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A COMPLETE HANDBOOK
OF MIDWIFERY

J. K. WATSON, M.D.

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A COMPLETE HANDBOOK

OF

MIDWIFERY

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MIDWIFERY

FOR MIDWIVES AND NURSES

BY

J. K. WATSON, M.D. Edin.

AUTHOR OF "A HANDBOOK FOR NURSES," "EXAMINATION OF THE URINE,"
ETC.

WITH OVER **140** *ILLUSTRATIONS*

SECOND AND REVISED EDITION

[1910]

24680/53

Dedicated

(BY PERMISSION)

TO

A. R. SIMPSON, M.D.

PROFESSOR OF MIDWIFERY AND DISEASES

OF WOMEN AND CHILDREN

IN THE UNIVERSITY

OF EDINBURGH

1904.

MIDWIVES' INSTITUTE

(Founded 1881. *Incorporated* 1889.)

AND

TRAINED NURSES' CLUB,

12 BUCKINGHAM STREET, STRAND.

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PREFACE TO SECOND EDITION.

A SECOND edition of this work having been called for the Author has carefully revised the text, but he has not considered it necessary to make more than a few alterations and additions. He desires to thank those Nurses and Midwives who have supported him in his endeavour to meet their wants.

BYFLEET, SURREY.
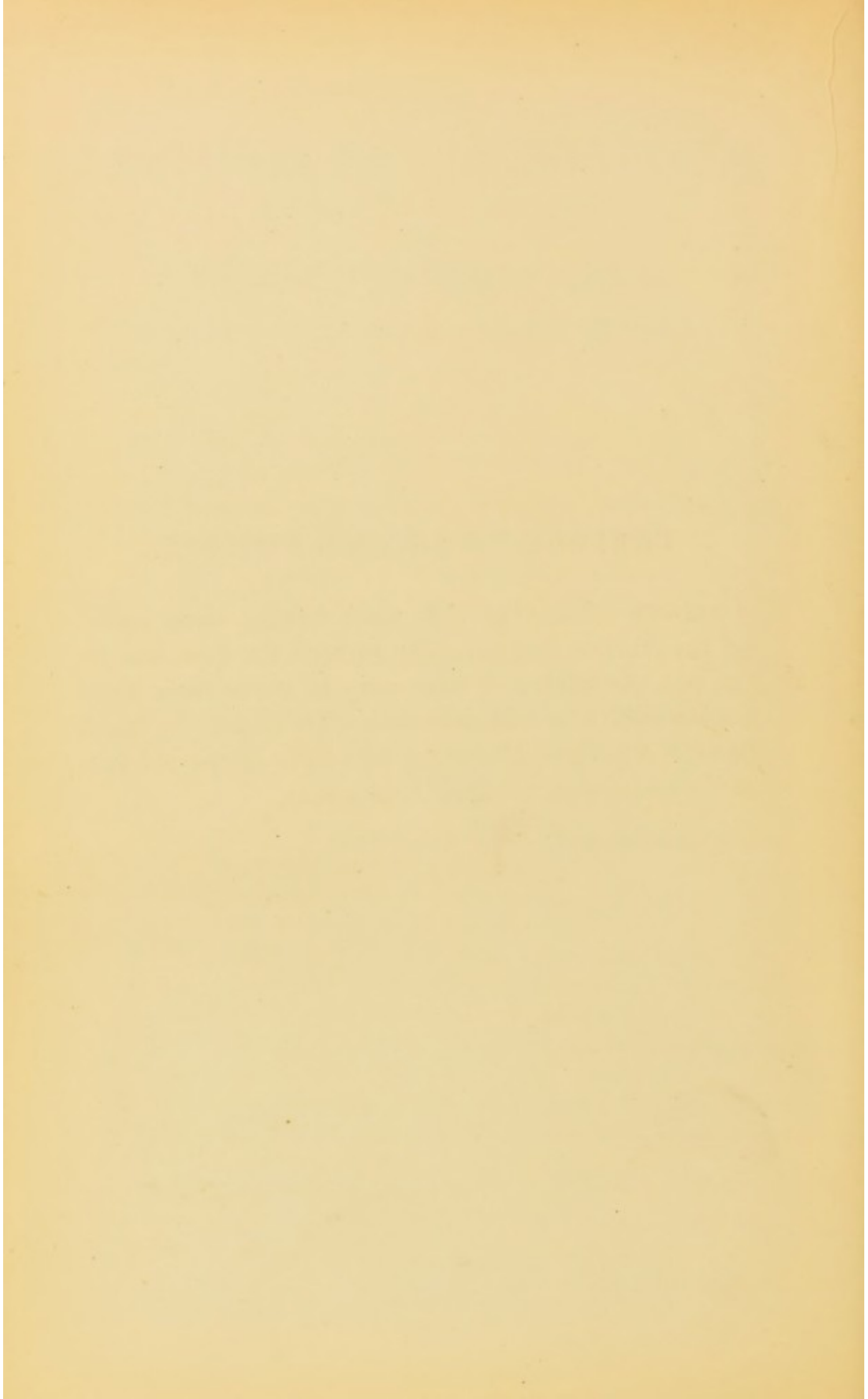
PREFACE.

