands, as this will be quicker, though the forceps can be used. The body of the child, having been wrapped in a warm towel, is placed across the left arm with a leg on each side. The first and second fingers of the left hand are inserted between the lower jaw and the cheeks, the child's body straddling on the arm. The right hand is then passed up along the back, and the first and third fingers are hooked over the shoulders. The long diameter of the head is then rotated into the transverse diameter of the pelvis to get it through the brim, after which the head is pulled through the birth canal by flexion of the head, traction on the shoulders, and pressure on the fundus of the uterus. The same method may be employed if the head is delayed in the pelvic cavity.



FIG. 164.—OCCIPUT POSTERIOR IN BREECH DELIVERY.

If the breech presents in the 3rd or 4th position, the occiput will be posterior. During labour the occiput usually undergoes internal rotation and comes to the front. Very rarely it remains behind (see under Fig. 149). In this case an attempt must be made to bring it to the front by rotating the body of the child, with or without the assistance of a finger in its mouth. As a rule, this will be successful. If the occiput cannot be rotated, the legs of the child must be carried forwards over the mother's abdomen with one hand, and with the first and second fingers of the other hand, one over each of the shoulders, traction is made.

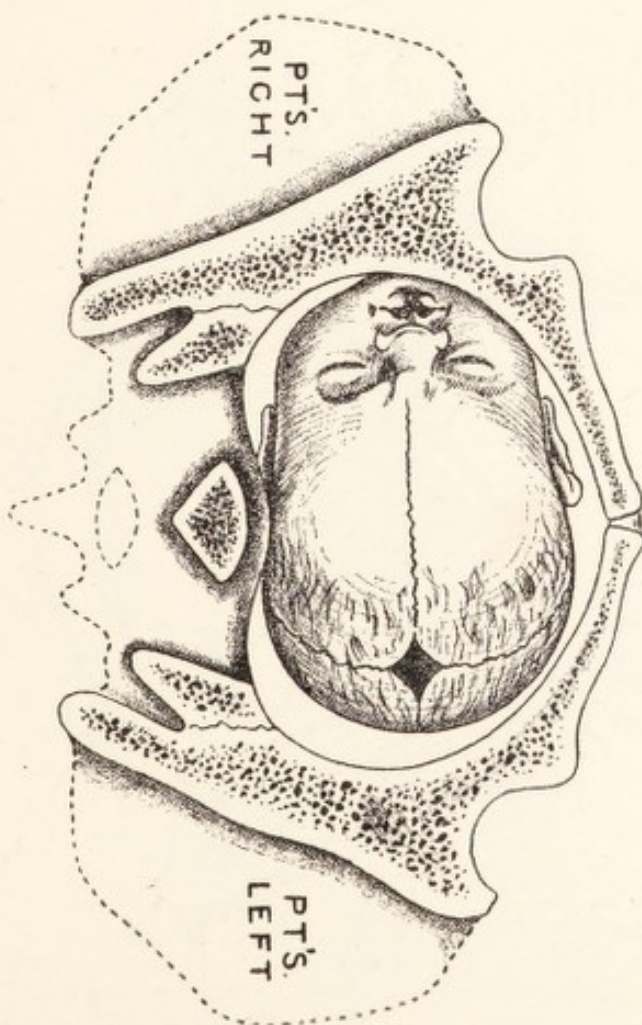
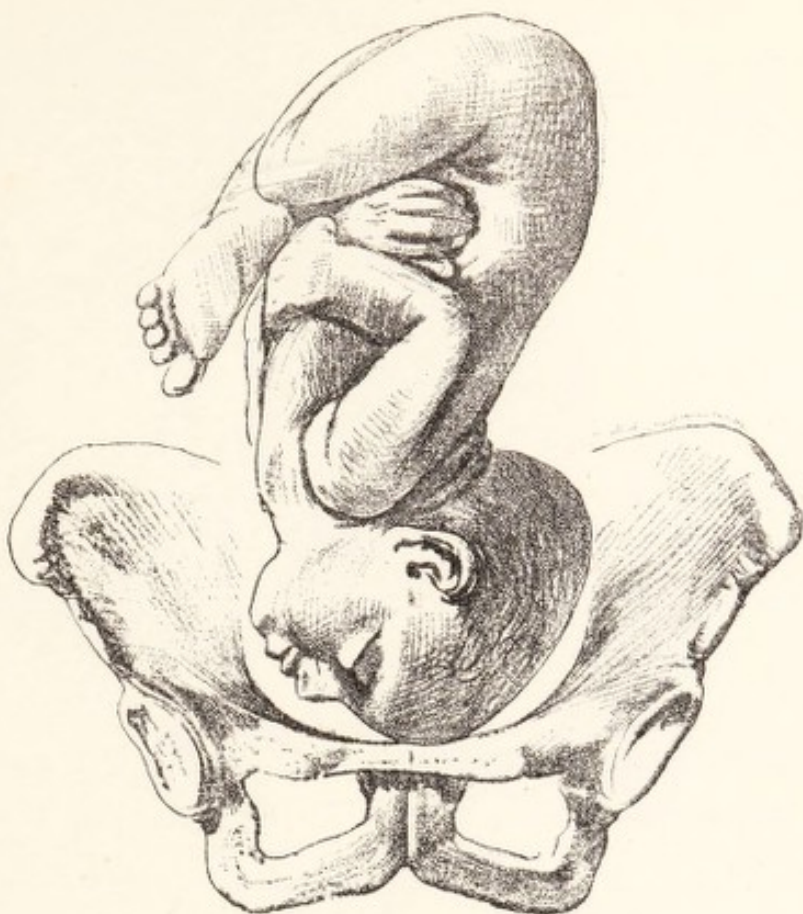


FIG. 165.—BROW PRESENTATION : POSITION OF THE CHILD IN THE UTERUS.

The lie of the child is longitudinal. The back is looking forward and to the left. The head is partly extended. The presenting part extends from the chin to the farthest point of the vertex, the diameter being the vertico-mental of $5\frac{1}{2}$ inches. This malposition is rare, and the head could not pass through the pelvis if both were of the average size and the presentation persisted. Brow presentation is due to most of the causes of face presentation, and more especially to marked obliquity of the uterus or a contracted pelvis.

**FIG. 166.—FIRST BROW:
RELATION OF THE
CHILD TO THE PELVIS,
AS SEEN FROM ABOVE.**

The lie is longitudinal. The head, which is usually lying transversely, is partly extended and, probably, has not entered the brim of the true pelvis. The back of the child is towards the left, and the chin is pointing to the right side of the pelvis. The brow is presenting.



**FIG. 167.—FIRST BROW: RELATION
OF THE FŒTAL HEAD TO THE
PELVIS, AS SEEN FROM BELOW.**

The long diameter of the head is lying on the transverse diameter of the pelvis; the frontal suture is the lowest point. Towards the right of the pelvis the root of the nose is situated, and towards the left the anterior fontanelle.

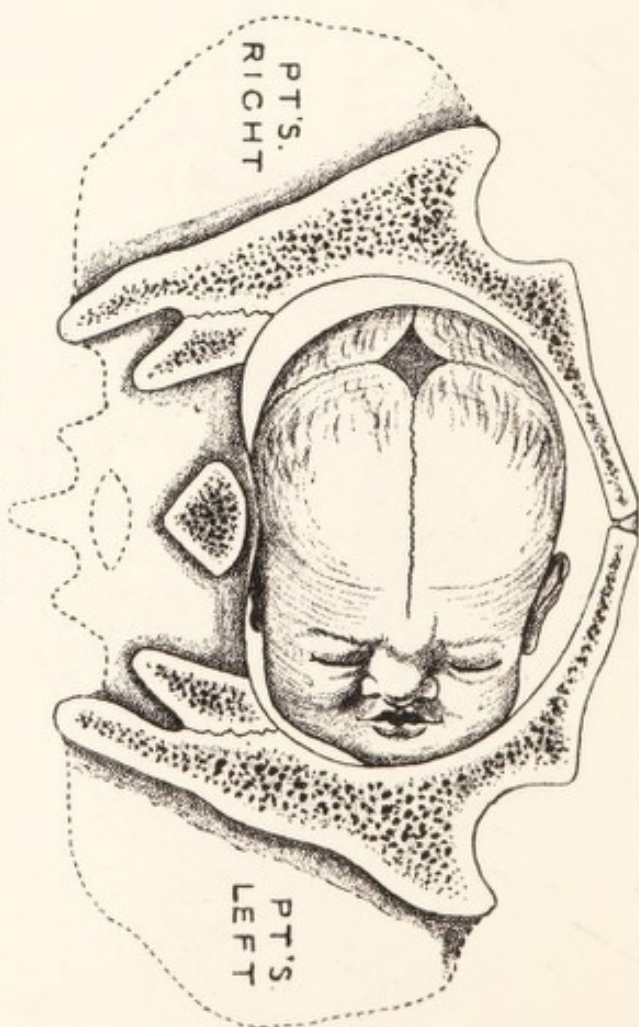


**FIG. 168.—SECOND BROW:
RELATION OF THE
CHILD TO THE PELVIS,
AS SEEN FROM ABOVE.**

The lie is longitudinal. The head, which is usually lying transversely, is partly extended and, probably, has not entered the brim of the pelvis. The back of the child is towards the right, and the chin is pointing to the left side of the pelvis. The brow is presenting.

**FIG. 169.—SECOND BROW: RELATION
OF THE FŒTAL HEAD TO THE
PELVIS, AS SEEN FROM BELOW.**

The long diameter of the head is lying on the transverse diameter of the pelvis; the frontal suture is the lowest point. Towards the left of the pelvis the root of the nose is situated, and towards the right the anterior fontanelle.



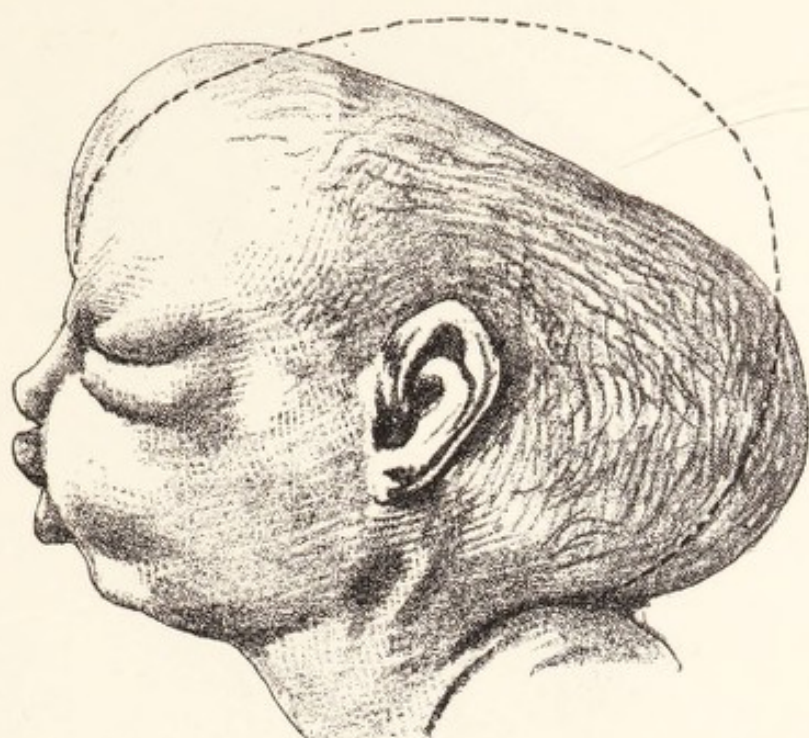


FIG. 170.—MOULDING OF THE HEAD OF THE CHILD IN BROW PRESENTATION.

The vertico-mental diameter of $5\frac{1}{2}$ inches is shortened, and the occipito-frontal diameter of $4\frac{1}{2}$ inches is lengthened. Delivery can only occur if labour is premature, or if the head of the child at birth is small.

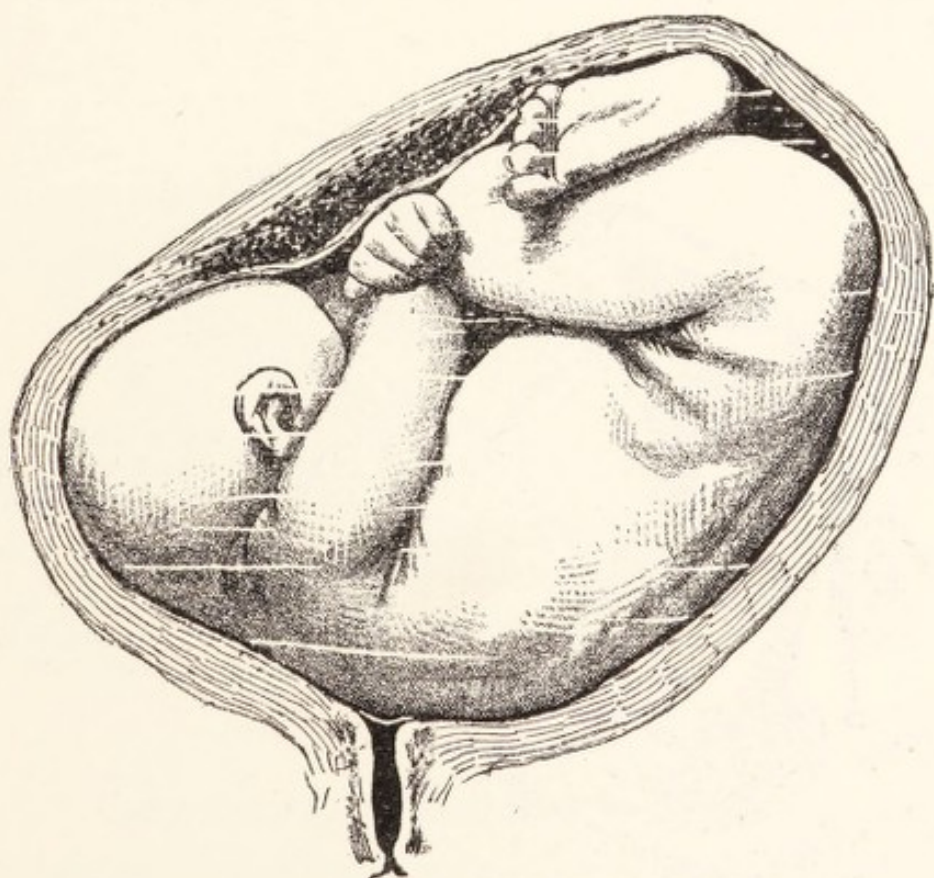


FIG. 171.—OBLIQUE LIE.

The child is lying obliquely, the shoulder presenting at the internal os. Often called a transverse lie, but a child at term cannot lie transversely; either the head or breech must be the higher. Note the peculiar shape of the uterus, which can be identified by inspection of the abdomen.

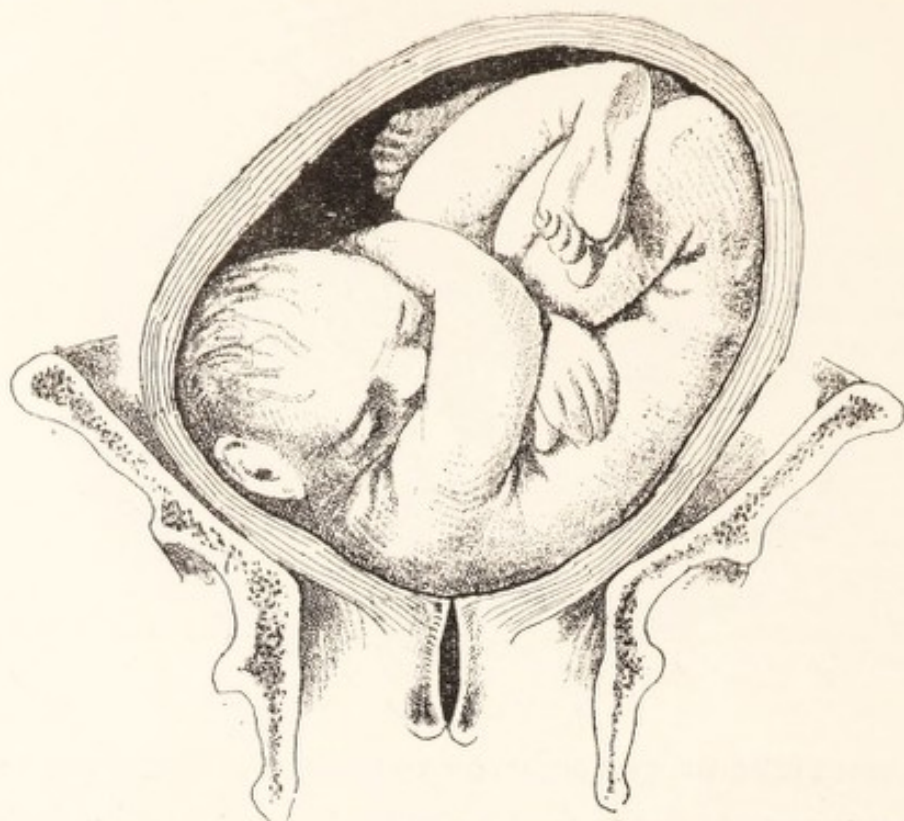


FIG. 172.—RELATION OF THE CHILD TO THE PELVIS, AS SEEN FROM ABOVE.

The child lies in the oblique diameter of the pelvis, the head in one or the other iliac fossa, the breech in the opposite side, but at a somewhat higher level, one shoulder presenting at the internal os.

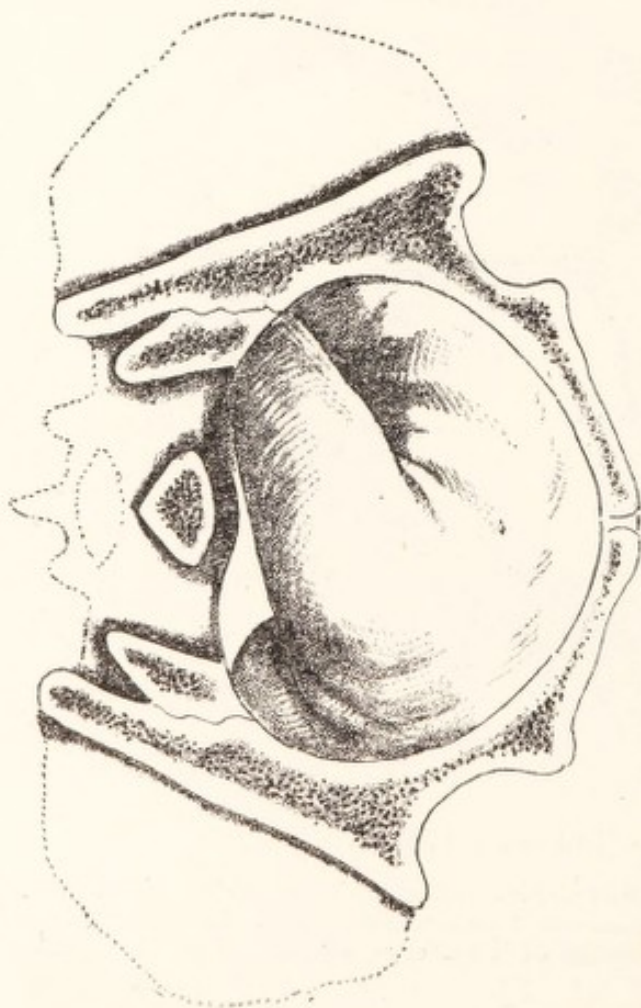


FIG. 173.—RELATION OF THE PRESENTING PART TO THE PELVIS, AS SEEN FROM BELOW.

The right shoulder of the child is presenting. The head is in the left iliac fossa of the pelvis, the breech is on the right at a higher level. The position is a dorso-anterior.

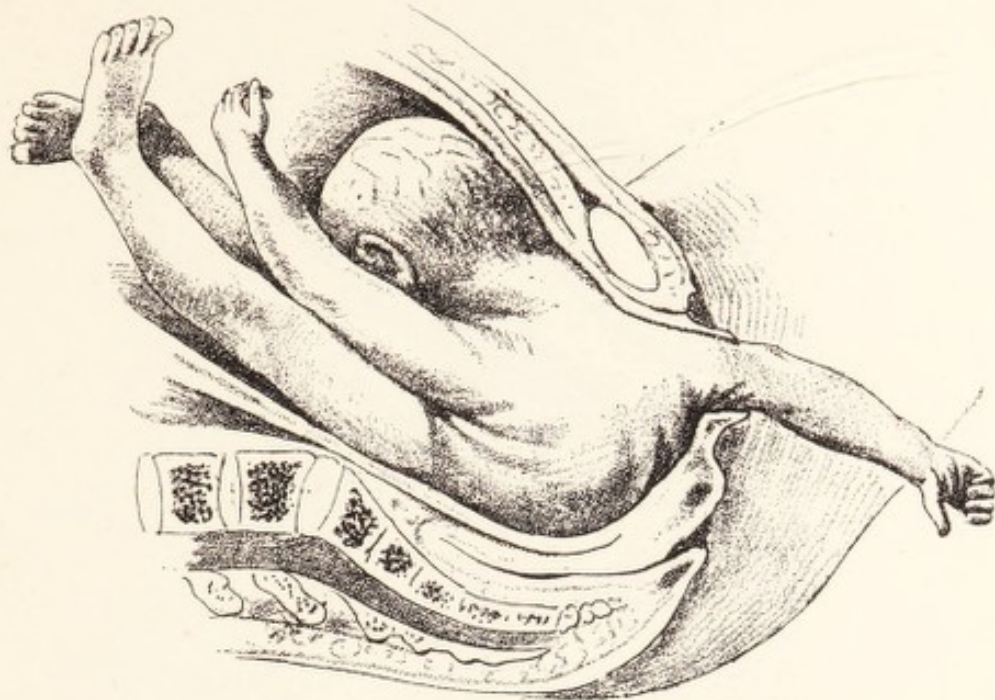


FIG. 174.—SPONTANEOUS EVOLUTION: STAGE I.

The natural method of delivery in a shoulder presentation, if left alone, is by spontaneous evolution. To allow of spontaneous evolution taking place, the child must be premature and doubled up, the pelvis roomy, the uterine action strong, the arm prolapsed, and the shoulder forced down as far as it will go.

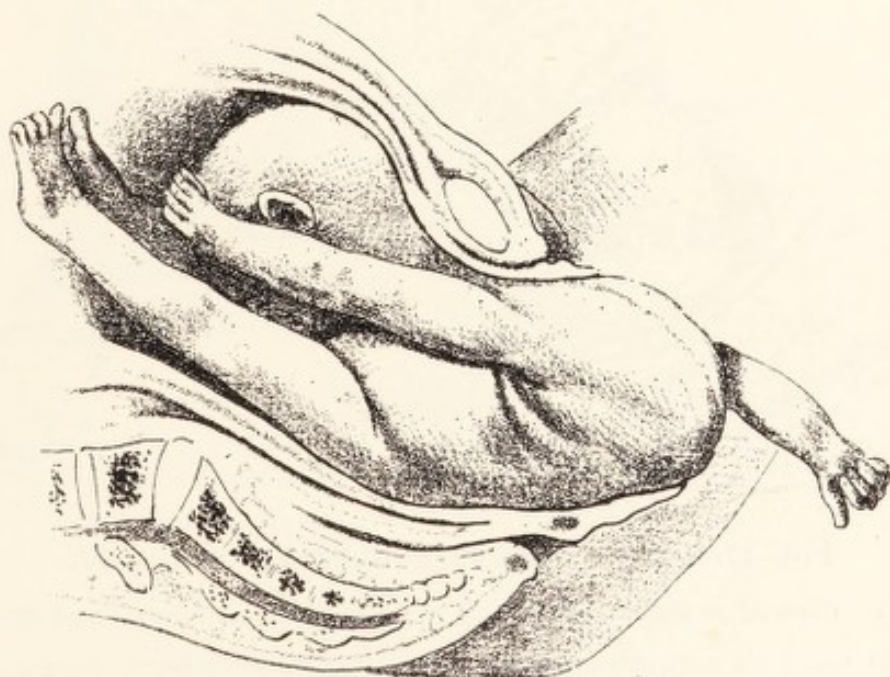


FIG. 175.—SPONTANEOUS EVOLUTION: STAGE II.

Head above the brim jammed into the abdomen, neck against the back of the symphysis, breech at the hollow of the sacrum, chest distending the vulval orifice.

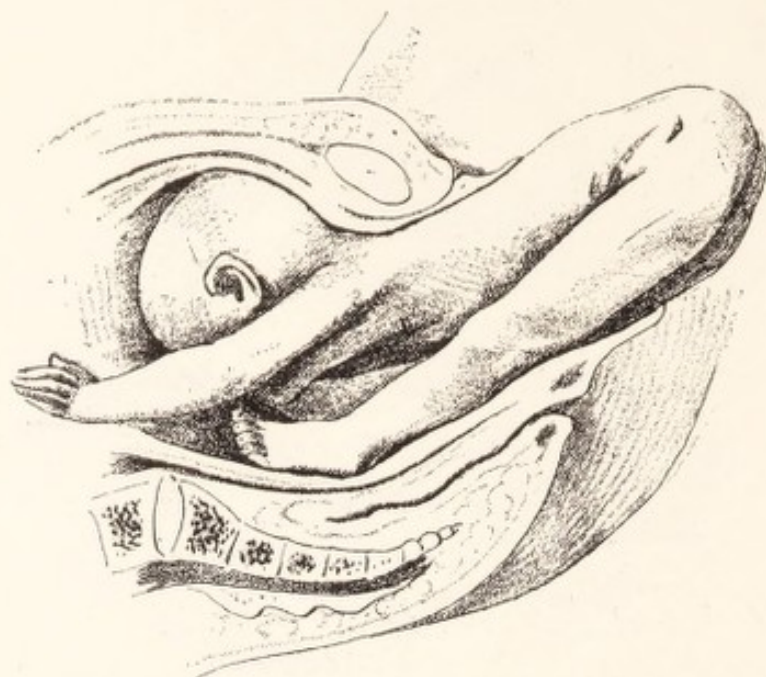


FIG. 176.—SPONTANEOUS EVOLUTION: STAGE III.

Birth of the body of the child, thorax, abdomen, and breech.

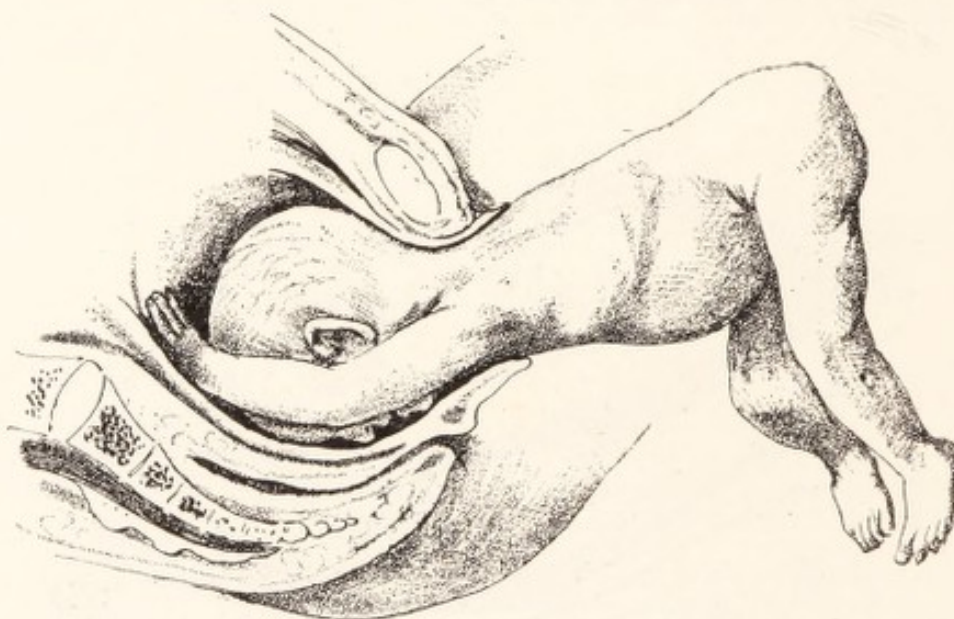


FIG. 177.—SPONTANEOUS EVOLUTION: STAGE IV.

Birth of the after-coming head and the remaining arm extended by it.

NOTE.—It must be remembered that the methods of delivery depicted in Figs. 174, 175, 176, 177 can only take place in neglected cases unless the child is dead and premature. If the child is of normal size the uterus will pass into tonic contraction and probably be ruptured.

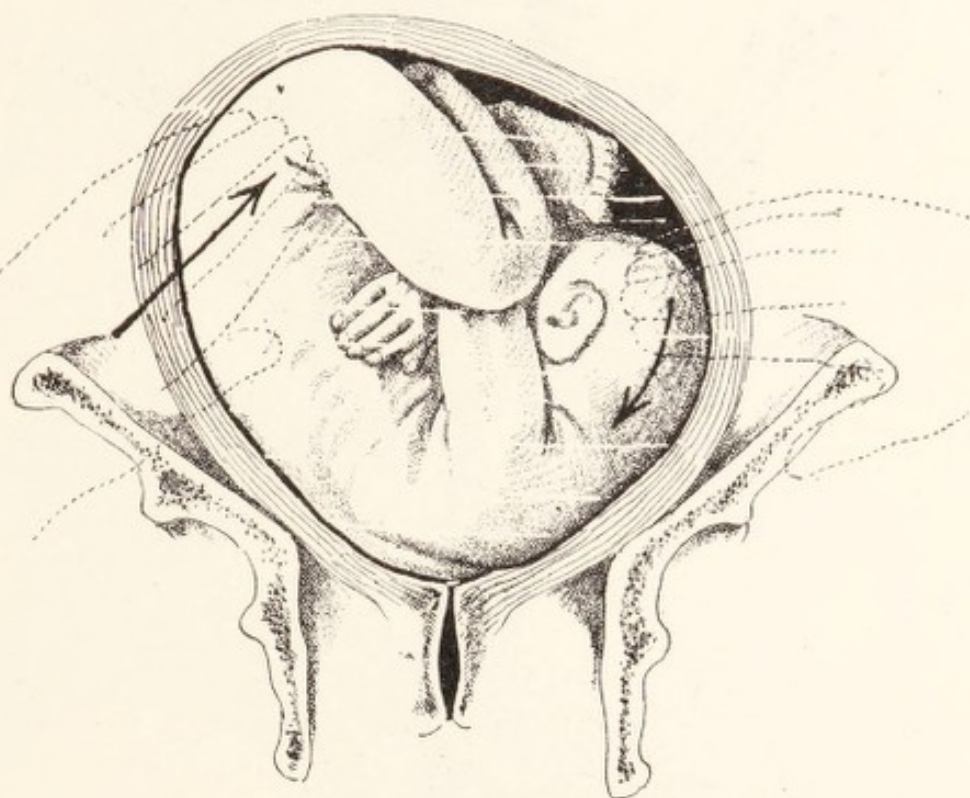


FIG. 178.—EXTERNAL CEPHALIC VERSION.

The operation of external version is best performed when the patient is seen in the antenatal department, and as soon after the 36th week as possible, although it can at times be performed early in the 1st stage of labour before the membranes have ruptured. It is indicated when the pelvis of the mother is normal and the lie of the child is oblique, since delivery is much safer for the child if the head presents. External cephalic version is performed by abdominal manipulations, one hand pushing the head down, the other hand pushing the breech up in the intervals of the pains as illustrated.

If necessary, and a doctor is not available, an experienced midwife may be able to perform external version. Other methods of version are bipolar podalic version and internal podalic version, which consist in bringing down a leg of the child, and are performed in cases of unavoidable hæmorrhage, flattened pelvis, and prolapse of the umbilical cord.

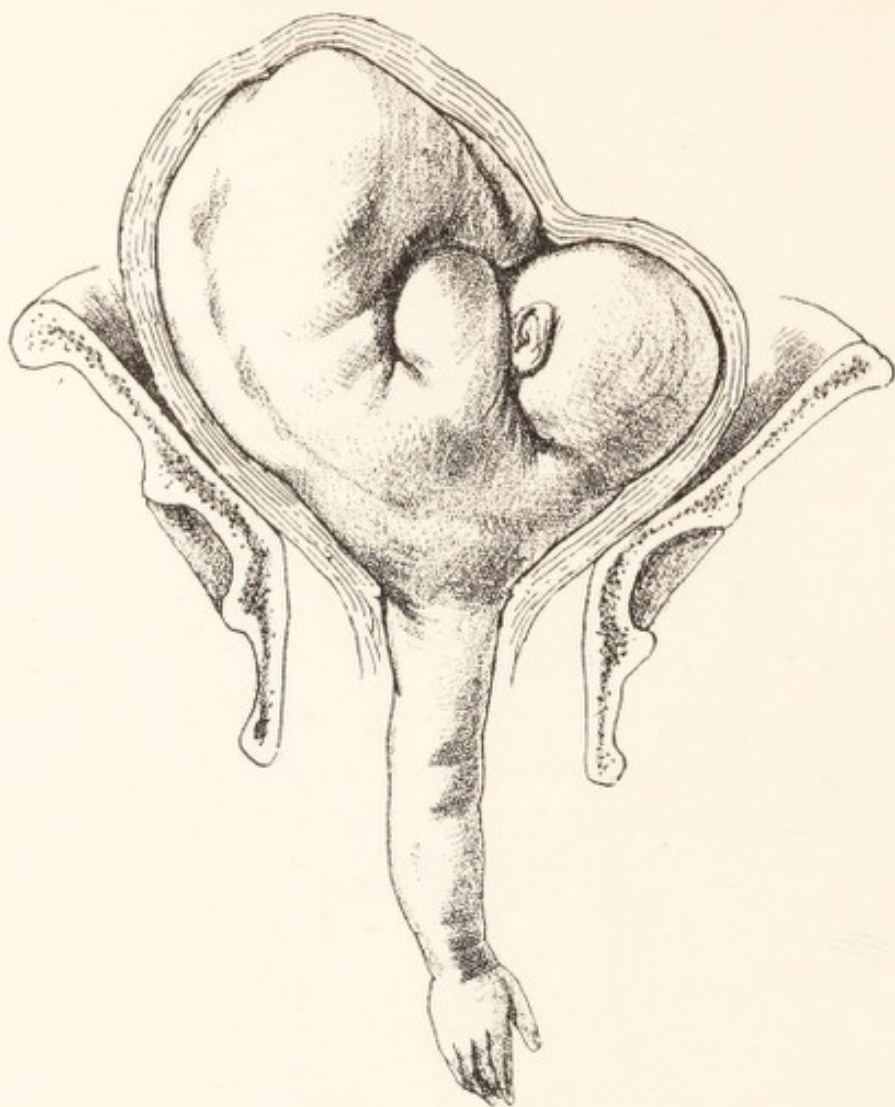


FIG. 179.—ARM PRESENTATION.

If the midwife in a case of oblique lie has not been sent for till hours after the rupture of the membranes, a circumstance difficult to imagine nowadays except in out-of-the-way places, the condition of neglected shoulder presentation will arise. The shoulder will have been forced down into the pelvis, the arm will be presenting, and the uterus will be contracted tightly round the child, which will be dead. In many cases the uterus ruptures.

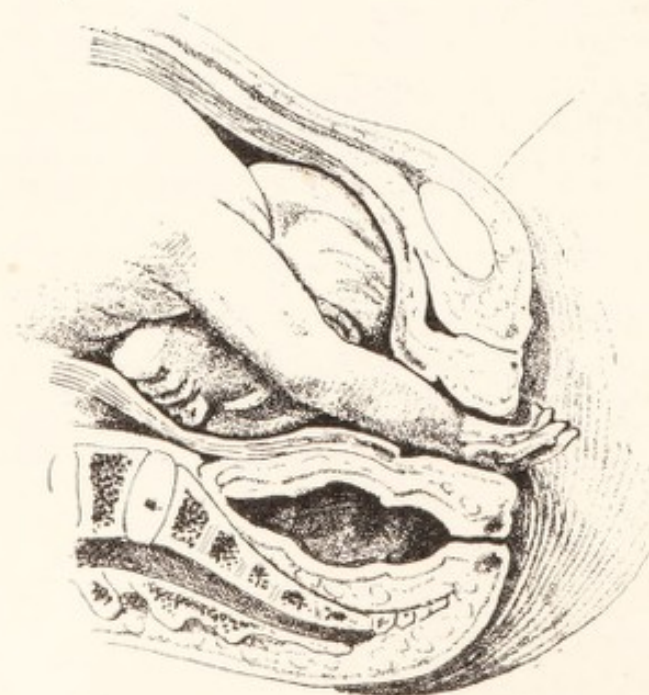


FIG. 180.—PRESENTATION OF ARM AND HEAD.

The complication is generally due to a small head or large pelvis, a malposition, or a contracted pelvis with abnormal obliquity of the uterus, the presenting part in such cases not fitting into the lower uterine segment as closely as it should, and leaving room for the arm to prolapse. The arm must be got out of the way by pushing it above the head, and then perhaps delivering the head by the forceps, or the head must be got out of the way by bringing down a leg by podalic version.

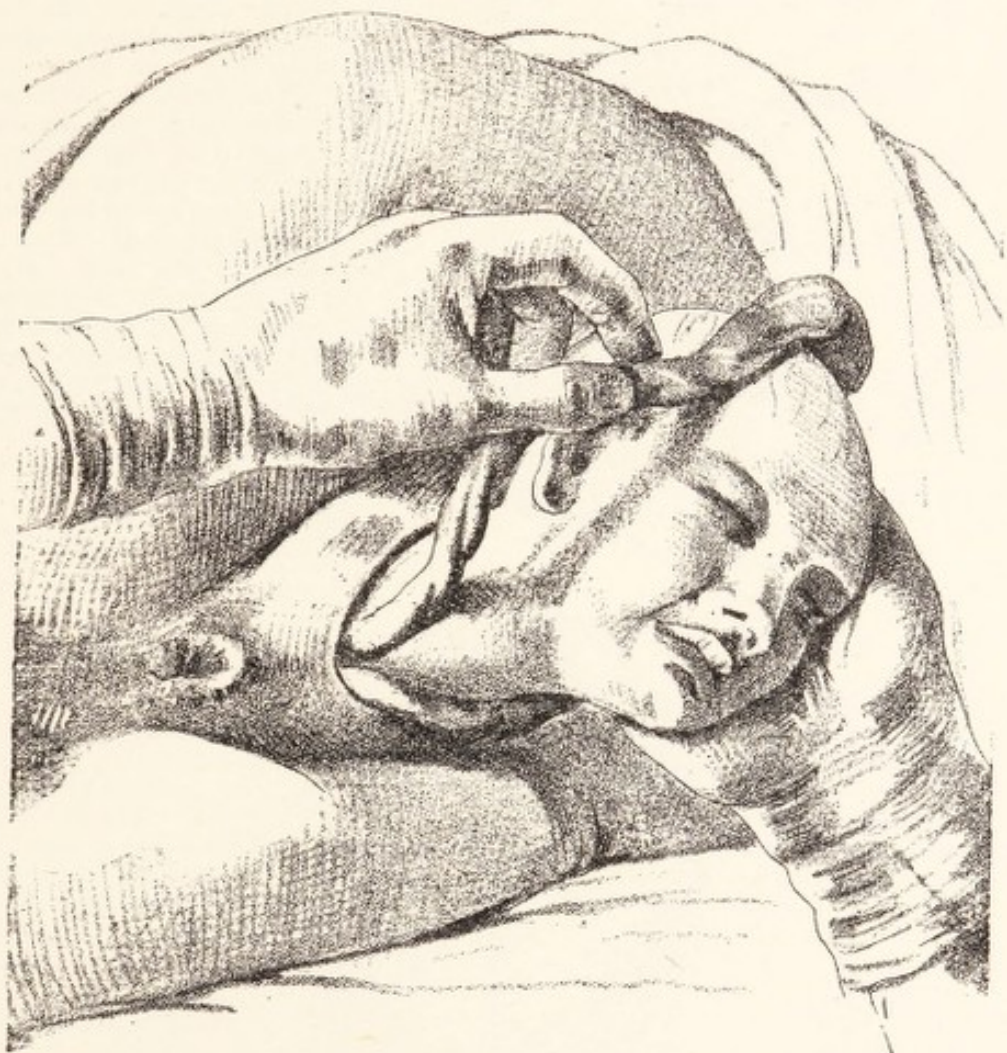


FIG. 181.—UMBILICAL CORD ROUND CHILD'S NECK.

When the head is born, a finger should be inserted into the vagina to ascertain if the cord is coiled round the neck. If so, it should be loosened and carried over the head. If this is impossible, it should be passed over the shoulders. This failing, it will have to be divided, the end from which the blood is spurting being compressed with pressure forceps.

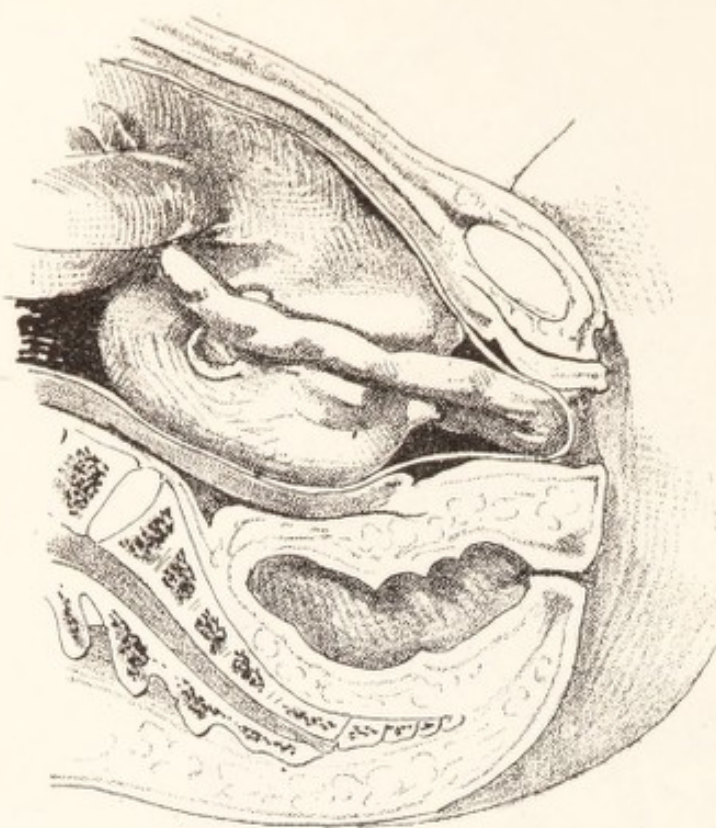


FIG. 182. — PRESENTATION OF THE UMBILICAL CORD.