In writing a handbook for midwives one is at the outset confronted with a difficulty. It is by no means easy to define the exact sphere of the midwife, and on this point there will, of necessity, be many and diverse opinions. Is it advisable that subjects should be treated of which it is never intended that a midwife should have anything to do with in the practice of her art? Answering this question most decidedly in the affirmative, it will be my endeavour to give such knowledge as can be assimilated by one who has not had the advantage of preliminary scientific training as has the medical student. It is my belief that the midwife who has taken all pains to become as conversant as she can with the theory of the subject will be more ready to appreciate her own dependence on medical assistance in times of difficulty and complexity, without forfeiting her powers of self-reliance and resourcefulness, than she who has contented herself with acquiring that minimum amount of knowledge which may allow of her becoming certificated. My aim in compiling this handbook will be "too much" rather than "too little," and I strongly advise the midwife not to neglect the theory of the subject while she is engaged in acquiring a knowledge of the practice of her art. Although this book has been designed more especially for the use of midwives I have also kept in mind the requirements of the monthly nurse, and I am not without hope that its use may not be confined merely to the midwife.

I have to acknowledge my indebtedness to my revered teachers Professor A. R. Simpson and Sir J. Halliday Croom on whose teaching the greater part of this book is based, and by whose kindness many of the illustrations appear. I am also indebted, among others, to Dr. C. J. Cullingworth, for allowing me to make use of some of his figures illustrating ectopic gestation, and for the assistance I have derived from his address dealing with this subject; to Dr. G. E. Herman, from whose useful little book (*First Lines in Midwifery*) I have derived considerable help; to Dr. McCleary, Medical Officer of Health for Battersea, for kindly allowing me to reproduce his directions on infant feeding; to my friend Mr. J. M. McOscar for reading the proof-sheets, to Mr. H. E. Smithers for the trouble he has taken over the preparation of the drawings, and, finally, to the Publishers, for their invariable courtesy and co-operation.

<div align="right">J. K. W.</div>

BYFLEET, SURREY,
  April, 1904.

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PART I.

A DESCRIPTION OF THE PARTS OF THE BODY CONCERNED IN CHILD-BIRTH.

CHAPTER I.

THE BONY PELVIS.

BEFORE the subject of midwifery can be studied with any profit an elementary knowledge of the parts of the body concerned in child-birth is necessary; and it is therefore fitting that we commence with a description of the pelvis and those structures contained in it with which we are more especially concerned. The anatomy of the pelvis will be more easily understood if the diagrams are carefully studied. We see it to be a more or less basin-shaped cavity (Lat. *pelvis*, a basin) consisting of a strong bony ring, with walls almost entirely rigid and deficient in certain points. It is bounded at the back by the sacrum and the coccyx, made up respectively of the five sacral and four coccygeal vertebræ welded together.

In front and laterally the walls are formed of the two haunch bones, meeting in front to form the symphysis pubis and joined behind to each side of the sacrum. The haunch bones are each made up of three parts: (1) the ilium, the broad expanded part forming the prominence of the hip and by which the haunch bone is united to the sacrum; (2) the ischium, the lower part of the bone on which the trunk rests in the sitting posture; and (3) the pubes, the upper and front part of the bone, which, as we have said, is united to its fellow of the opposite side by a joint, the symphysis pubis. These three parts all assist in the formation of the cup-shaped depression