The cord is below the presenting part, and the membranes are not ruptured. This complication is generally due to a small head or large pelvis, a malpresentation, hydramnios, a flattened pelvis, or an abnormal obliquity of the uterus. The presenting part in such cases is not fitting closely into the lower uterine segment, thus leaving room for the cord to present. The child, so far as any pressure on the cord is concerned, is not in danger, but since presentation of the cord may be due to some abnormality a doctor must be summoned.

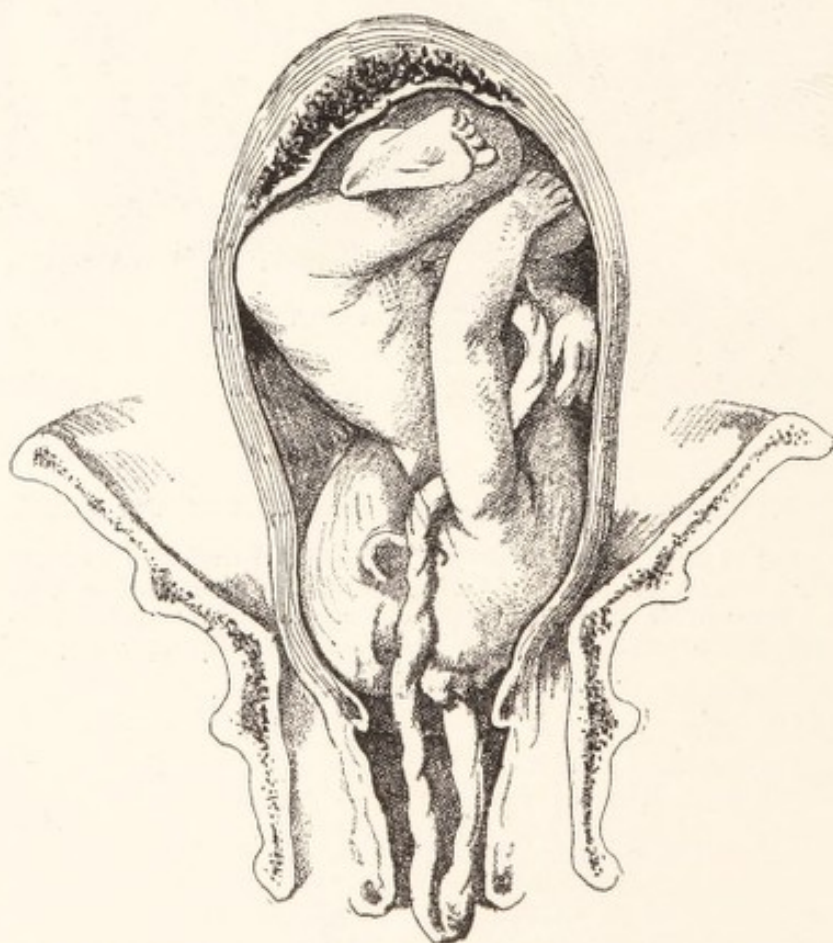


FIG. 183.—PROLAPSE OF THE UMBILICAL CORD.

The cord is below the presenting part, and is lying in the vagina and even protruding through the vulva, and the membranes are ruptured. This complication is generally due to causes similar to those of presentation of the cord.

If the cord is subjected to pressure, the child will be in danger.



FIG. 184.



FIG. 185.

FIGS. 184 AND 185.—INSTRUMENTAL REPOSITION.

The correct treatment of presentation and prolapse of the umbilical cord is to ascertain the cause and thus, if possible, remedy it. Failing this, or no cause being ascertainable, presentation is treated by the postural method (see Fig. 51). Prolapse of the cord is treated according to whether it is evident, from the pulsation in the cord, that the child is in danger or not. If the child is not in danger and the head is being born quickly the condition may be left, as it may be if the child is dead. If the child is in danger the cord must at once be replaced as follows, since the delay in waiting for medical assistance will result in the death of the child.

If, therefore, the cervical canal is sufficiently dilated, the cord should be wrapped in gauze, and carried up by the hand past the presenting part, after which the head, if presenting, should be pressed down into the pelvis and a tight binder applied. If the cervix is not sufficiently dilated to allow the hand to be passed into the uterus, the midwife can only await the arrival of the doctor. If the os is large enough to insert a de Ribes's bag, and the doctor is possessed of one, having pushed the cord up he will keep it in position by the bag, or he may do so with a gum-elastic catheter as follows:

A gum-elastic catheter having been perforated opposite the eye, the cord can be secured in two ways. Fig. 184: A loop of tape is threaded through the openings, and a coil of cord is secured by the loop. Fig. 185: A loop of string is threaded through the openings, a coil of cord is passed over this loop, and the latter is then passed over the end of the catheter. If the prolapse is due to a flattened pelvis, the doctor will probably advise Cæsarean section.

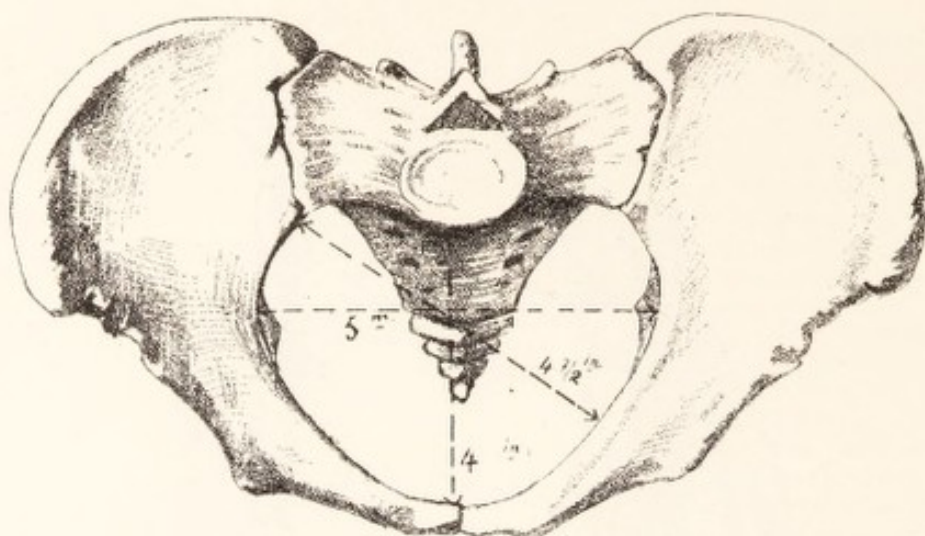


FIG. 186.—NORMAL PELVIS.

Measurements at the brim of the pelvis for purposes of comparison with Figs. 187 and 188.

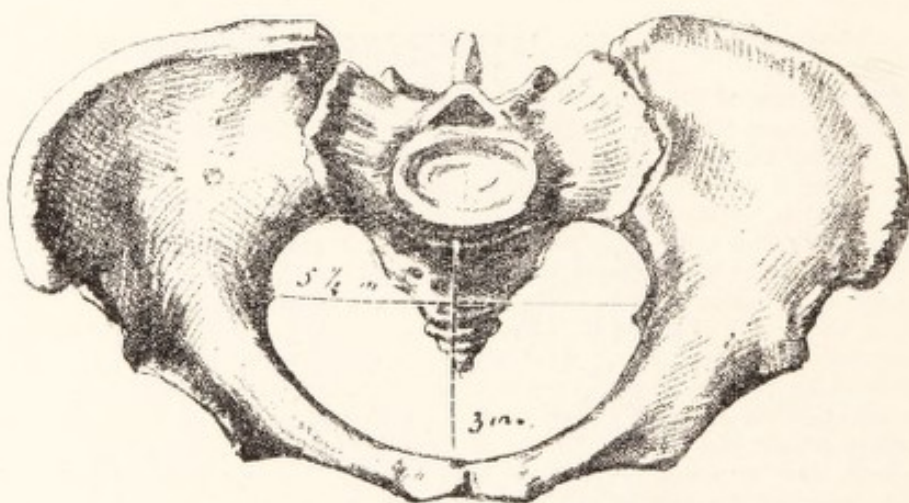


FIG. 187.—FLAT PELVIS.

Owing to softening of the bones, the antero-posterior diameter of the brim is much reduced. The transverse at the brim is normal or longer. Below the brim the diameters are normal. The malformation is due to rickets, and if this disease has been marked the promontory of the sacrum will be driven forward to a marked degree, and a reniform pelvis will result. The head is delayed at the brim of the pelvis, and, although the patient is in labour, the head will be found movable on abdominal examination (see Fig. 82). Efficient antenatal measurement will allow the correct steps for delivery of the child to be taken.

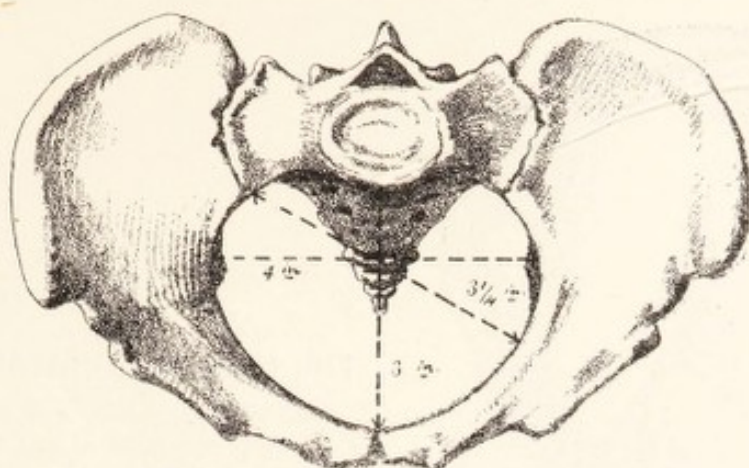


FIG. 188.—GENERALLY CONTRACTED PELVIS.

This pelvis is of normal shape, but all its diameters are reduced from the brim to the outlet. Although this kind of pelvis is found in dwarfs, it is also found in women who are otherwise well developed, when nothing is known as to its causation. In such cases the head may enter the brim of the pelvis, and delay in its birth take place at the outlet. Efficient antenatal measurement will allow the correct steps to be taken for delivery of the child.

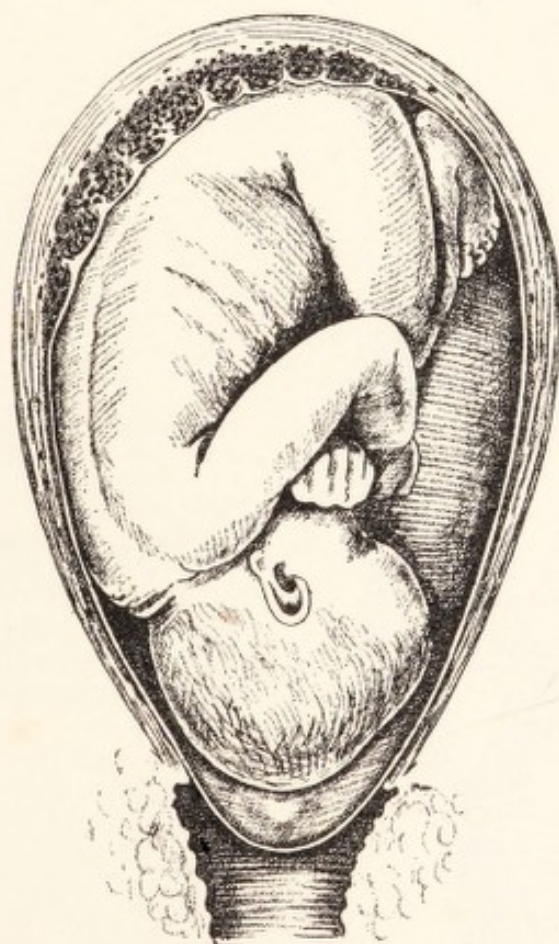


FIG. 189.—NORMAL LABOUR, SHOWING THE SYMMETRICAL SHAPE OF THE UTERUS.

The body of the child is not embraced by the uterus anywhere and there is room for the liquor amnii. The illustration shows the condition in the intervals of the pains before the rupture of the membranes. During the pains the head would be fitting the lower uterine segment.

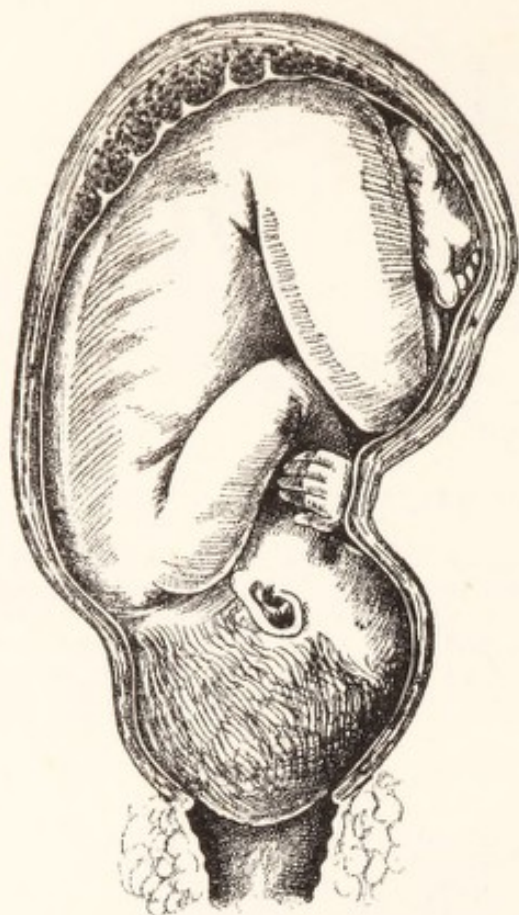


FIG. 190.—THE IRRITATED UTERUS.

The uterus closely embraces the child.
The lower segment is not thinned.

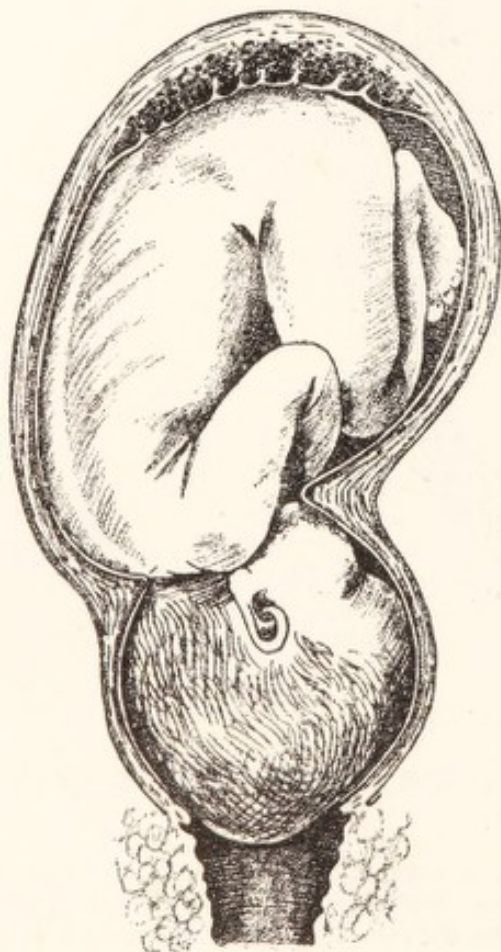


FIG. 191.—THE INTERNAL CONTRACTION RING.

The child is not closely embraced by
the uterus except in the region of the neck.
The lower segment is not thinned.



FIG. 192.—TONIC CONTRACTION OF THE UTERUS.

The appearance of the abdomen when the uterus is in a state of tonic contraction, due to obstruction to delivery of the child, is easily recognized by the general condition of the patient.



FIG. 193.—TONIC CONTRACTION OF THE UTERUS.

The uterus tightly embraces the child. The upper uterine segment is thickened (retracted), the lower segment is thinned (stretched). This difference at the junction of the two segments forms a ridge (Bandl's ring), which can be felt on abdominal examination.



FIG. 194.—HYDROCEPHALUS.

A congenital malformation of the ventricles of the brain, which are distended with cerebro-spinal fluid, and the head is thus greatly enlarged. The cranial bones are not properly ossified, and are small, so that they do not entirely cover the head, with the result that the sutures are broad and the fontanelles large. The dotted line in the illustration shows the pelvic inlet, and how impossible it would be for the head to pass through the pelvis. In such cases to reduce the size of the head it has to be perforated, when the fluid escapes. In some cases the presentation is a breech, the shape of the child with its enlarged head fitting better into the upper uterine segment.

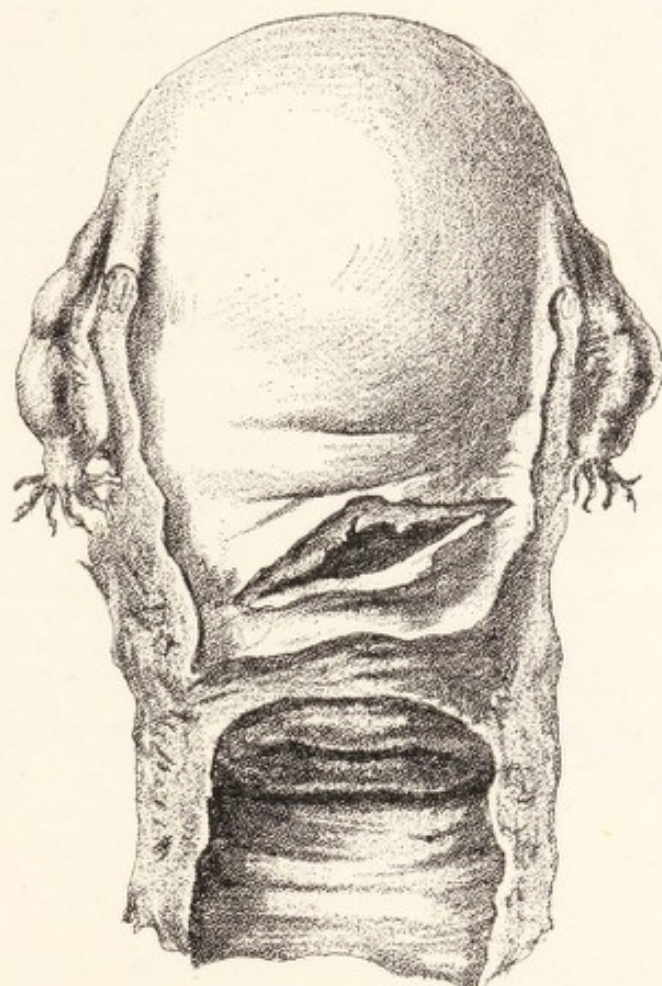


FIG. 195.—RUPTURE OF THE UTERUS, SHOWING A COMPLETE TEAR IN THE ANTERIOR WALL OF THE LOWER SEGMENT.

Spontaneous rupture, although it may very rarely occur during pregnancy and occasionally through the scar of a previous Cæsarean section, nearly always takes place during obstructed labour when the medical attendant is attempting by internal version to turn an oblique lie of the child into a longitudinal one, or when delivering the child by the forceps in a difficult case.

Rupture occasionally occurs when a careless or ignorant midwife fails to call in medical assistance when she should in a case of protracted labour. Such neglect is now becoming very rare, due to the better teaching of pupil midwives and to the raising of the standard of training and examinations of the C.M.B. The rent usually occurs in the lower uterine segment, which is markedly thinned because of the excessive retraction of the upper segment.

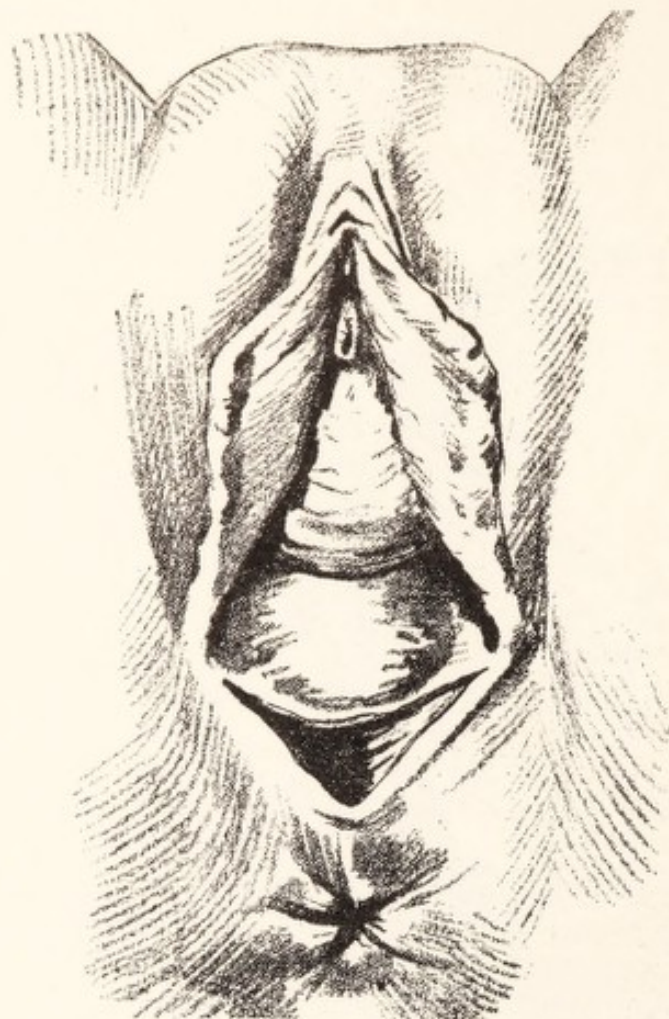


FIG. 196.—FIRST VARIETY OF LACERATION OF THE PERINEUM: SLIGHT INJURY TO THE PERINEUM AND TO THE POSTERIOR VAGINAL WALL.

At the termination of the 3rd stage of labour, a careful examination must be made of the perineum and posterior vaginal wall. Such an examination can be properly carried out only by placing the patient on her back with her knees drawn up and separated, a good light falling on the perineum. The labia should then be separated, the parts swabbed, and the extent of the injury, if any, determined. It is in this way only that an injury to the posterior vaginal wall can be detected. It is evident from this that the method of examining the perineum by raising the upper buttock, the patient lying on her side, is a very bad one. There are four varieties of laceration, the first not at all uncommon in primiparæ, especially when the delivery of the head has not been properly managed. A lacerated perineum affords a site for infection and the damage to the pelvic floor predisposes to prolapse of the uterus later.



FIG. 197.—SECOND VARIETY OF LACERATION OF THE PERINEUM.

Injury to the perineum as far back as the sphincter ani and the lower inch of the posterior vaginal walls is more likely to occur if the vulval orifice is small, if the labour is precipitate, if the pelvis is generally contracted, if the head is born as a persistent occipito-posterior or extended in a breech delivery, if the shoulders are abnormally large, or if the child has not rotated into the antero-posterior diameter of the outlet before being born or is delivered by the forceps.

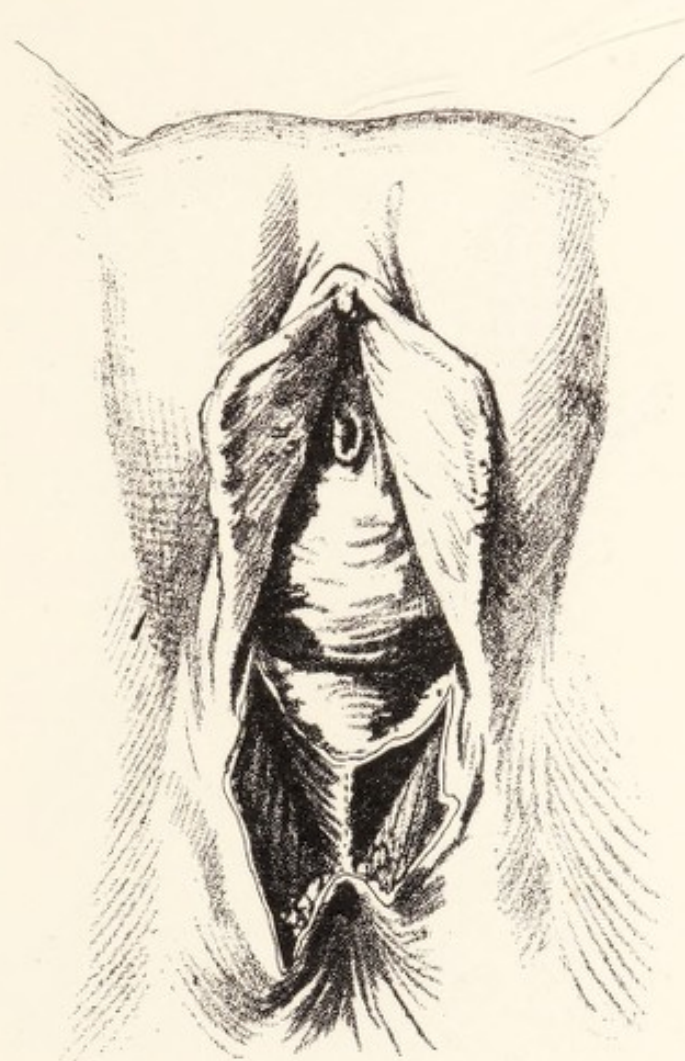


FIG. 198.—THIRD VARIETY OF LACERATION OF THE PERINEUM.

In which the perineum is torn right through into the rectum, the sphincter ani being lacerated, and the lower inch of the posterior vaginal wall torn. This is termed a complete rupture, in contradistinction to the first two varieties, which are called incomplete ruptures. If a complete rupture does not heal, the patient suffers from incontinence of fæces. Causes—the same as those mentioned under the second variety.

The fourth variety of laceration, not illustrated, is very rare. In this case the presenting part bursts through between the vulval orifice and the rectum. This is known as a central rupture. It is essential that when the perineum is lacerated, whatever the variety may be, it should be sutured forthwith by a doctor.

It is strictly against the regulations of the Central Midwives Board that a midwife should suture a lacerated perineum, and if she is directed to do so she must refuse, otherwise she runs the risk of being cited before the Board. The reason for such a regulation is not appreciated as it should be by all midwives and some doctors. Suturing a ruptured perineum is not a matter, which some appear to think, of passing a stitch or two through the torn edges of the skin. If each separate tissue which has been torn is not efficiently sutured, apart from the risk of infection, prolapse of the uterus is far more likely to occur in due course.

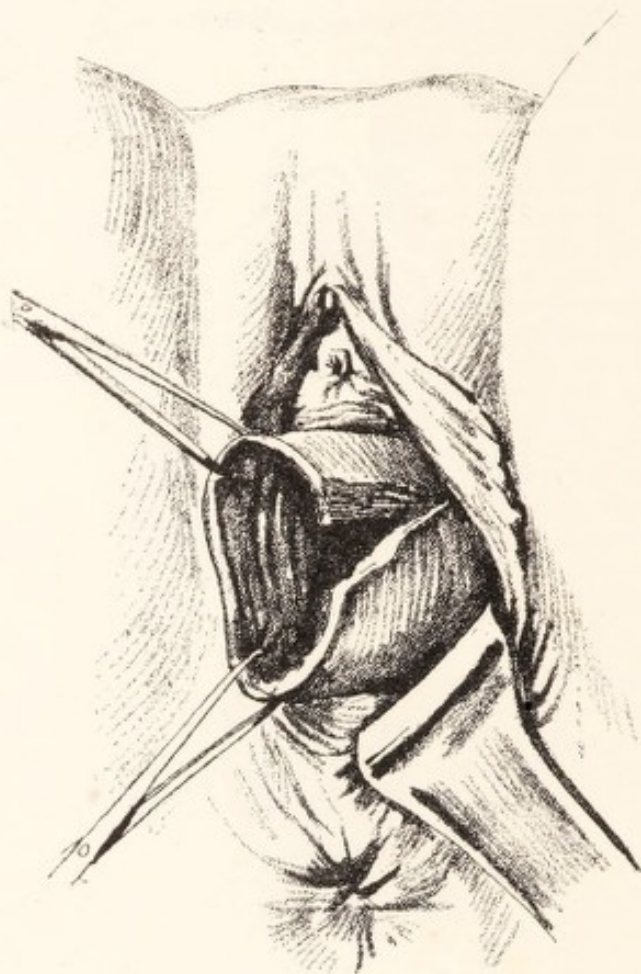


FIG. 199.—LACERATION OF THE CERVIX.

Lacerations of the cervix may be due to a too rapid delivery of the child, to operative interference, or to artificial dilatation of the cervix. The size of such lacerations varies from that of a small notch to a large rent involving the lower uterine segment, the vaginal vault, and sometimes a branch of the uterine artery. The commonest cause of a bad laceration is the application of the forceps and the delivery of the child before the cervix is fully dilated. A slight laceration is of frequent occurrence, but since it does not give rise to any signs the injury is not detected. In cases in which some branch of the uterine artery is torn through, the patient suffers from post-partum hæmorrhage. Since the bleeding is not from the placental site, the uterus is firmly contracted and retracted, and yet the bleeding continues. The cervix may also be lacerated by the hard presenting part of the head when dilating the cervix, if the membranes rupture early. The blood escaping is also of a brighter red than the usual discharge after birth of the child, and spurting from an artery may be seen. Such serious injuries are properly treated by suturing the laceration, and, until this can be done, by giving a hot douche and plugging the laceration if it can be felt.

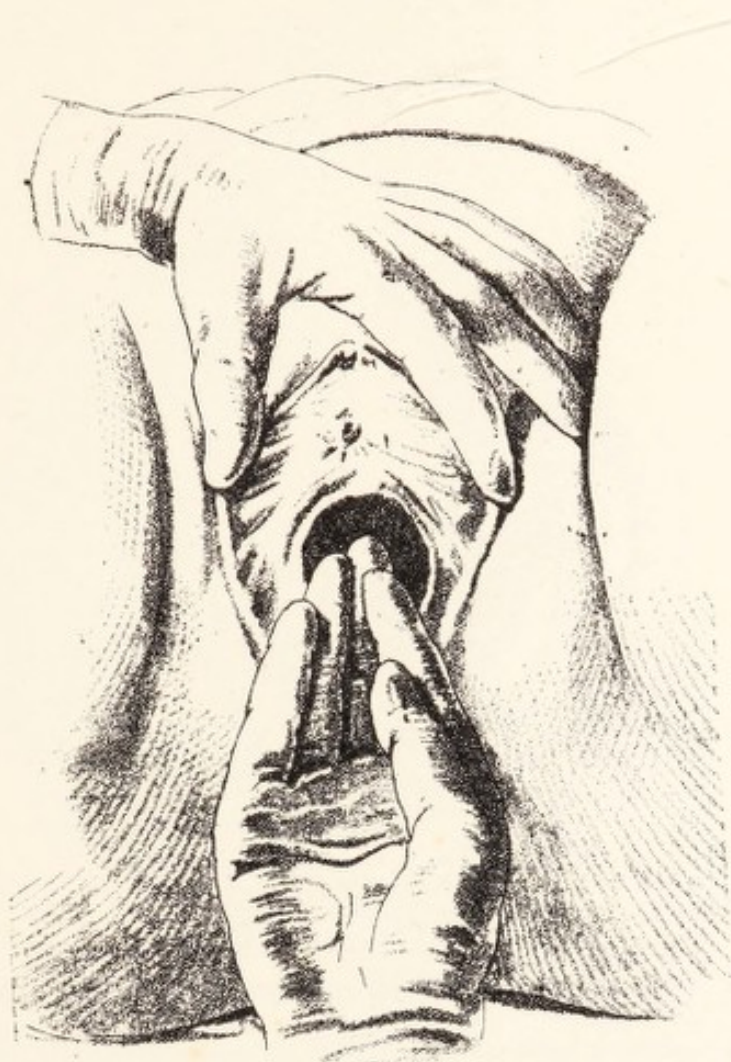


FIG. 200.—INSERTING THE HAND INTO THE VAGINA.

The hand may have to be inserted into the vagina when it is necessary to apply bimanual compression for post-partum hæmorrhage, when it is necessary to remove the placenta in cases of post-partum hæmorrhage, or when an attempt is being made to rotate the occiput or chin in a 3rd or 4th vertex, or a 1st and 2nd face position when the occiput or chin remains posterior.

The hand and fingers are made into the shape of a cone.

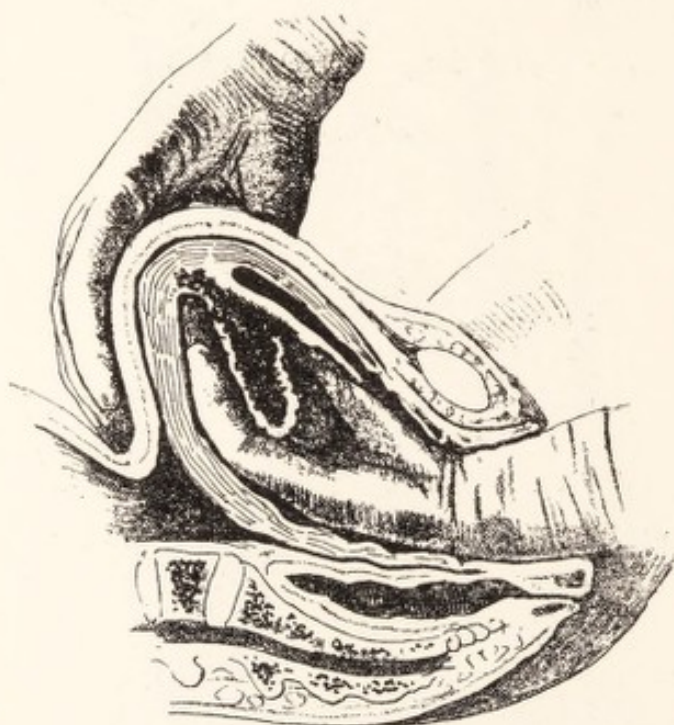


FIG. 201.—MANUAL REMOVAL OF THE PLACENTA.

In cases of post-partum hæmorrhage from the placental site before the complete separation of the placenta, in which massage of the uterus does not stop the bleeding, and it is found impossible to express the placenta *per abdomen*, the hand must be inserted into the uterus and the placenta removed, the other hand on the abdomen making counter-pressure on the uterus. The edge of the placenta is best found by following up the umbilical cord to its insertion so that the hand is inside the amnion, and then passing the fingers along the foetal surface of the placenta to its edge. When the fingers reach the edge they are inserted between the maternal surface of the placenta and the wall of the uterus, the amnion and chorion intervening, and the placenta is then separated by a sweeping movement of the fingers. *This is a very dangerous operation, the worst cases of puerperal sepsis often following its performance. Every effort, therefore, should be made to express the placenta or to encourage the uterus to express it, by ergometrine, before attempting manual removal.*

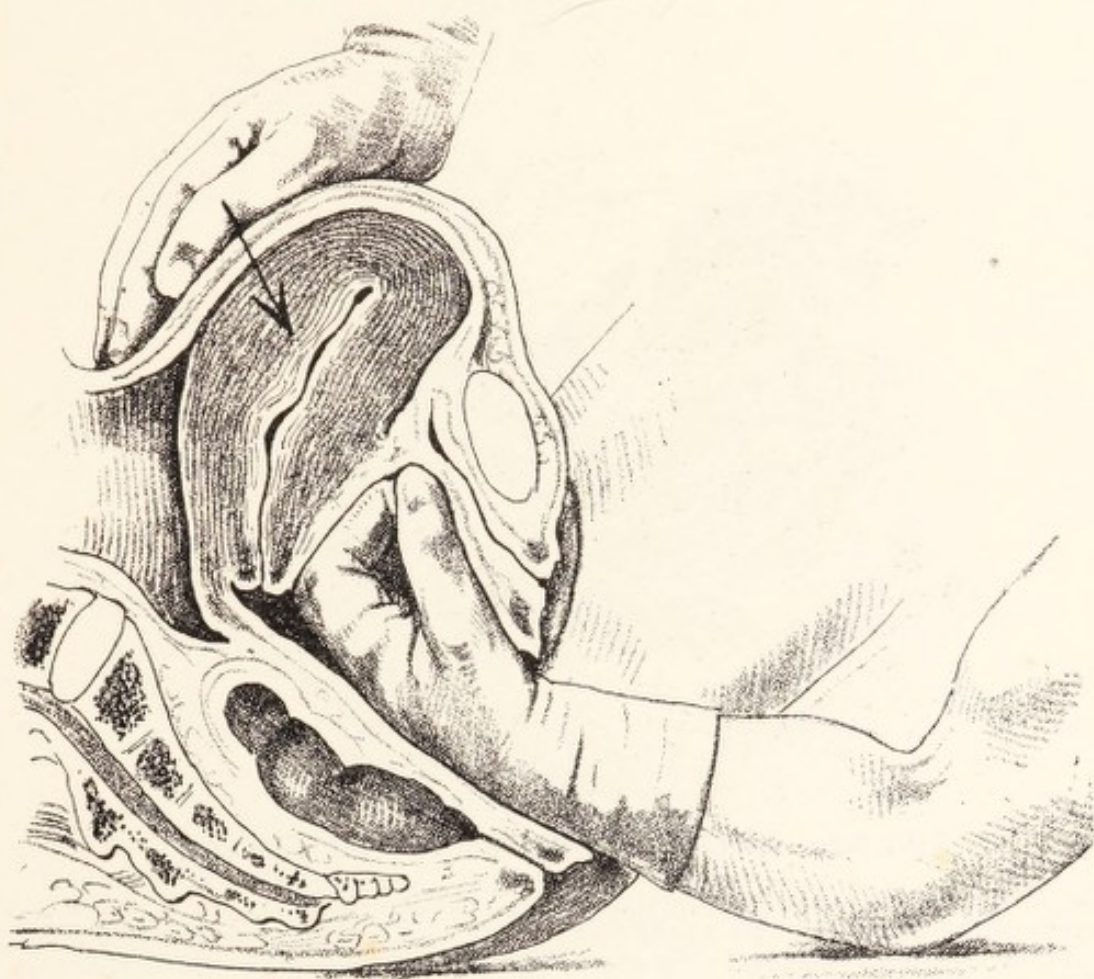


FIG. 202.—BIMANUAL COMPRESSION OF THE UTERUS, FOR POST-PARTUM HÆMORRHAGE.

After the placenta has been expelled or removed manually, if a hot intra-uterine douche does not stop the bleeding, bimanual compression must be employed. The left hand, having been passed into the vagina, is doubled up in the anterior fornix and then the right hand anteflexes the uterus from the abdomen, so that the posterior wall of the uterus is pressed against the anterior wall. The elbow of the left hand rests on the bed, so that a constant pressure can be kept for a longer period with less exertion. The uterine cavity is thus obliterated, and there is no space into which blood from the uterine vessels can escape. The open mouths of these vessels are therefore closed artificially until the blood in them clots, and not, as in nature, by retraction of the placental site.

Such a manœuvre is tiring and cannot be kept up for many minutes. An assistant pressing on the abdominal hand is an additional help and relieves the strain.

The arm should be covered by the sleeve of a sterilized gown or towel.

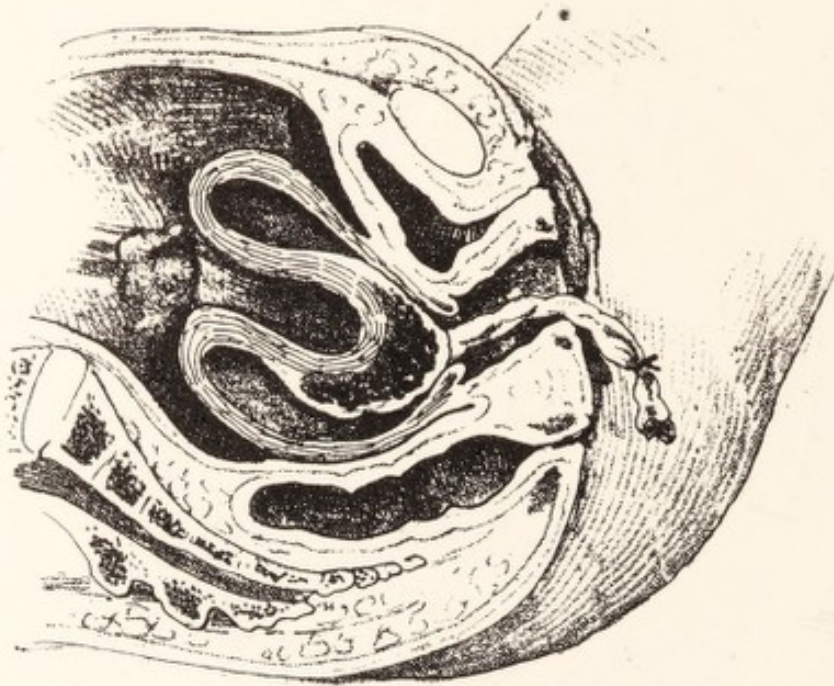


FIG. 203.—PARTIAL INVERSION OF THE UTERUS.

The fundus bulging into the uterine cavity, but not protruding through the cervix. Inversion of the uterus may be due to the attendant pulling on the cord to deliver the placenta, or to trying to express the placenta in an interval of uterine contraction by a faulty method. It also occurs spontaneously. The patient is in the greatest danger from shock and also, but as a rule not so much, from hæmorrhage. The treatment is concerned principally with the shock, which must be attended to first, and if this is serious, unless the bleeding is also serious, the inversion may be left till the patient has recovered wholly or partly from the shock. In severe cases of shock at once replacing the inversion may lead to the death of the patient. The treatment for shock, until the doctor arrives, is an injection of morphia, hot-bottles and a rectal saline. If there is bleeding, pitocin must be given in addition, and a hot douche. The inverted uterus must be reinverted by squeezing the fundus with the hand to get as much blood out of it as possible, and then pushing back the inversion, commencing at that portion the last to invert. If the placenta is still partially attached, it must be removed first. After the reinversion a hot antiseptic douche must be given.