I

on the outer side of the bone, the acetabulum, which receives the head of the thigh bone (femur) and forms the hip joint. The three parts of the haunch bone are separate at birth and do not completely unite to form one bone until about the twenty-fifth year. The coccyx is important in midwifery, since by its yielding during labour the outlet of the pelvis is increased and labour is thereby facilitated. Again, looking at the diagram of the
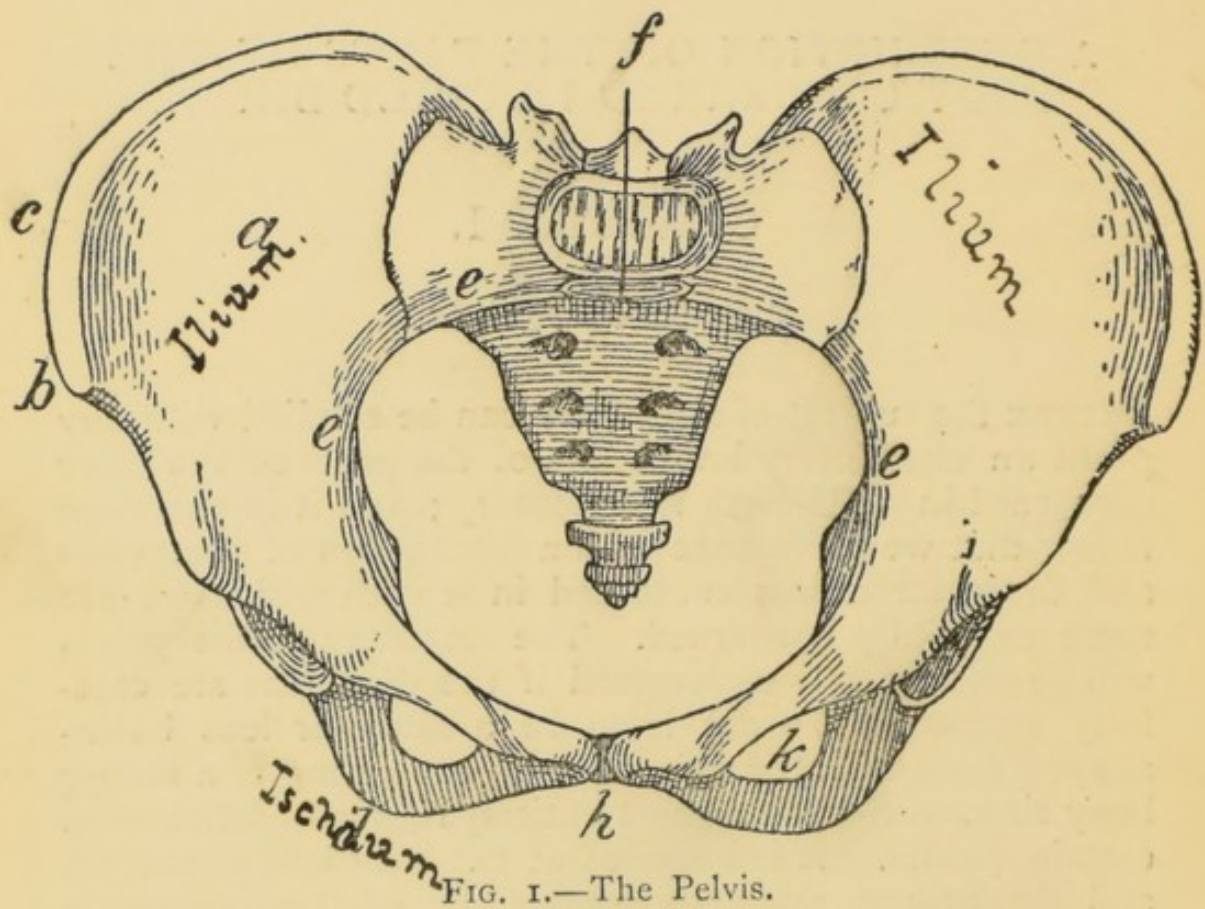
FIG. 1.—The Pelvis.

a, Ilium ; b, Anterior superior spinous process of the ilium ; c, Crest of the ilium ; d, Tuberosity of the ischium ; e, Ilio-pectineal line ; f, Promontory of the sacrum ; h, Symphysis pubis; k, Obturator foramen.

pelvis, it is at once seen that its walls are deficient at certain points. Behind there is a space between the sacrum and the haunch bone, which is partly filled up by a couple of bands (ligaments) passing between the sacrum and the ischium on each side; these are known as the great and small sacro-sciatic ligaments (see Fig. 3). Again, there is an opening (foramen) called the obturator or thyroid foramen in the front part of each haunch bone, which is closed by a membrane. Lastly, in front the

pubic bones form an arch (pubic arch) which is covered in by the soft parts. The pelvis is therefore shallow in front and deep behind. Looked at as a whole there are also certain other anatomical points to be noted.