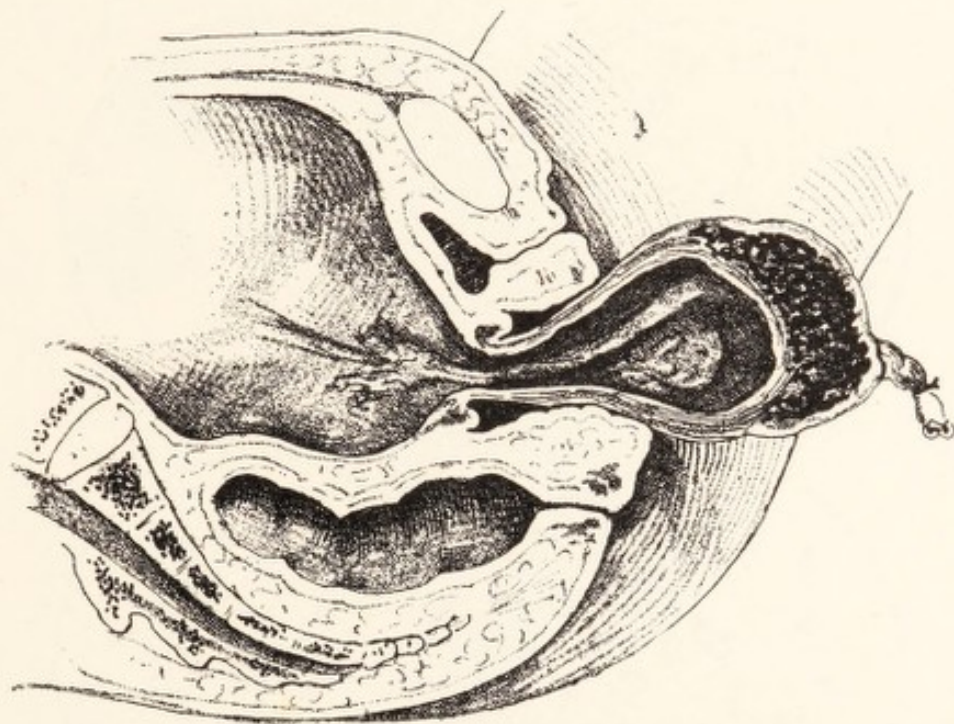


FIG. 204.—COMPLETE INVERSION OF THE UTERUS.

The whole of the uterus and placenta and the vagina being completely turned inside out and projecting through the vaginal orifice.

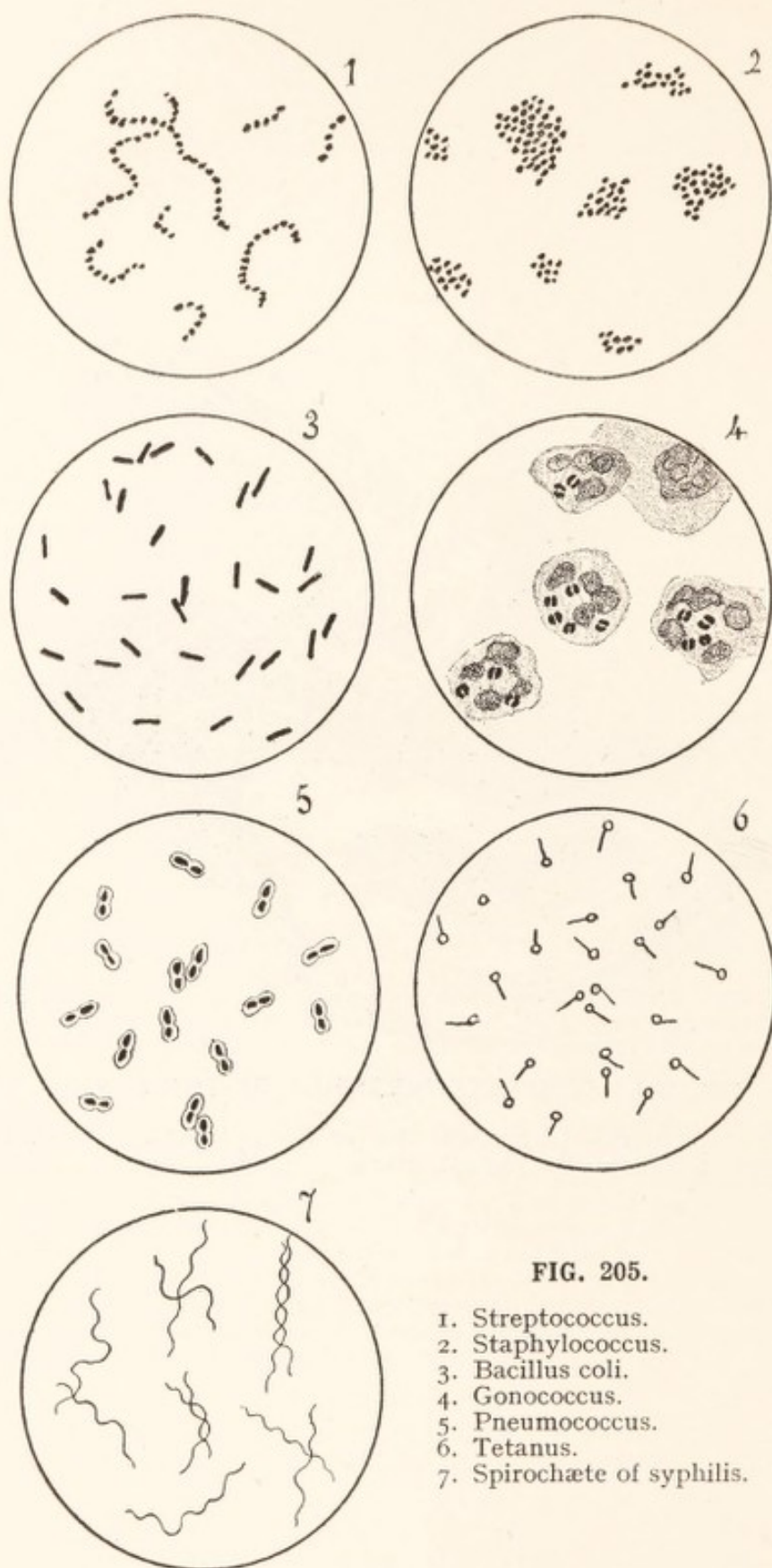


FIG. 205.

1. Streptococcus.
2. Staphylococcus.
3. Bacillus coli.
4. Gonococcus.
5. Pneumococcus.
6. Tetanus.
7. Spirochæte of syphilis.

The streptococcus, staphylococcus, bacillus coli and gonococcus are the organisms which may be responsible for puerperal sepsis. In fatal cases the infection is most commonly due to the hæmolytic streptococcus A, and in the great majority of non-fatal cases to this streptococcus or staphylococcus. The staphylococcus is generally found in cases of mastitis, the gonococcus in ophthalmia neonatorum, and tetanus results from infection of the cord.

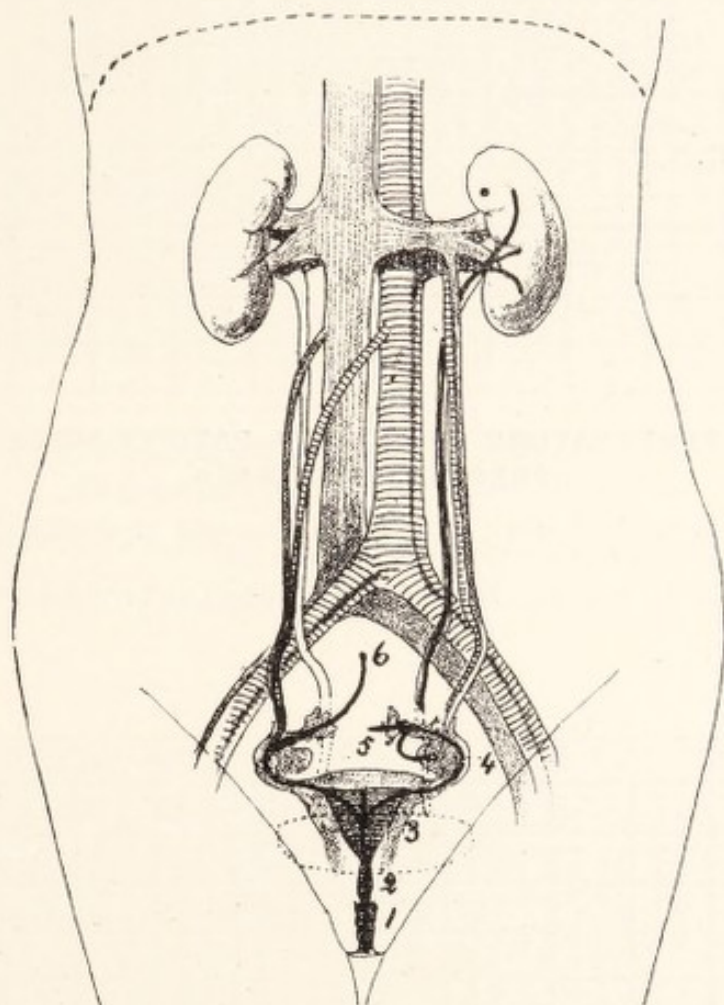


FIG. 206.—DIAGRAM SHOWING THE COURSE OF INFECTION WHEN IT SPREADS FROM THE VULVA TO THE ABDOMINAL CAVITY.

1. Vaginitis. 2. Endometritis. 3. Pelvic cellulitis. 4. Ovaritis, salpingitis.
5. Pelvic peritonitis. 6. General peritonitis.

Infection may also spread up the ureter to the bladder, pelvis of the kidney (pyelitis), and to the substance of the kidney (pyelo-nephritis).

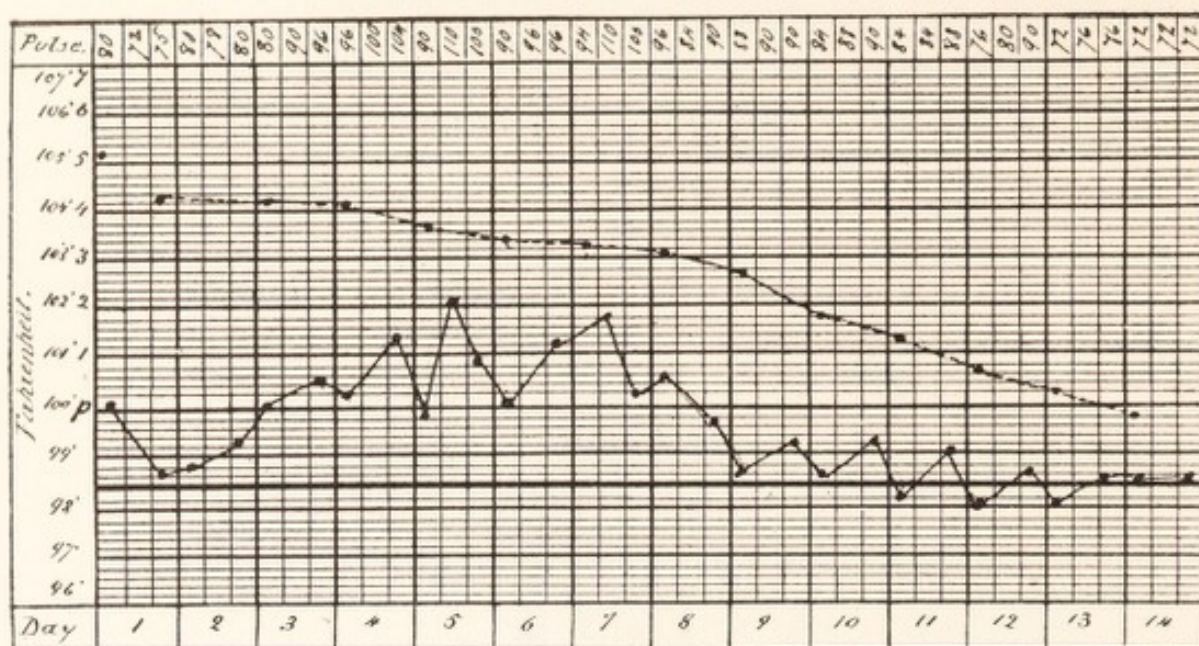


FIG. 207.—TEMPERATURE CHART OF A PATIENT SUFFERING FROM PUERPERAL TOXÆMIA.

The pulse-rate is not high when compared with a case of septicæmia. The involution of the uterus is retarded till the attack passes off.

(From "Midwifery by Ten Teachers," by kind permission of Edward Arnold and Co.)

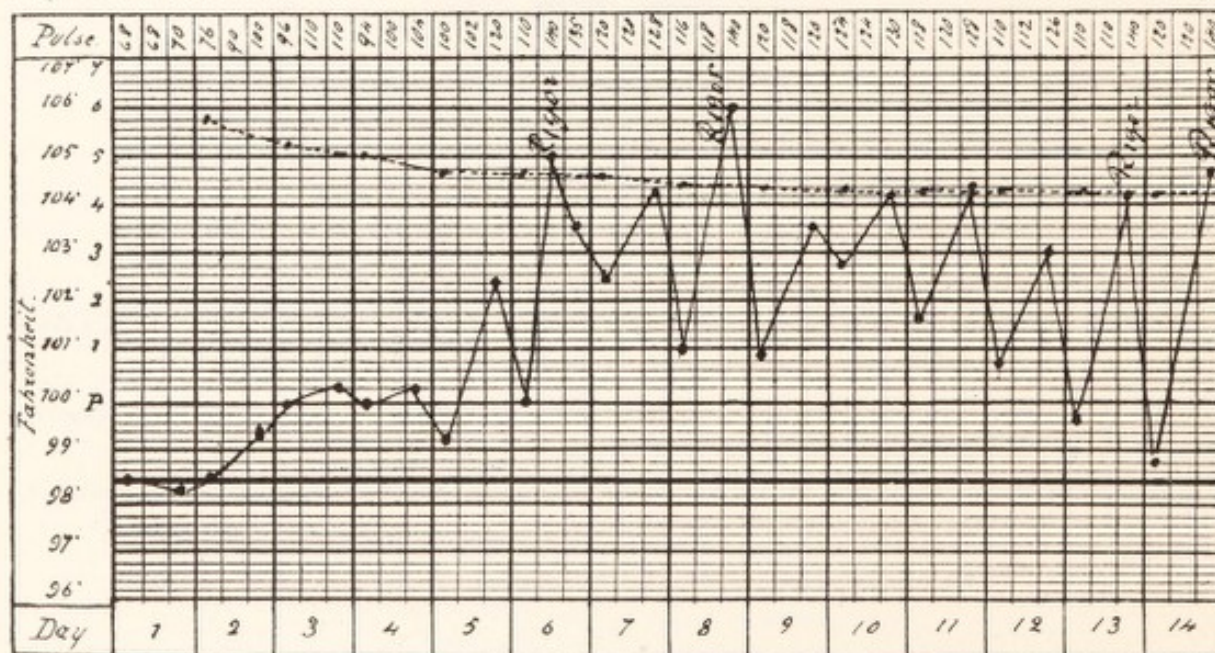


FIG. 208.—TEMPERATURE CHART OF A PATIENT SUFFERING FROM PUERPERAL SEPTICÆMIA.

The temperature on the 3rd, 4th and 5th day suggested toxæmia, and the transition from toxæmia into septicæmia is common. The involution of the uterus is practically stationary. The pulse-rate is high.

(From "Midwifery by Ten Teachers," by kind permission of Edward Arnold and Co.)

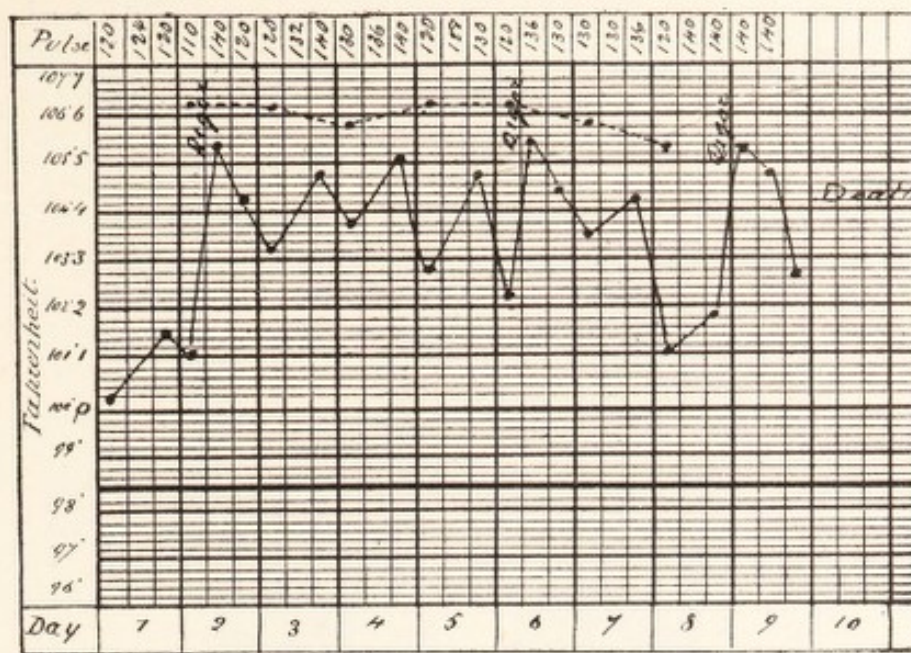


FIG. 209.—TEMPERATURE CHART OF A PATIENT SUFFERING FROM FULMINANT PUERPERAL SEPTICÆMIA.

Temperature very high and fever present at the termination of labour.

(From "Midwifery by Ten Teachers," by kind permission of Edward Arnold and Co.)

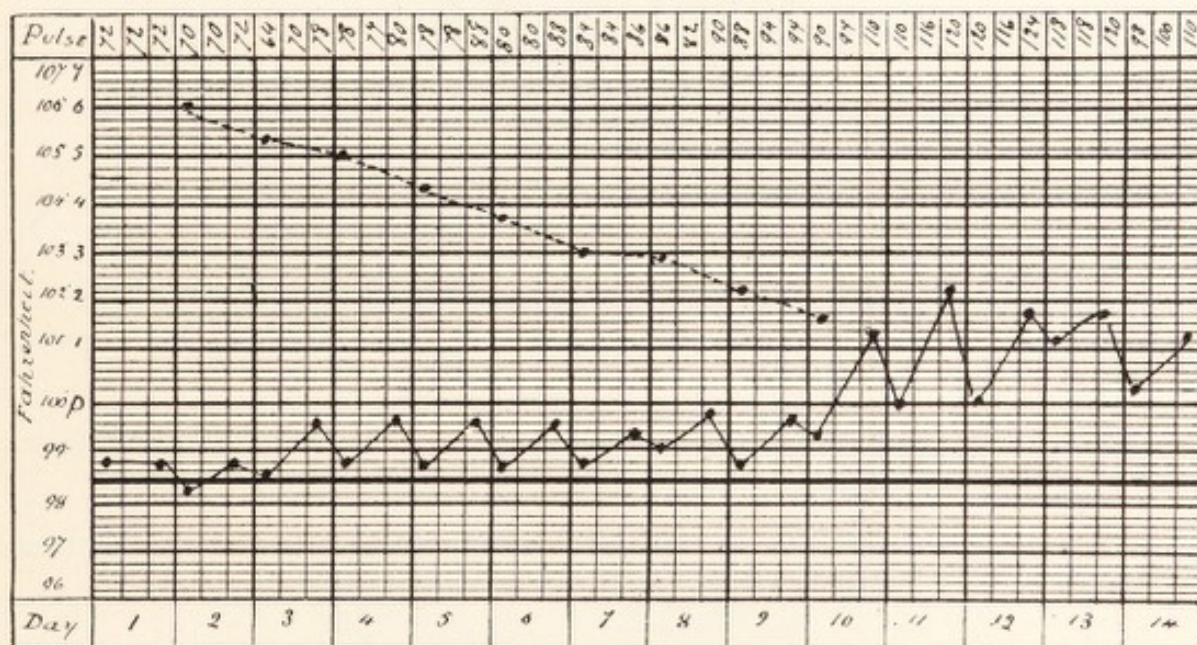


FIG. 210.—TEMPERATURE CHART OF A PATIENT SUFFERING FROM FEMORAL THROMBOPHLEBITIS.

The temperature commences, as a rule, on the 10th day. For several days preceding the attack the temperature has not been quite normal. The involution of the uterus is practically normal.

(From "Midwifery by Ten Teachers," by kind permission of Edward Arnold and Co.)



FIG. 211.—INFECTION OF THE BREAST.

1. Fissured or cracked nipple.
2. Infection of the milk ducts.
3. Infection of superficial and deep lobes *via* the milk ducts (parenchymatous mastitis).

LESS COMMON.

4. Interstitial mastitis due to infection of cellular tissue *via* the lymphatics from an inflamed nipple.

RARE.

5. Submammary abscess due to infection of cellular tissue behind the gland, being an extension from a parenchymatous mastitis.