The pelvis is divided by a prominent line, well shown in the figure, into an upper part, the false pelvis, and a lower part, the true pelvis. This is called the ilio-pectineal line. It is the true pelvis with which we shall
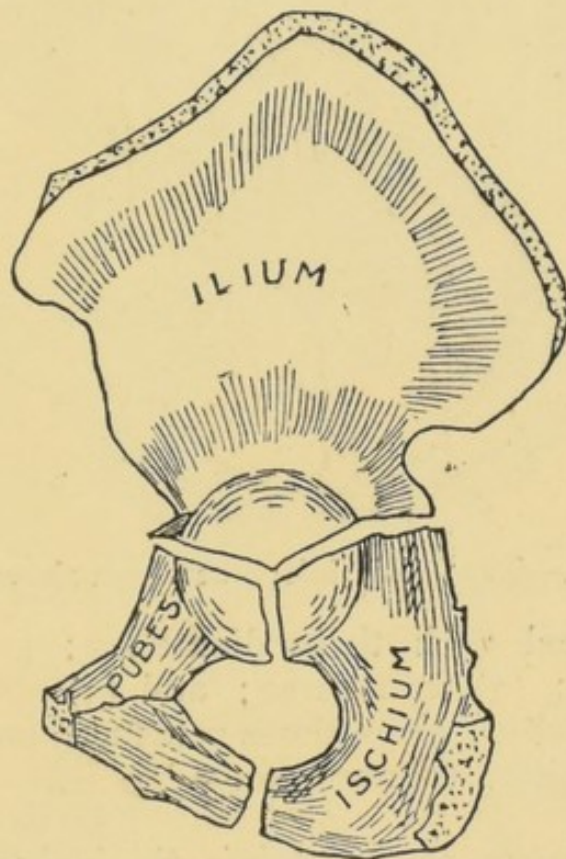
FIG. 2.—The Innominate or Haunch Bone.
(To show its three component parts.)

be more especially concerned. The false pelvis is formed by the broad expanded ilium on each side; in front it is incomplete, being filled up by the walls of the abdomen.

Various other anatomical parts of the pelvis, such as the crest of the ilium, the anterior superior spine of the ilium, the tuberosity of the ischium, the crest of the pubes, will be understood by referring to the diagram.

The true pelvis is divided into three parts: (1) the inlet, brim or upper strait; (2) the cavity; and (3) the outlet or lower strait.

These parts of the true pelvis are of great importance in midwifery since an alteration in their size or shape may seriously affect the labour. Each part of the normal female true pelvis has certain measurements which are regarded as the standard measurements. We are ac-
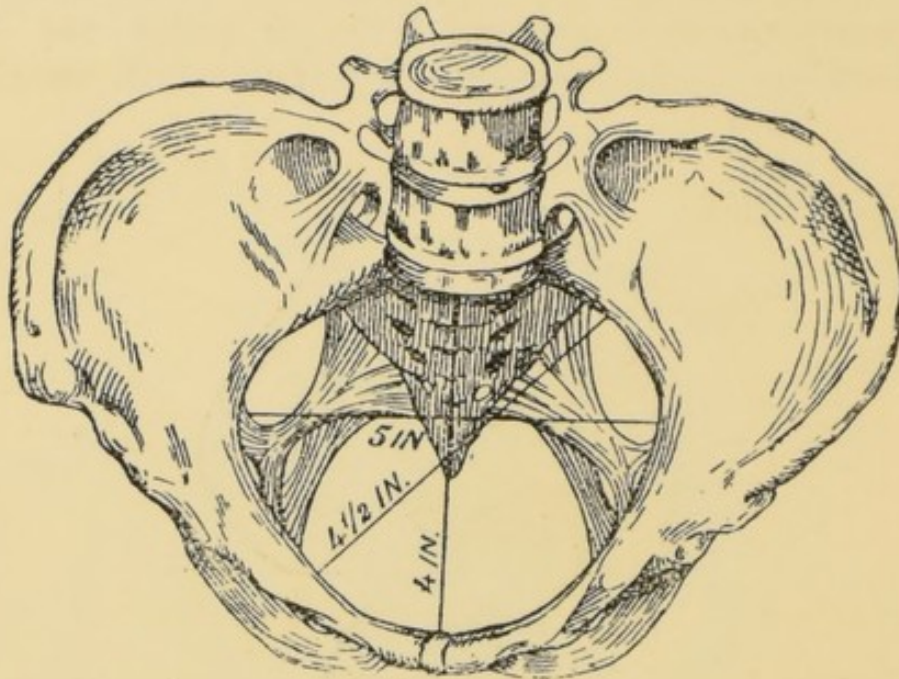
FIG. 3.—The Pelvic Inlet (seen from above).

customed to deal with three diameters: (1) conjugate (front to back); (2) transverse; and (3) oblique. The following table which gives these measurements in inches should be committed to memory :—

Diameters of the Pelvis (in inches).