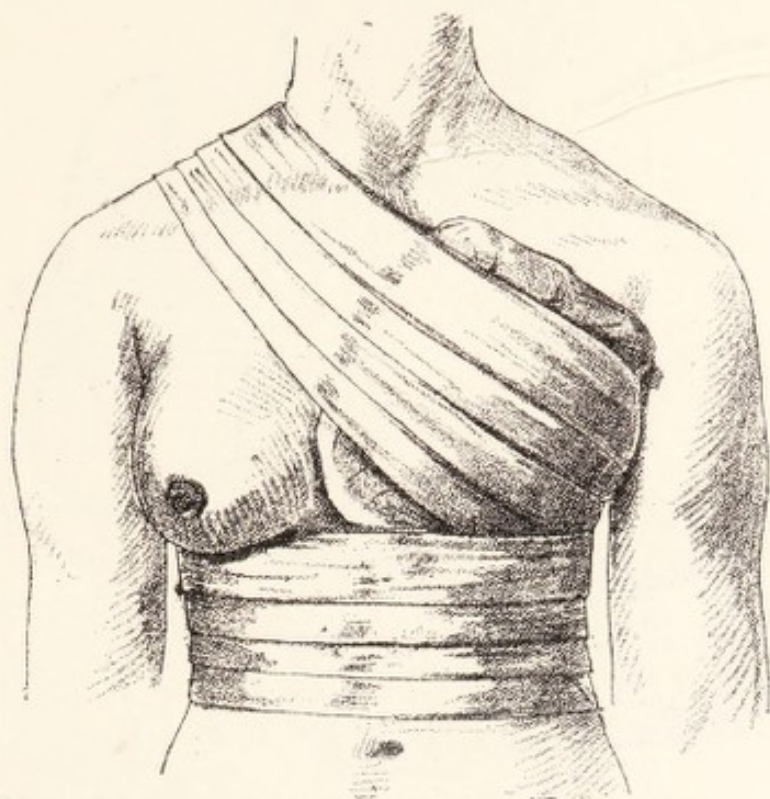


FIG. 212.—METHOD OF BANDAGING ONE BREAST.

Wool should be placed under that portion of the bandage passing over the shoulder.

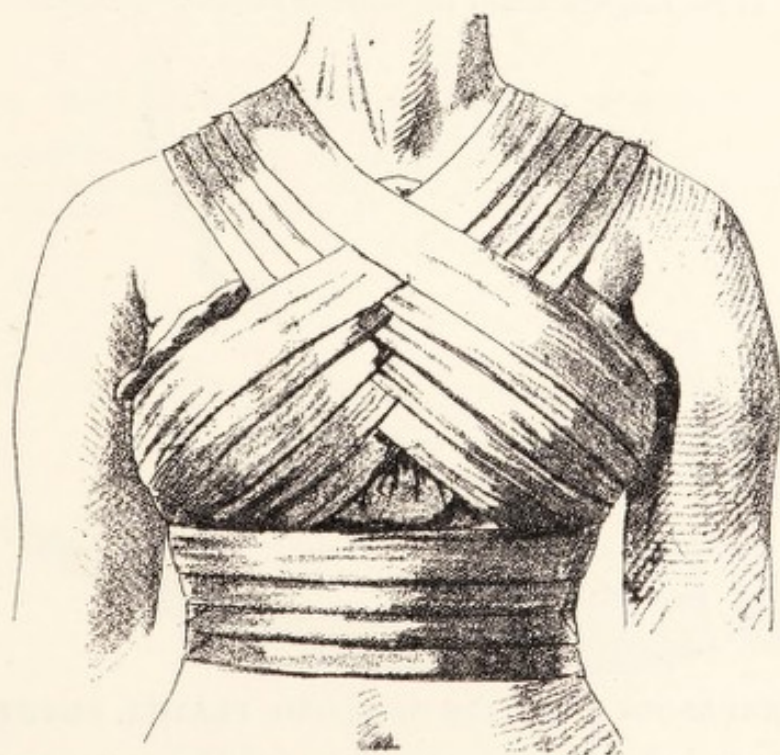


FIG. 213.—METHOD OF BANDAGING BOTH BREASTS.

Wool should be placed under the bandage passing over each shoulder.

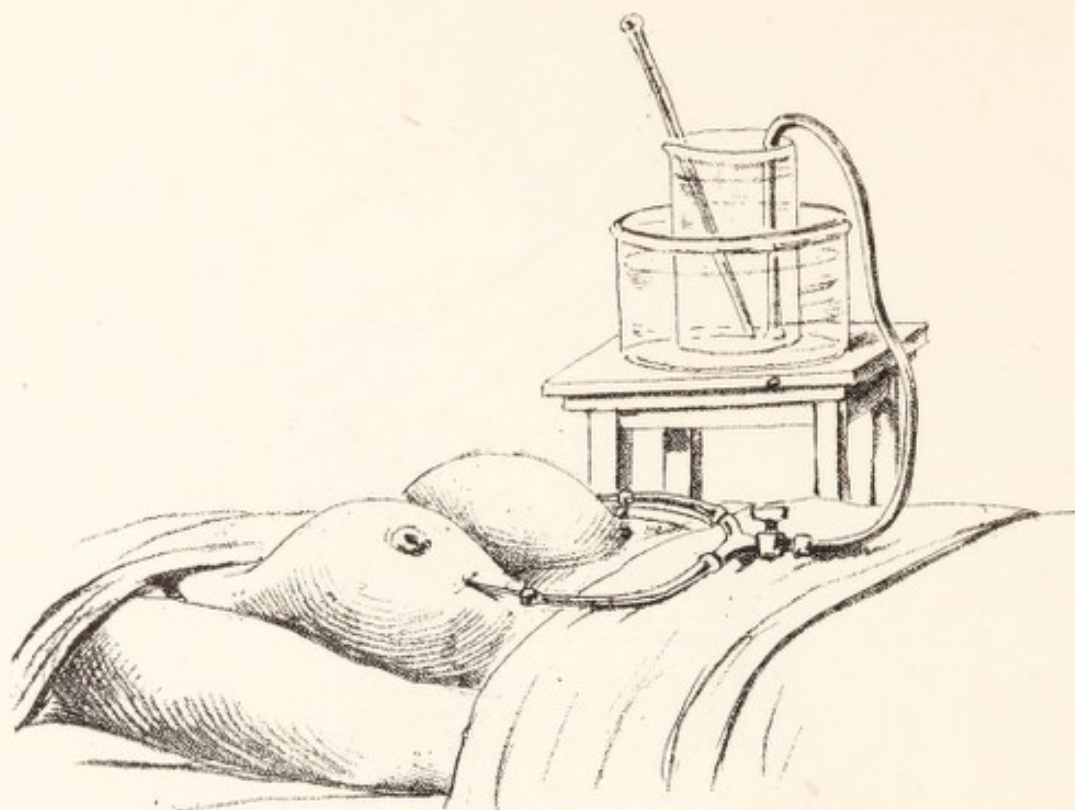


FIG. 214.—SUBCUTANEOUS INFUSION OF SALINE SOLUTION INTO BOTH BREASTS.

The solution consists of a teaspoonful of table salt to every pint of water. This is known as normal saline solution, because in every pint of blood in the body there is a teaspoonful of salt. The water, after the salt has been added, should be boiled. The temperature of the solution in the glass receptacle should be 110° F.

If one is available, a vacuum flask specially made for the purpose is a better receptacle for the solution, as the temperature of the solution can then be left at the proper level without trouble.

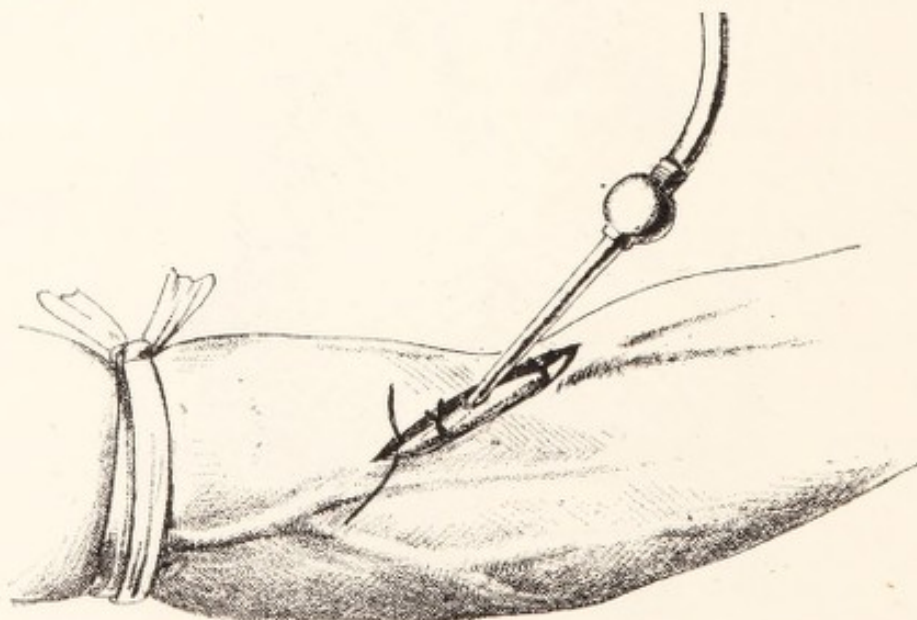


FIG. 215.—INTRAVENOUS INJECTION OF BLOOD, PLASMA, SERUM, OR SALINE.

A bandage is fastened tightly above the elbow to fill the veins. A prominent vein is then exposed by dissection. The distal end of the vein is ligatured. A loose ligature is left at the proximal end of the vein to be tied after the cannula is removed. The vein is then opened and the cannula inserted into it, the solution being allowed to escape from its end meanwhile. When the cannula is in the lumen of the vein, it is kept in position by a third ligature. This is not always used.

SECTION IV

THE CHILD



FIG. 216.—THE CORRECT WAY TO HOLD A NEW-BORN CHILD.

If the child is held in the position shown in the illustration it cannot slip. The grasp is very firm, the neck is supported by the right hand, and the viscera are not in any danger of being injured.



FIG. 217.—CLEARING THE UPPER AIR PASSAGES.

If, when the child is born, it does not breathe, although its heart is beating, its upper air passages must be cleared of mucus with the aid of a soft rag or piece of gauze wrapped round the first finger, the child meanwhile being held up by its legs. This can be done before the child is separated.



FIG. 218.—SPINAL FRICTION.

If, after the mucus has been cleared from the upper air passages, the child still does not breathe, and it is suffering from asphyxia livida or blue asphyxia, it can be slapped and sprinkled with cold water. If these measures do not suffice, the child should be held up by its legs, and its spine should be somewhat vigorously rubbed. This can be done before the child is separated.



FIG. 219.—MOUTH-TO-MOUTH RESPIRATION.

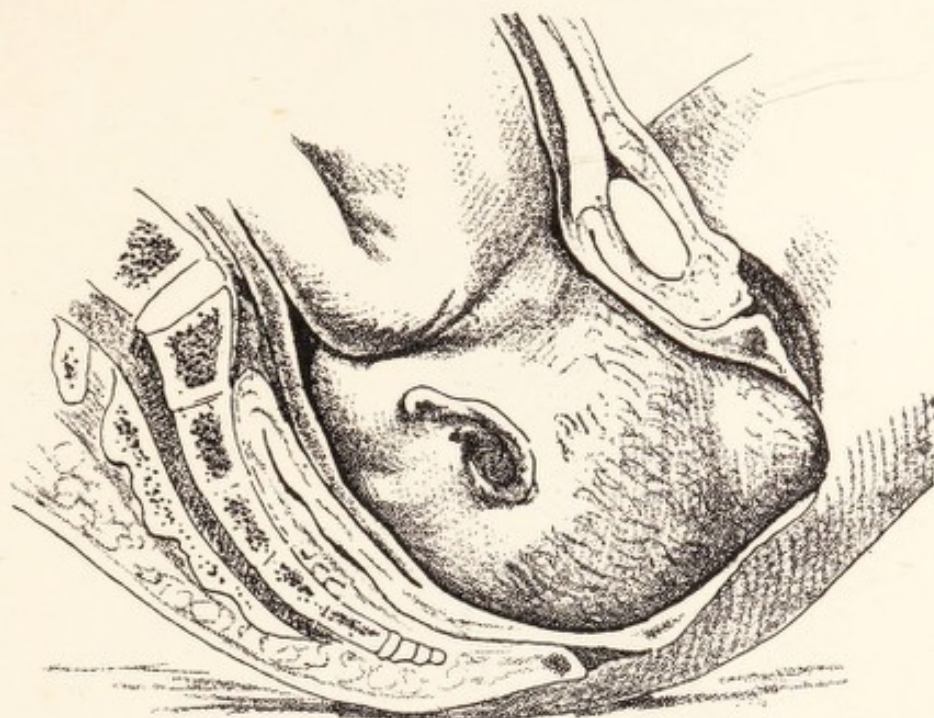
This method will at times start the child breathing when other methods have failed, and it can be carried out with the child in a hot bath. The nostrils of the child should be closed with the fingers to prevent the air escaping through the nose, and its stomach pressed with the hand to prevent this organ being distended with air. With a handkerchief over the mouth of the child the attendant then blows into its lungs. The illustration shows a less efficient method, in which the nostrils are not closed.



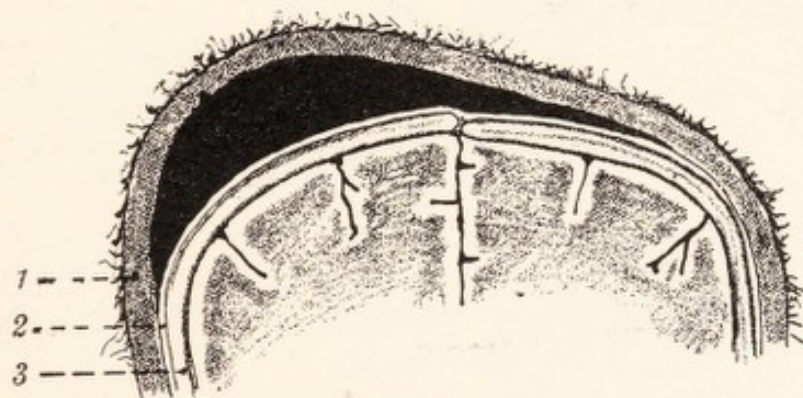
FIG. 220.—CATHETER METHOD : REMOVING MUCUS OR FLUID FROM THE LARYNX.

If the air passages are full of mucus or fluid, they must be cleared if necessary. This is accomplished, if holding the child upside down as in Fig. 217 is not effective, by inserting the index finger behind the tongue of the child, and, using the finger as a guide, passing a catheter into its larynx. The fluid can then be sucked up. The best catheter is a special one, by the use of which the fluid cannot be drawn into the mouth of the attendant. Care must be taken not to pass the catheter into the œsophagus.

The methods of resuscitation known as Byrd's, Sylvester's or Labordé's are now recognized as being useless for purposes of treating asphyxia neonatorum. Since the alveoli of the lungs are collapsed at birth, until the action of the respiratory centre causes them to expand, air cannot be made to enter them by any of the foregoing methods. The modern treatment is, if necessary, the injection of lobelin, if a doctor is in attendance.



FIGS. 221 AND 222.—
CAPUT SUCCEDANEUM.



This swelling on the head of the child is formed by the effusion of serum between (1) the pericranium and (2) the scalp. It occurs on that portion of the head which is not subjected to pressure during labour. It will be noticed that as the tissues of the scalp are not attached to a suture, the effusion can cross over a suture. A

caput succedaneum is formed during the 2nd stage of labour. If there is much resistance to the advance of the head, then the caput succedaneum may be a large one. The swelling is present before and at birth, and disappears in a few hours. The skin is discoloured.

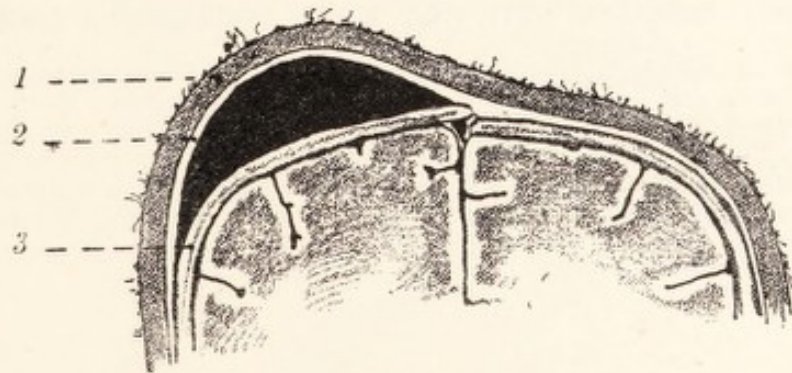


FIG. 223.—CEPHALHÆMATOMA.

This swelling is formed by the escape of blood between (1) the pericranium and (2) the cranial bones, from bloodvessels injured during the 2nd stage of labour. The pericranium being attached to the edge of the bones, this effusion is limited to one bone only.

Although a cephalhæmatoma is usually due to excessive pressure when the head is passing through a contracted pelvis (flat), or to the use of the forceps, it may occur in a normal labour. The swelling generally appears a day or two after the birth of the child, and is at first fluid. The edges become hard in a few weeks and raised, owing to the deposition of bone, which is eventually absorbed. The skin is not discoloured.

1. Scalp.

2. Pericranium.

3. Skull.



FIG. 224.—CORRECT ATTITUDE WHEN SUCKLING A CHILD.

The mother is sitting up and leaning forward. She is holding her child so that its head rests on her arm, and its back is supported by her right hand. With her left hand she supports her breast, with three fingers underneath the nipple and the thumb and first finger above. By this means the breast tissue around the nipple is depressed, and so does not interfere with the nostrils of the child, who can thus breathe through its nose while it is suckling, and so does not have to keep dropping the nipple to take breath, the latter being a cause of sore nipples.

**FIG. 225.—FACIAL PARALYSIS.**

In this complication the facial nerve is injured. The paralysis, which is generally on one side only, as a rule disappears in a few days. The injury is caused by one blade of the forceps, during delivery, pressing on the facial nerve. The face is drawn towards the uninjured side. After the child has been fed, especial care must be taken to clean its mouth of any curds which may be present, otherwise these may cause inflammation.

**FIG. 226.—DEPRESSION OF THE SKULL.**

The depression of the skull is due to the pressure of the promontory of the sacrum. Such a depression may occur when the pelvis is flattened. It usually disappears within 7 days. Sometimes, when delivery by the forceps is difficult, especially in cases of labour in which the pelvis is flattened or when extraction of the after-coming head is difficult, the bone is fractured also, and in addition there may be an intracranial hæmorrhage.



FIG. 227.—ERB'S PARALYSIS.

If the size of the shoulders of the child is larger than normal, or there is a delay in their birth, traction will have to be applied to the neck of the child to get the anterior shoulder down. It sometimes happens, in such circumstances, that the upper cords of the brachial plexus, or some of the nerve fibres running in these cords, are ruptured. The same injury may result when delivering the after-coming head by the Prague method.

The shoulder is fixed and the elbow is fully extended, while the humerus is rotated inwards and the forearm is pronated, so that the palm of the hand turns backwards, or even outwards.

The arm must be bandaged to the chest for 2 weeks, since, if it is allowed to hang down, the paralysis may be lasting. A light splint should also be applied to keep the forearm supinated and the fingers extended. Massage should be started after 2 weeks. The recovery is generally complete.

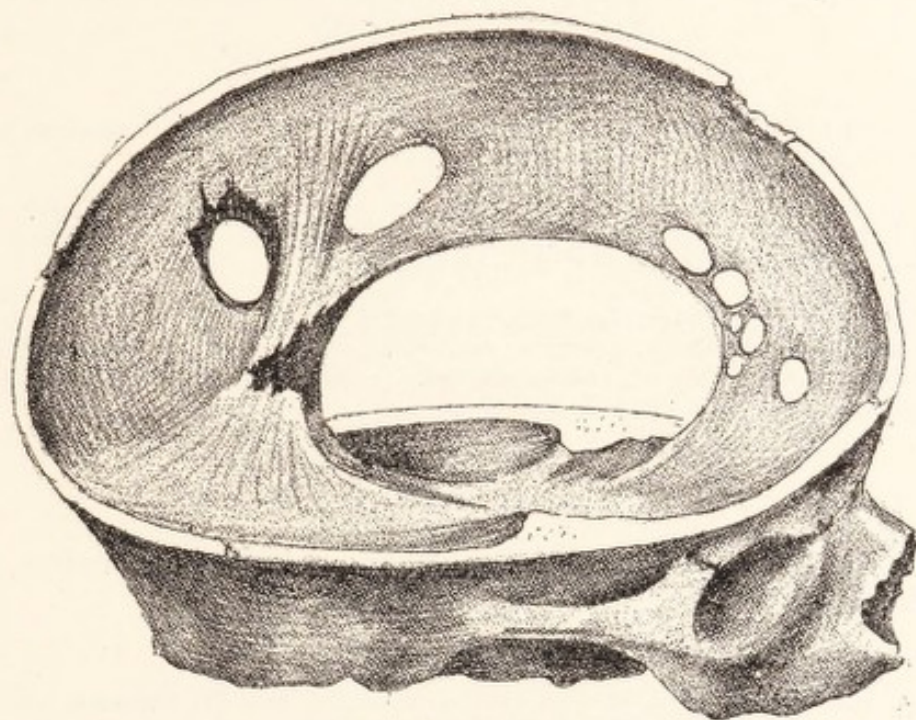


FIG. 228.—CEREBRAL HÆMORRHAGE.

The commonest cause of death of the child, after a difficult labour, is deep cerebral hæmorrhage, due to processes of the dura mater termed the tentorium cerebelli and falx cerebri being torn. The illustration shows tears in the falx cerebri, and one, roughly triangular, in the tentorium cerebelli. The commonest cause is due to the head in a breech delivery being delivered too quickly after the birth of the child's body. After the body of the child is born the head may remain in the vagina for 5 minutes or so without danger of the child asphyxiating. The midwife, not realizing this, may hasten the delivery by traction on the child. During normal labour the head is some hours passing through the pelvis, and so there is plenty of time for gentle moulding. On the other hand, in breech deliveries the head has only a short time to pass through the pelvis, its body being already born. Thus there is a far shorter time for moulding which is more forcible.

Other causes are due to excessive moulding when there is disproportion between the head of the child and the pelvis of the mother and to injury by the forceps.

EXERCISES SUITABLE FOR WOMEN AFTER PARTURITION.

OBJECT.—To improve the tone of the abdominal and pelvic floor muscles, and to improve the circulation.

In normal cases the exercises described may be commenced on the fourth day of the puerperium. They are each performed four times at first, and increased with one additional movement each day.

Position of the patient for the performance of most of these exercises is either: *Half-lying*—i.e., semi-reclining position, shoulders supported by three pillows, arms resting straight by the side; or, *crook-lying*—i.e., shoulders raised on one pillow, and one pillow placed under the knees.

FOURTH DAY.

First Exercise.

Position : Half-lying. The patient inhales slowly through her nostrils, and then exhales fully through her mouth. To be repeated six times.

Second Exercise.

Position : Half-lying. The patient stiffens first and relaxes the muscles of one leg and then of the other. To be repeated four times.

Third Exercise.

Position : Half-lying. The patient turns both arms outwards, inhales slowly through her nostrils—pauses—turns both arms inwards, and exhales fully through her mouth. To be repeated four times.

Fourth Exercise.

Position : Half-lying. The patient contracts her abdominal muscles as firmly as possible and then relaxes. To be repeated four times.

Fifth Exercise.

Crook Position. The patient presses her hands as firmly as possible over her lower ribs, on each side, and inhales slowly. The thoracic expansion is resisted so far as possible by pressure with the hands; this encourages abdominal breathing. To be repeated four times.

FIFTH DAY.

In addition to the above, the following two exercises:

First Exercise.

Position : Half-lying. First one hip and then the other is drawn up and allowed to recede. To be repeated five times, keeping the knee straight.

Second Exercise.

Position : Crook. The knees having been bent outwards so far as possible are then drawn together again; at the same time the perineal muscles are contracted firmly. To be repeated four times.

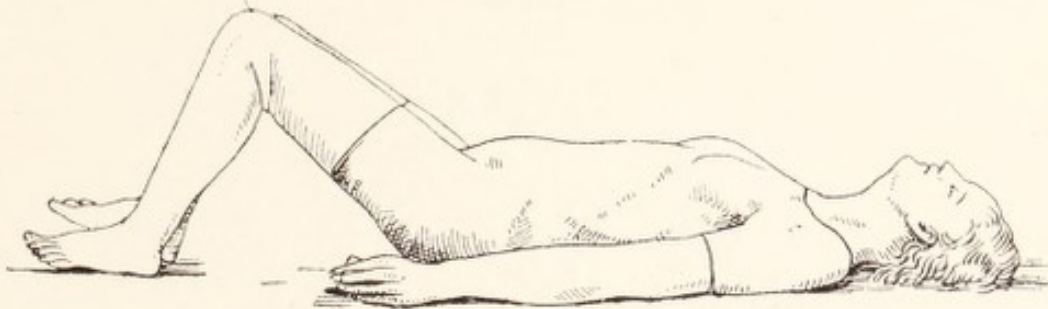


FIG. 229.

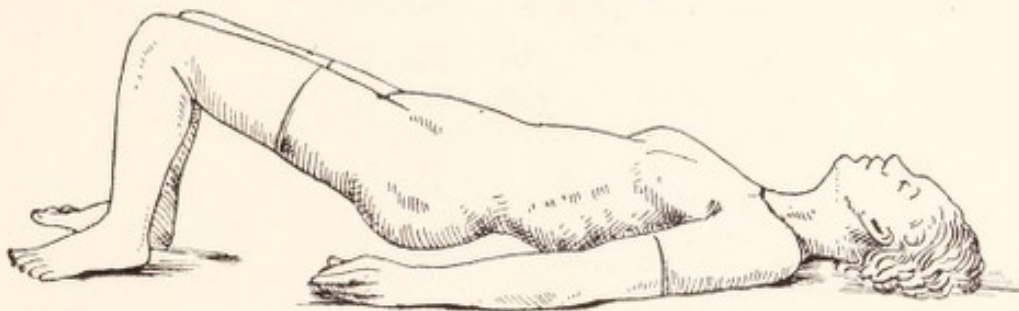


FIG. 230.

SIXTH DAY.

In addition to the exercises already described, pelvic lifting with rotation should be added.

Position : Body flat on bed, arms straight by side, knees drawn up (see illustration, Figs. 229 and 230). The pelvis must be raised off the bed so that body rests on feet, shoulders, and head. The pelvis is then rotated, first to the right and then to the left. To be repeated four times.



FIG. 231.

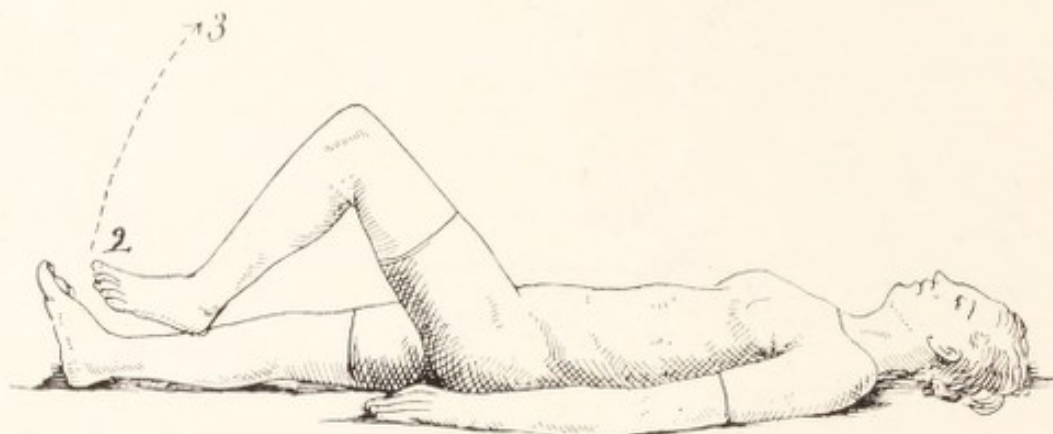


FIG. 232.

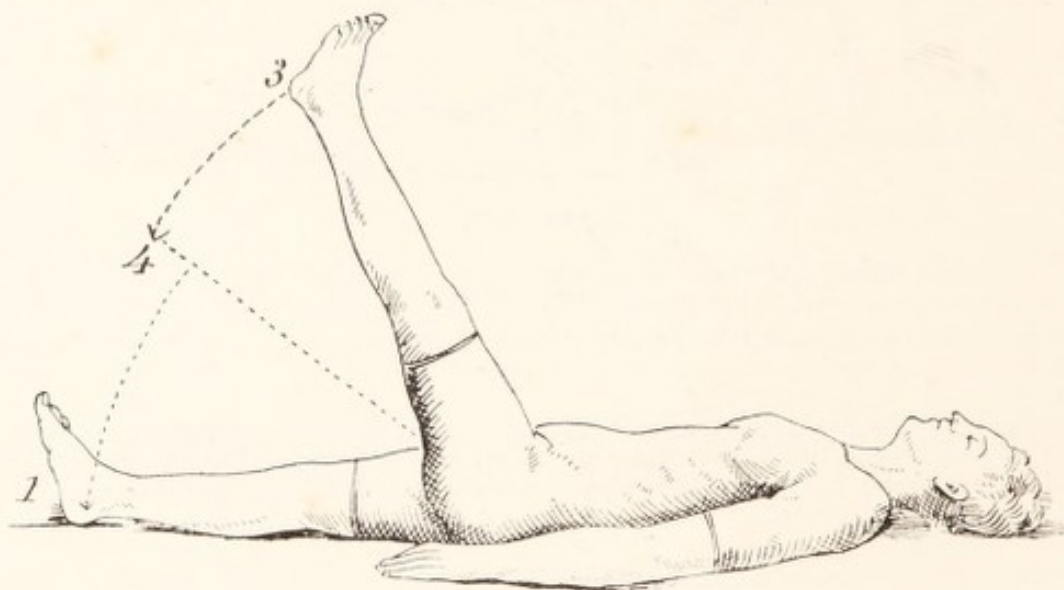


FIG. 233.

SEVENTH DAY.

Add "cycling" to the previous exercises.

Position : Flat on the bed (Fig. 231, 1). One leg must be drawn up, the knee bent (Fig. 232, 2 to 3), the leg then straightened and lowered to original position (Fig. 233, 3, 4, 1). These movements to be repeated four times, first with one leg and then with the other, as in cycling, hence the term used to describe the exercise.

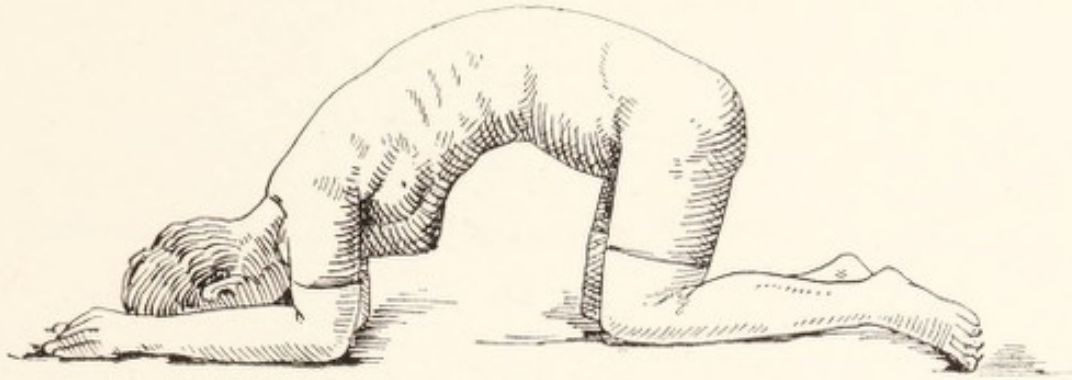


FIG. 234.

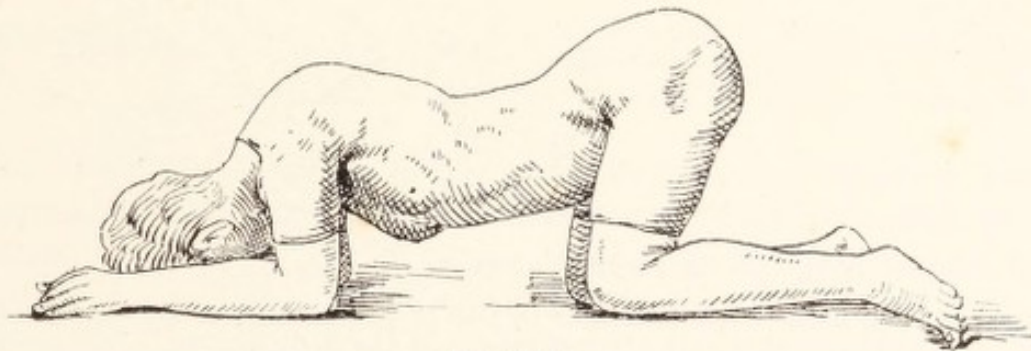


FIG. 235.

EIGHTH DAY.

Add to the previous exercises: (1) "Trunk rotation."

Position : The patient sits on side of the bed and rotates her trunk first to the right and then to the left. To be repeated four times.

(2) "Donkey exercises."

Position : Knee elbow. The lumbar spine must be alternately flexed and extended, the trunk first arching upwards and then downwards (Figs. 234 and 235). To be repeated four times.



FIG. 236.



FIG. 237.

NINTH DAY.

Add "stretch lying" to the previous exercises.

Position : The patient lying straight in bed (Fig. 236) stiffens and stretches every muscle, so that the lumbar spine is just raised off the bed (Fig. 237). This alternate stiffening and relaxation is repeated four times.

TENTH DAY.

Add walking, about three bed-lengths.

SECTION V

INSTRUMENTS AND APPLIANCES USED IN THE FOLLOWING OPERATIONS

The instruments and appliances detailed in the following lists are enumerated in the order in which the doctor, or surgeon, will generally use them.

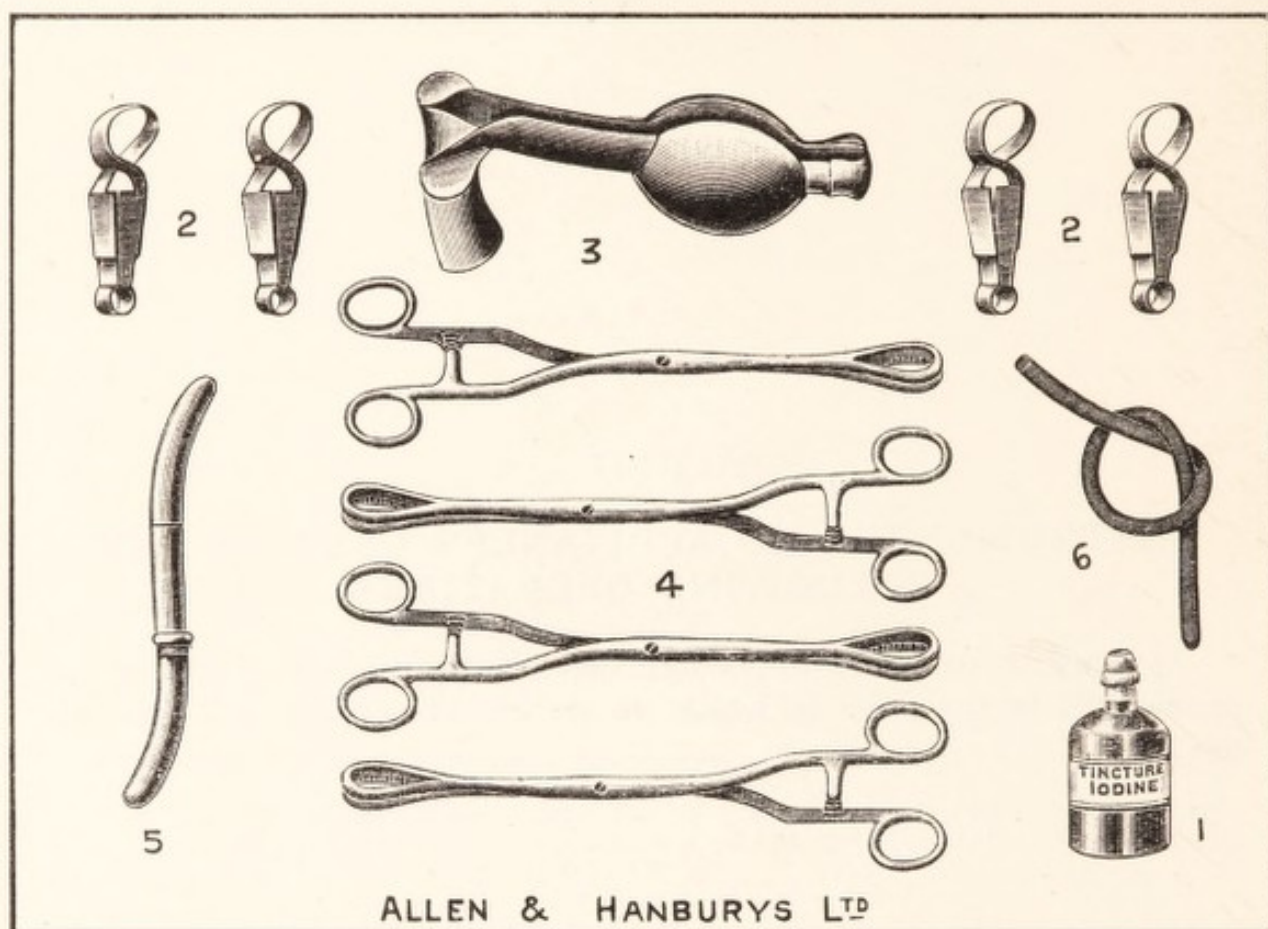


FIG. 238.—INDUCTION OF PREMATURE LABOUR.

1. Tincture of iodine with which to swab the vulva and vagina.
2. Clips with which to fasten the sterilized towels or perineal cover.
3. Auvard's speculum to expose the neck of the uterus.
4. Ring forceps to hold swabs and to steady the neck of the uterus.
5. Fenton's dilators with which to enlarge the cervical canal if necessary.
6. Solid indiarubber tube for insertion into the cavity of the uterus.

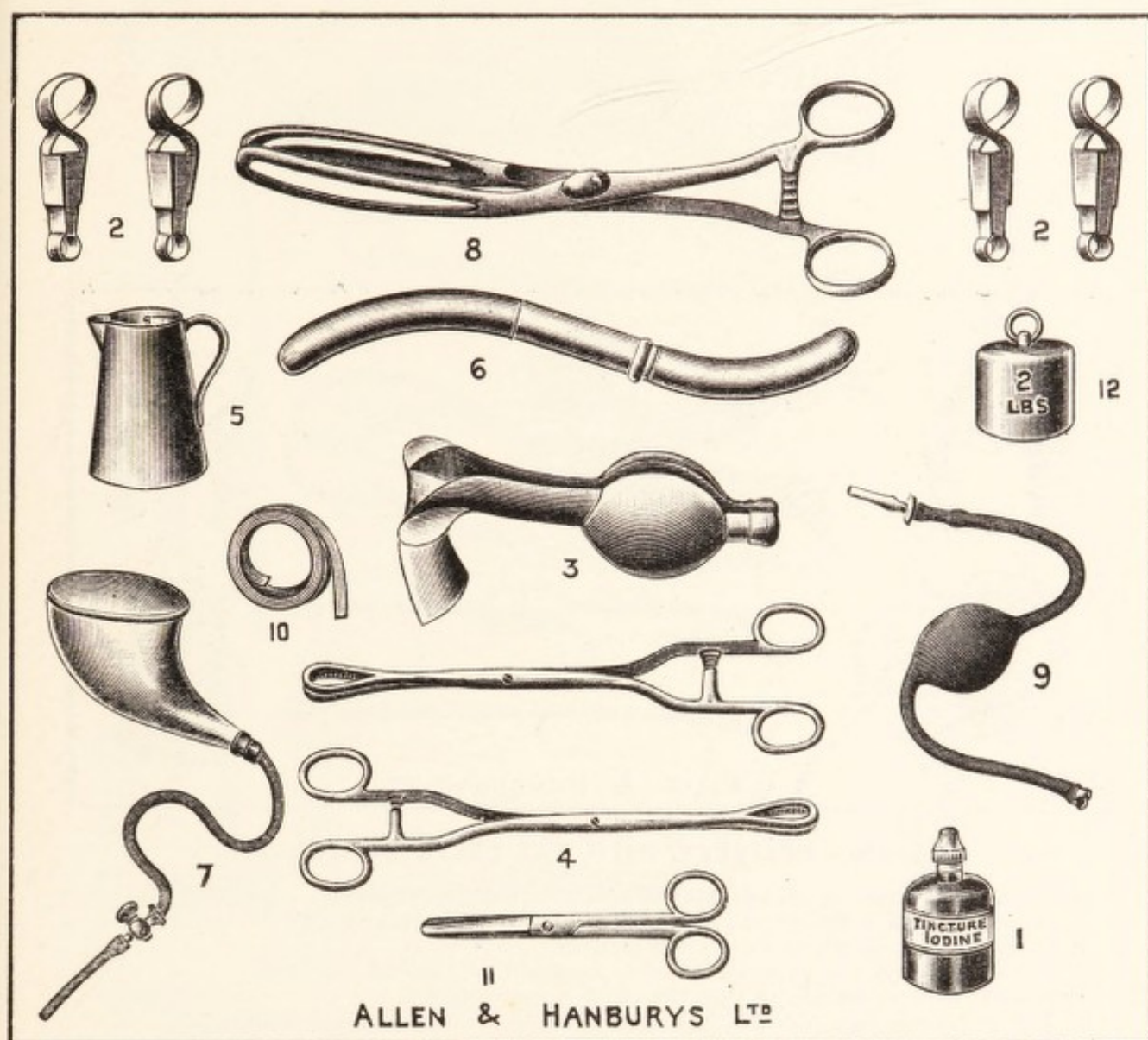


FIG. 239.—INSERTION OF DE RIBES'S BAG.

1. Tincture of iodine with which to swab the vulva and vagina.
2. Clips with which to fasten the sterilized towels or perineal cover.
3. Auvard's speculum to expose the neck of the uterus.
4. Ring forceps to hold swabs and to steady the neck of the uterus.
5. Jug to hold sterile solution.
6. Fenton's dilators with which to enlarge the cervical canal.
7. De Ribes's bag for insertion into the cavity of the uterus.
8. Forceps with which to introduce the bag.
9. Higginson's syringe with which to fill the bag with the solution.
10. Tape with which to ligature the tube of the bag, after it has been filled, to prevent leaking and to secure the weight if used.
11. Scissors with which to cut the tape.
12. Two-pound weight to hang on the bag if necessary.