Parts of the Pelvis.	Conjugate.	Oblique.	Transverse.
Inlet	4	$4\frac{1}{2}$	5
Cavity	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$
Outlet	5	$4\frac{1}{2}$	4

The most important of these diameters are those of the inlet, and especially the conjugate of the brim, which

is called the true conjugate or conjugata vera. This diameter is taken from the middle of the promontory of
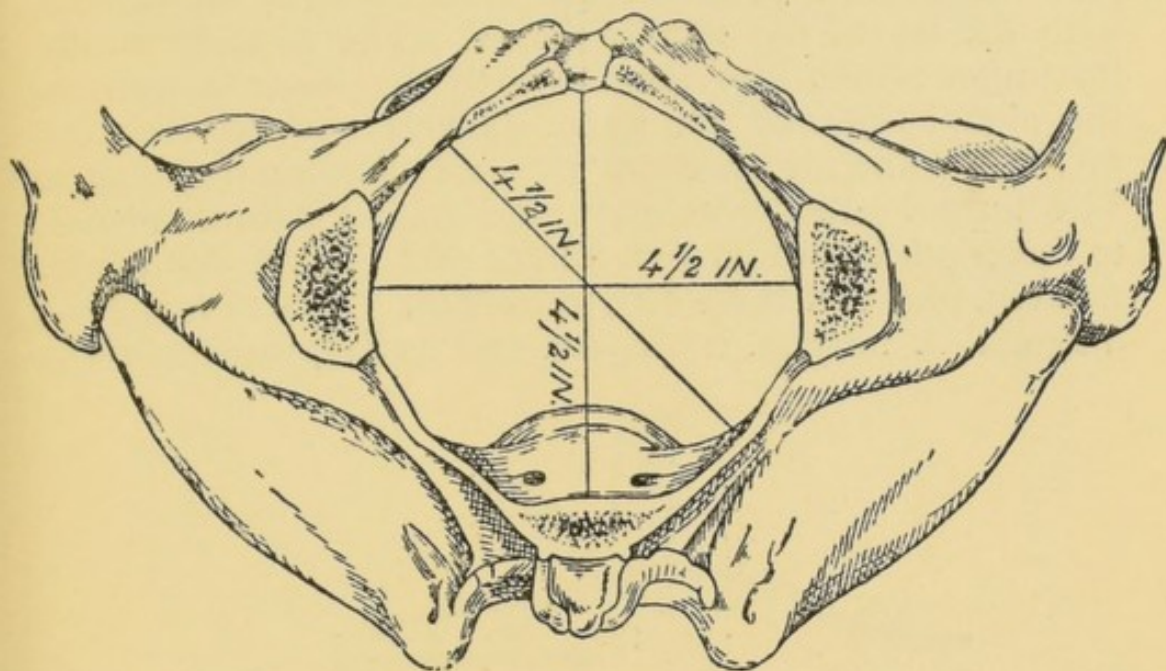
FIG. 4.—The Pelvic Cavity (seen from below).

the sacrum to the upper part of the symphysis pubis. Since, however, this can only be measured in the dried
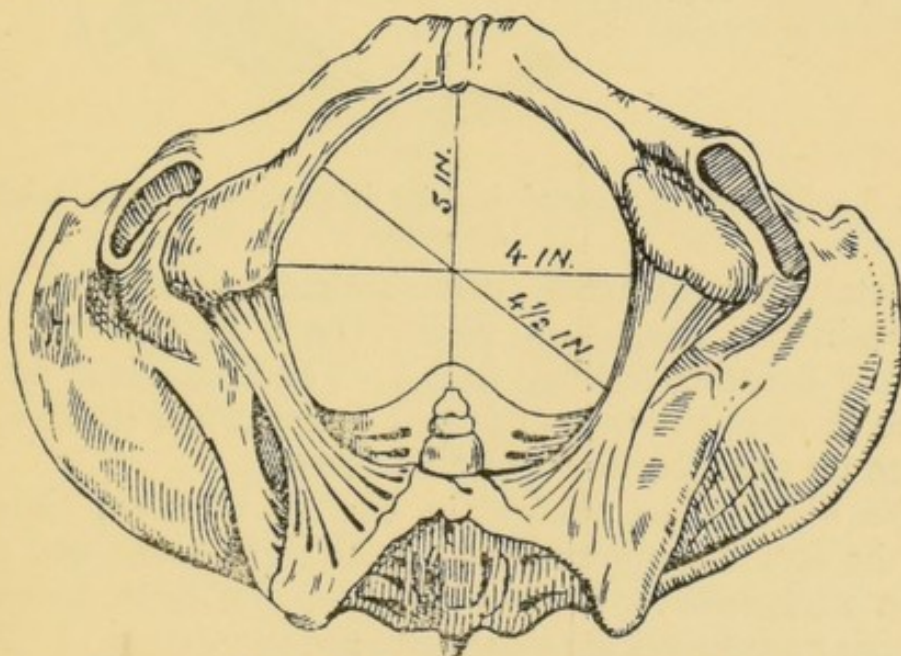
FIG. 5.—The Pelvic Outlet (seen from below).