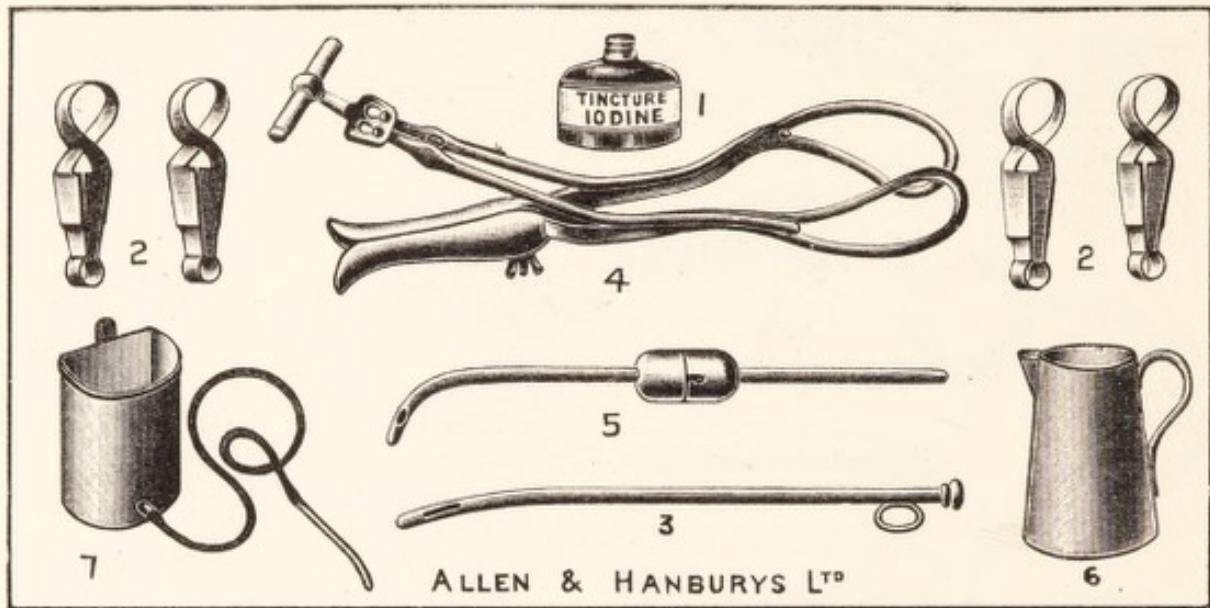


FIG. 240.—DELIVERY WITH THE OBSTETRIC FORCEPS.

1. Tincture of iodine with which to swab the vulva and vagina.
2. Clips with which to fasten the sterilized towels or perineal cover.
3. Catheter with which to empty the bladder.
4. The axis traction forceps with which to apply traction on the head.
5. Mucus catheter for use in case the child is asphyxiated.
6. Jug to hold sterile solution, in case the doctor wishes to give a douche.
7. Douche can.

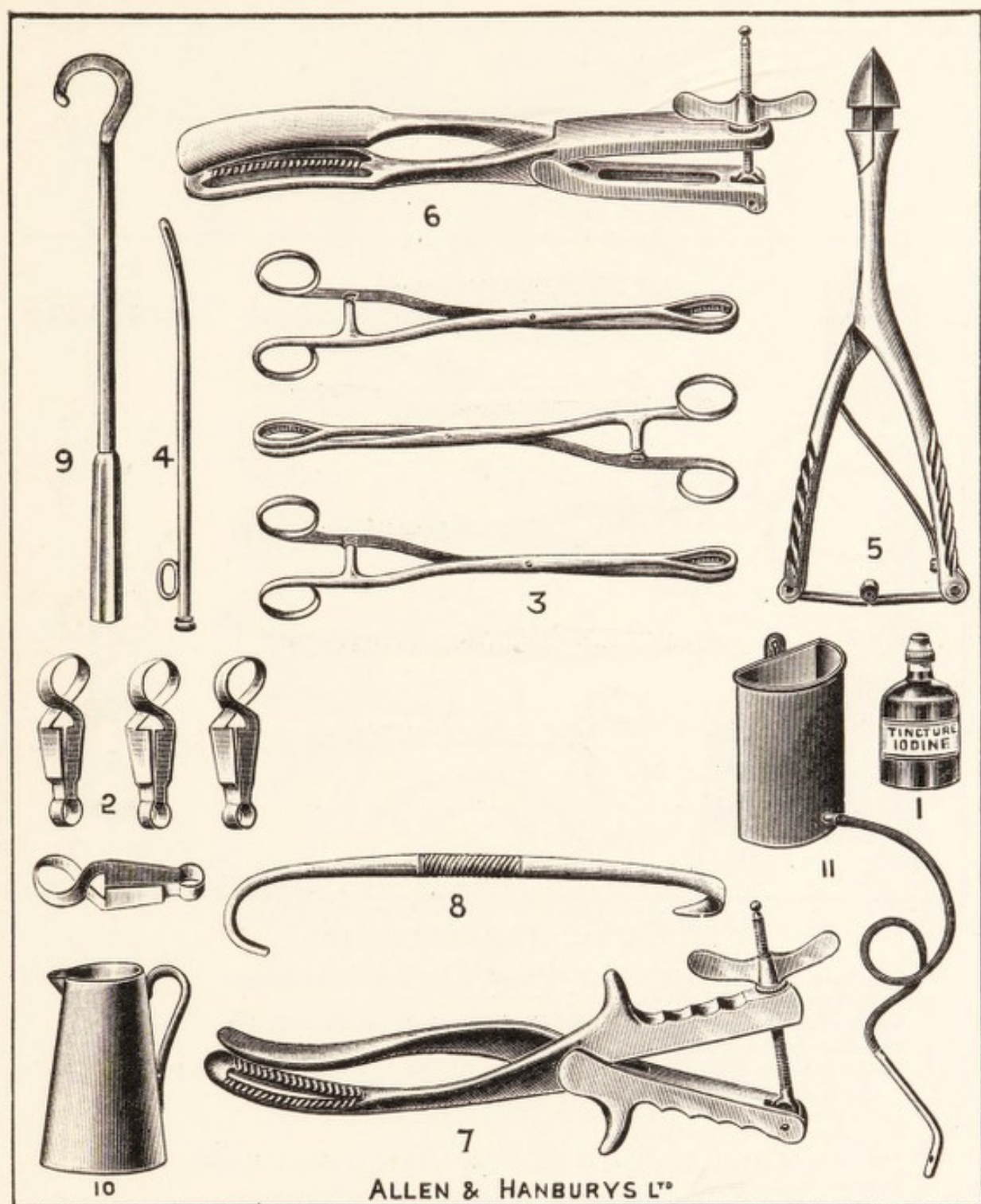


FIG. 241.—CEPHALOTRIPSY—CRANIOTOMY—DECAPITATION.

All three operations.

1. Tincture of iodine with which to swab the vulva and vagina.
2. Clips with which to fasten the sterilized towels or perineal cover.
3. Ring forceps to hold swabs.
4. Catheter with which to empty the bladder.

Cephalotripsy.

5. Perforator with which to make a hole in the skull.
6. The cephalotribe with which to crush and pull out the skull.

Craniotomy.

5. Perforator with which to make a hole in the skull.
7. The cranioclast with which to pull out the skull.

Decapitation.

8. Blunt hook with which to pull down the neck of the child so that it becomes more accessible.
9. Decapitating hook with which to cut off the head of the child.
10. Jug to hold sterile solution if the doctor wishes to give a douche. Solution also used to wash the brain out of the skull.
11. Douche can.

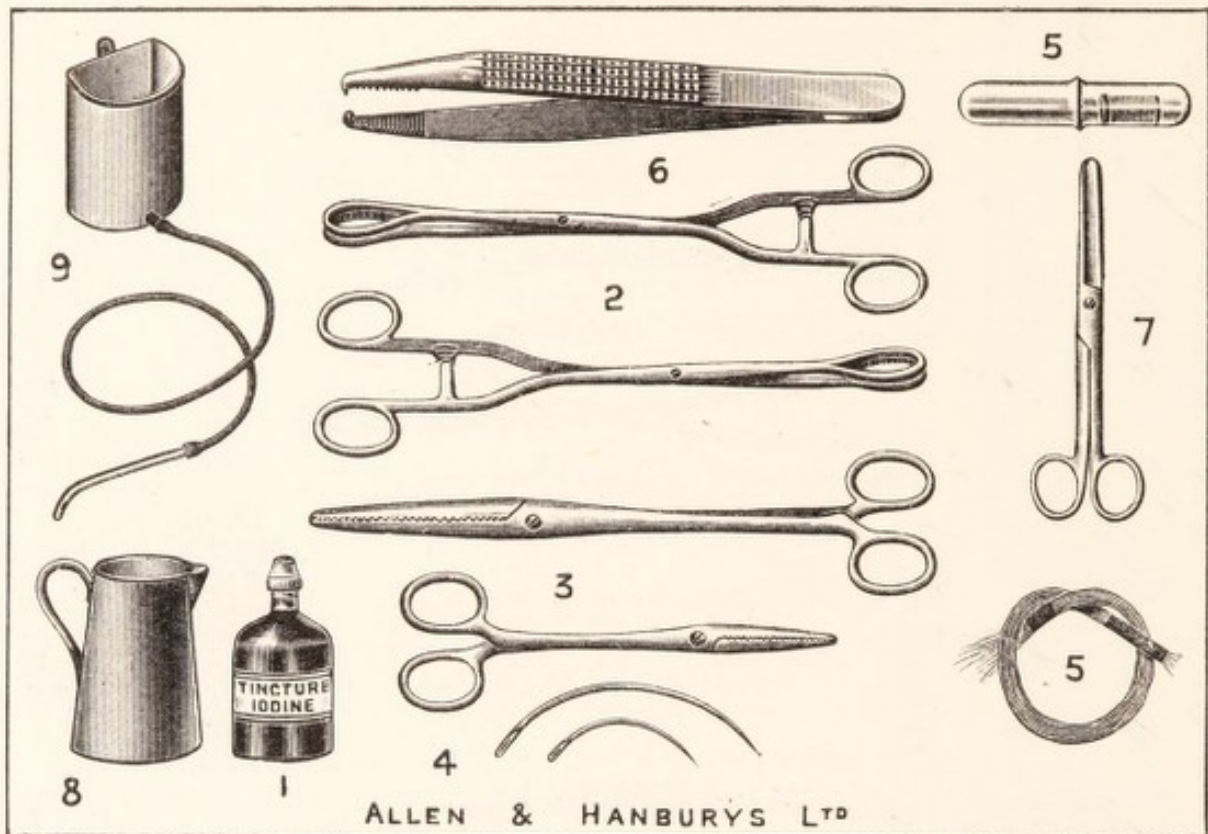


FIG. 242.—PERINEORRHAPHY.

1. Tincture of iodine with which to swab the vulva and vagina.
2. Ring forceps to hold swabs.
3. Spencer Wells forceps, long and short, for holding the needles.
4. Needles, half curved, numbers 5 and 9.
5. Silkworm gut or catgut, or both, according to the wish of the doctor, for suturing the lacerated perineum and rectum.
6. Dissecting forceps with which to steady the tissues.
7. Scissors.
8. Jug to hold sterile solution, if the doctor wishes to give a douche.
9. Douche can.

The same instruments and appliances serve to suture a lacerated neck of the uterus.

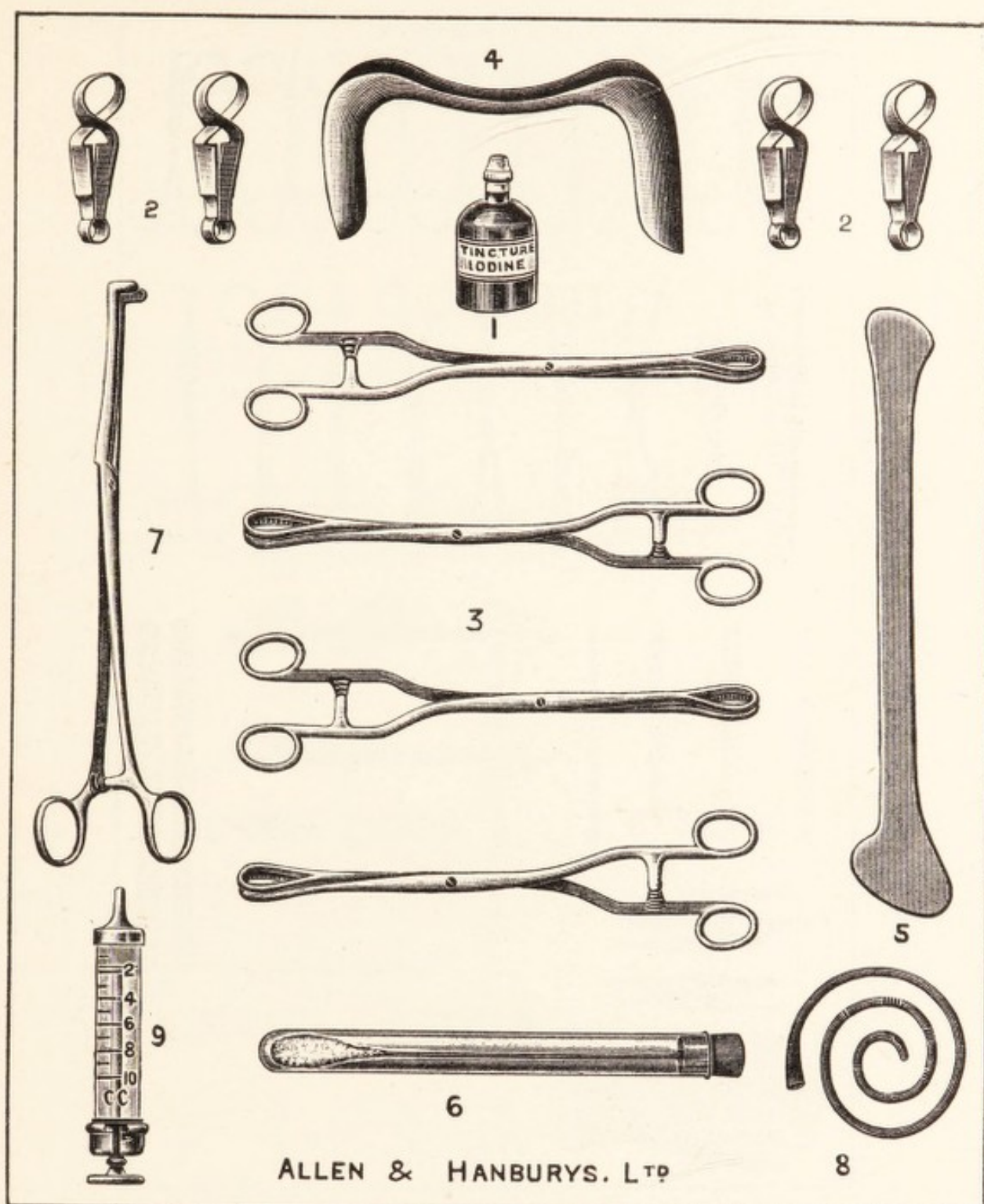


FIG. 243.—INTRA-UTERINE INJECTION OF GLYCERINE FOR PUERPERAL SEPSIS.

1. Tincture of iodine with which to swab the vulva and vagina.
2. Clips with which to fasten the sterilized towels, or perineal cover.
3. Ring forceps to hold swabs and to steady the neck of the uterus.
4. Sims's speculum to retract the posterior wall of the uterus.
5. Hobbs's speculum with which to retract the anterior wall of the vagina. Convenient, but not necessary.
6. Sterilized swab with which to take a specimen of the uterine content.
7. Hobbs's forceps for introducing the indiarubber uterine catheter. Convenient, but not necessary.
8. Indiarubber catheter for insertion into the uterus.
9. Syringe to be filled with 10 c.c. of glycerine for injection into the uterus.

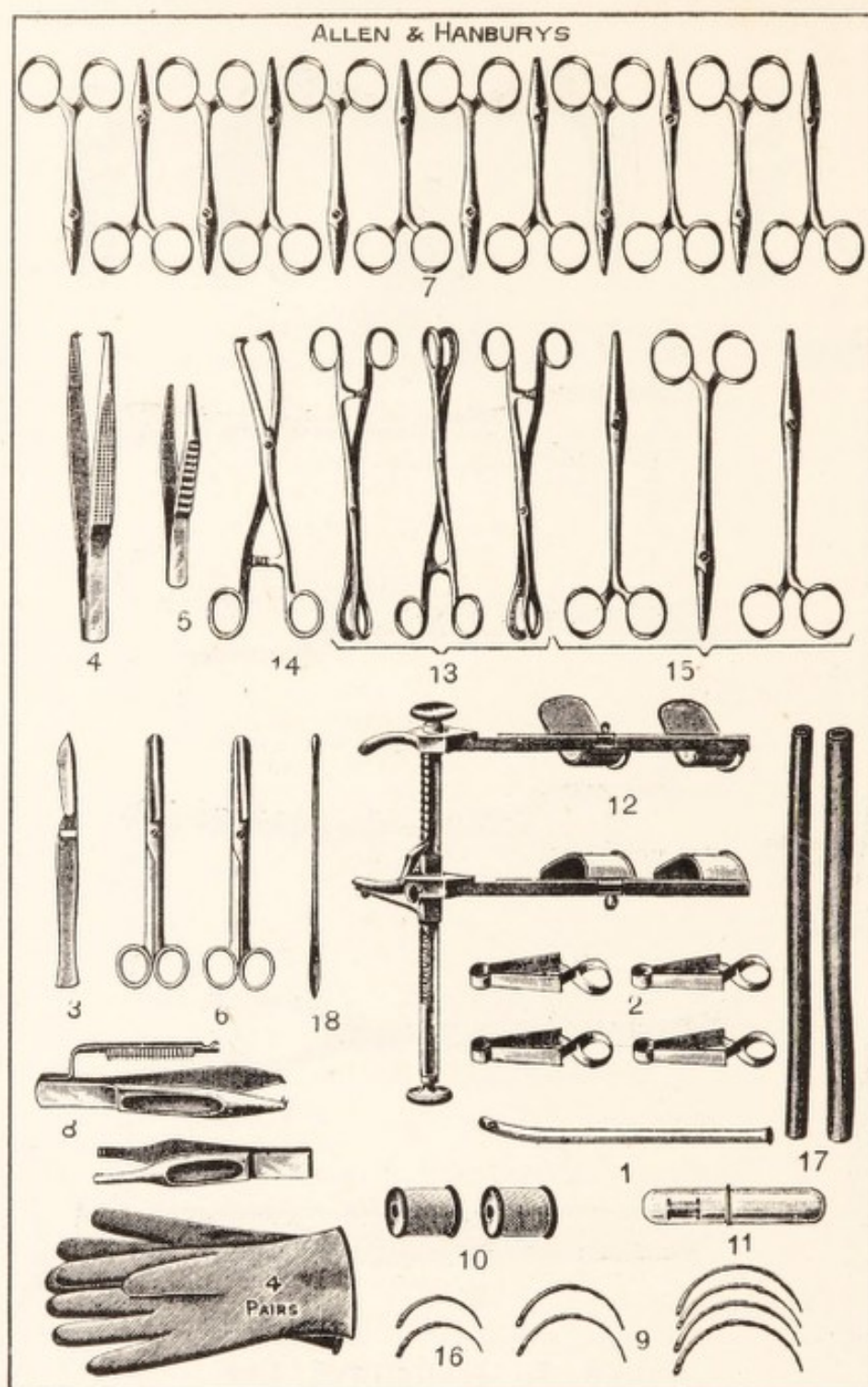


FIG. 244.—CÆSAREAN SECTION : CÆSAREAN HYSTERECTOMY.

The patient having been prepared properly, the following instruments will be required:

BOTH OPERATIONS.

1. Catheter with which to empty the bladder just prior to the operation.
2. Clips with which to fasten the sterilized towels or body cover.
3. Scalpel with which to make the incision through the abdominal wall into the cavity of the uterus, and with which to remove that organ if necessary.
4. Dissecting forceps to steady the tissues.
5. Dissecting forceps for the instrument nurse with which to handle the needles, sutures, and ligatures.

6. Blunt-pointed scissors for enlarging incisions and dividing ligature and sutures.
7. Spencer Wells forceps for clamping cut bloodvessels.
8. Forceps and holder (Berkeley's pattern) for applying Michel's clips.

CÆSAREAN SECTION.

9. Half-curved needles, numbers 5 and 9, for suturing the incision in the uterus, and the peritoneum and fascia of the abdominal incision.
10. Silk, numbers 4 and 2, in case the surgeon uses silk for the uterine incision.
11. Catgut, if the surgeon uses this for ligatures and sutures.

CÆSAREAN HYSTERECTOMY.

12. Abdominal retractor (Berkeley and Bonney's pattern) for exposing the cut surface of the neck of the uterus after the body has been removed.
 13. Ring forceps to hold swabs.
 14. Volsellum to steady the neck of the uterus while the body of the uterus is being removed.
 15. Long Spencer Wells forceps with which to secure the ovarian and uterine bloodvessels.
 - 16 and 9. Half-curved needles, numbers 5, 9 and 13, with which to suture the cut surface of the neck of the uterus, the cut peritoneum of the broad ligament, and the peritoneum and fascia of the abdominal incision.
 - 10 and 11. Silk, numbers 2 and 4, and catgut, according to whether the surgeon wishes to use one or the other for ligaturing and suturing.
 17. Drainage tubes, if the case is a septic one.
 18. Probe with which to push in the stump of the appendix if the latter has been removed. A pair of Spencer Wells forceps will do just as well.
- The surgeon may not use Michel's clips in either operation; in that case he will require a straight needle with which to suture the skin of the abdominal incision.