pelvis, a method to ascertain this must be adopted, which can be made use of during life; and so the measurement from the same point posteriorly to the lower part of the

symphysis pubis is taken. This is done by passing the first and second finger of the right hand into the vagina and touching the centre of the promontory of the sacrum with the tip of the second finger. The knuckle of the forefinger comes into relation with the lower margin of the symphysis and the exact spot is marked with the finger nail and measured off after withdrawing the fingers. The normal measurement of this diameter is from one-half to three-quarters of an inch longer than the true conjugate, namely, four and three-quarter inches. This is called the diagonal or internal conjugate, and having measured this
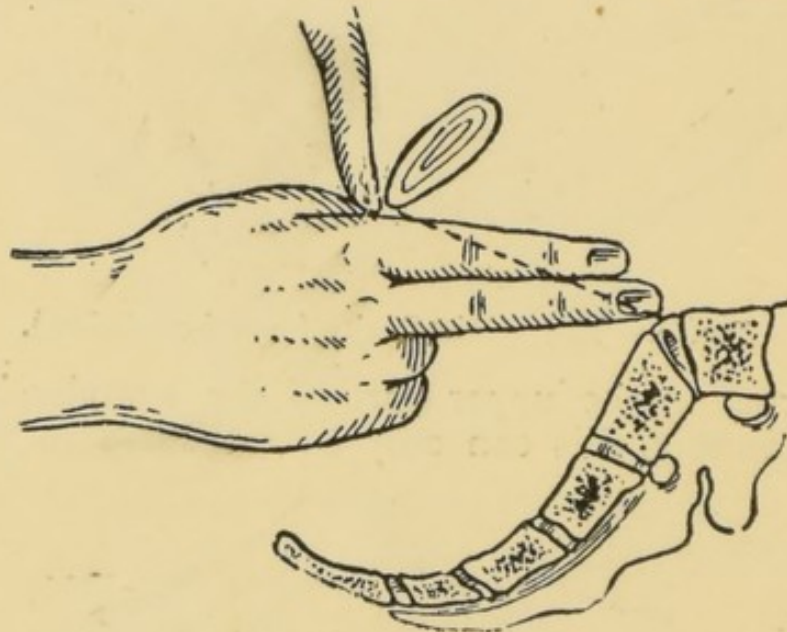
FIG. 6.—Method of ascertaining the diagonal or internal conjugate diameter.

diameter, by subtracting three-quarters of an inch we can ascertain the conjugata vera. (In a well-formed pelvis we only subtract half an inch.) The transverse diameter of the brim is the measurement between the most distant points on the two ilio-pectineal lines.

The oblique diameters are two in number, right and left, the former commencing at the right sacro-iliac articulation and passing obliquely across the brim to the left pectineal eminence and the left *vice versâ*.

There are three other diameters which are known as external measurements and refer to the false pelvis; these are the external conjugate, the interspinous and the intercristal (or bis-iliac). The external conjugate is measured from the spine of the last lumbar vertebra to the most

distant point on the symphysis pubis and is reckoned as seven and a half inches.

The interspinous diameter is the transverse diameter between the two anterior superior spines of the ilium.
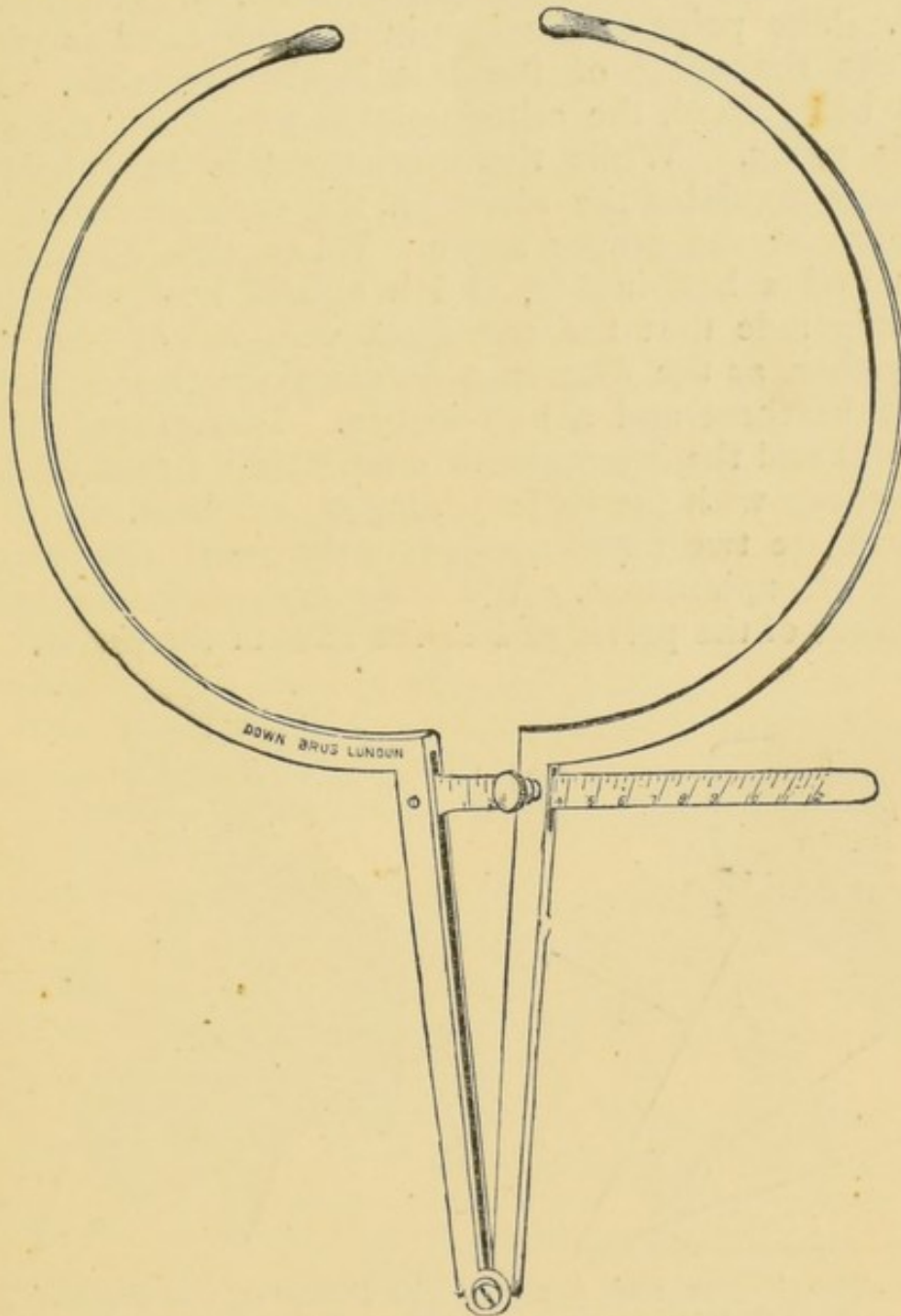
FIG. 7.—Matthews Duncan's Pelvimeter.

This is nine to nine and a half inches. That between the highest points of the iliac crests is called the intercristal diameter and it measures about an inch more than the interspinous. The important point to remember is that in a normal pelvis the intercristal diameter should be the

greater and that there should be the difference of an inch
between the two. These external diameters are measured
by an instrument known as a pelvimeter or calipers. To
ascertain the external conjugate the patient is placed on
the left side and the pelvimeter is taken, one arm in each
hand. The point of the arm in the left hand is placed
opposite the spine of the last lumbar vertebra. This
point being fixed, the other point is placed on the sym-
physis pubis. While the instrument is thus held an
assistant regulates the screw on the scale to fix the in-
strument at the proper angle When this diameter is
seven and a half inches, and it should not be less, we
may conclude that the conjugata vera is not less than
four inches, as the difference between the two diameters
should be three and a half inches. To measure the in-
tercristal and the interspinous diameters we proceed in a
similar way with the patient lying on her back.

There are two terms applied to the pelvis that require
a word of explanation. We are accustomed to speak of
the planes of the pelvis and of the axes of the pelvis. In
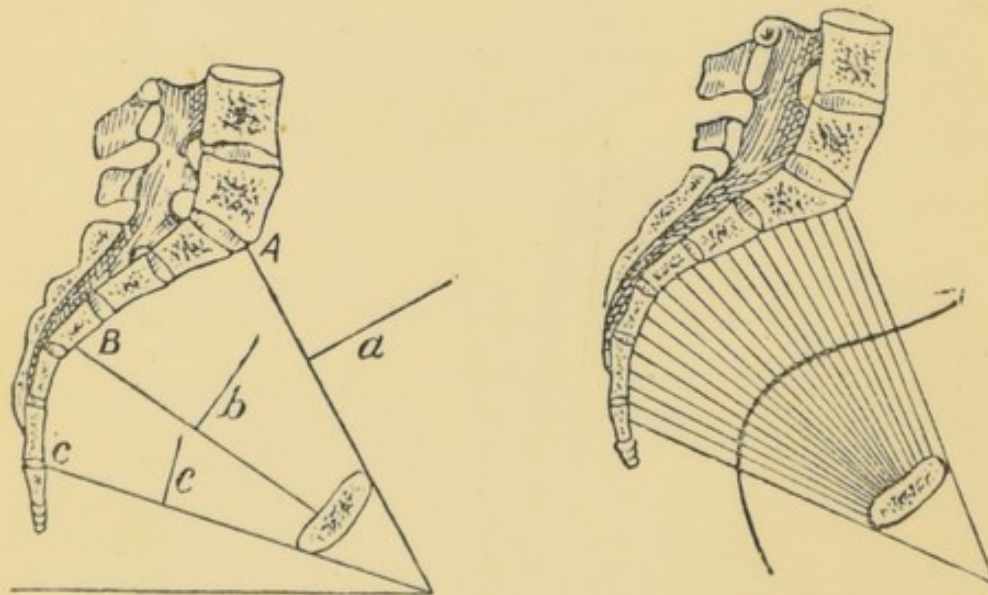
Fig. 8.—The Planes and Axes   The Planes of the Pelvis. The
of the Pelvis.   Curve of Carus.

A, Plane of the brim ; B, Plane of the cavity ; C, Plane of the outlet ;
a, Axis of the brim ; b, Axis of the cavity ; c, Axis of the outlet.

the erect attitude the pelvis is inclined at an angle of
about 60°, so that the acetabula look directly downwards
and the pubic arch is horizontal. A line drawn from

the promontory of the sacrum to the upper edge of the symphysis pubis will represent the plane of the inlet with the pelvis inclined at this angle. Now if we drew a line at right angles to this and produced it in each direction it would correspond with the umbilicus above and with the middle of the coccyx below. This represents the axis of the brim, and its direction is downwards and backwards. Again, with the pelvis held at the same angle, lines drawn from the third piece of the sacrum and from the lower part of the sacrum to the middle and the lower edge of the symphysis respectively, would represent the plane of the cavity and the plane of the outlet. Similarly a line drawn at right angles to these two planes would represent the axes of the cavity and of the outlet. The axis of the cavity may be represented by a curved line passing through imaginary lines representing the planes of the cavity at the various levels as represented in the figure. The axis of the outlet corresponds to a line drawn downwards and forwards from the promontory of the sacrum. The importance of understanding the axes of the pelvis lies in the fact that the direction which the fœtal head takes in labour is that of the axes of the pelvis. The curve represented by a line joining the various axes of the pelvis is known as the curve of Carus.

It must be remembered that contained in the pelvis as a whole are various structures, muscles, ligaments, blood-vessels and nerves, the bladder in front, and the rectum behind, with the uterus between, and the Fallopian tubes and ovaries connected with it on each side.

The only ligaments to which we need refer are two pairs known respectively as the great and the small sacro-sciatic. These pass from the sides of the sacrum to the ischium, the great to the tuberosity of the ischium (the bony point on which the body rests in the sitting posture) and the small to a bony projection known as the spine of the ischium.

CHARACTERISTICS OF FEMALE PELVIS AS COMPARED WITH MALE.

Female Pelvis.

1. Bones lighter and smoother.
2. Iliac fossæ wider. Ilia more spread out.

3. Promontory less pronounced.
4. Brim more capacious.
5. Cavity *shallow*, *not* funnel-shaped.
6. Outlet wider.
7. Ischial tuberosities *farther apart*.
8. Pubic arch wider, 90° to 100°.
9. Rami of ischium and pubes *farther apart*.
10. Coccyx more flexible.
11. Acetabula *farther apart*.

CHAPTER II.

THE FEMALE ORGANS OF GENERATION.

WE next pass to a brief description of the female organs of generation ; these are divided into internal and external. The former include the uterus, the ovaries and the Fallopian tubes. The uterus in the unimpregnated state,
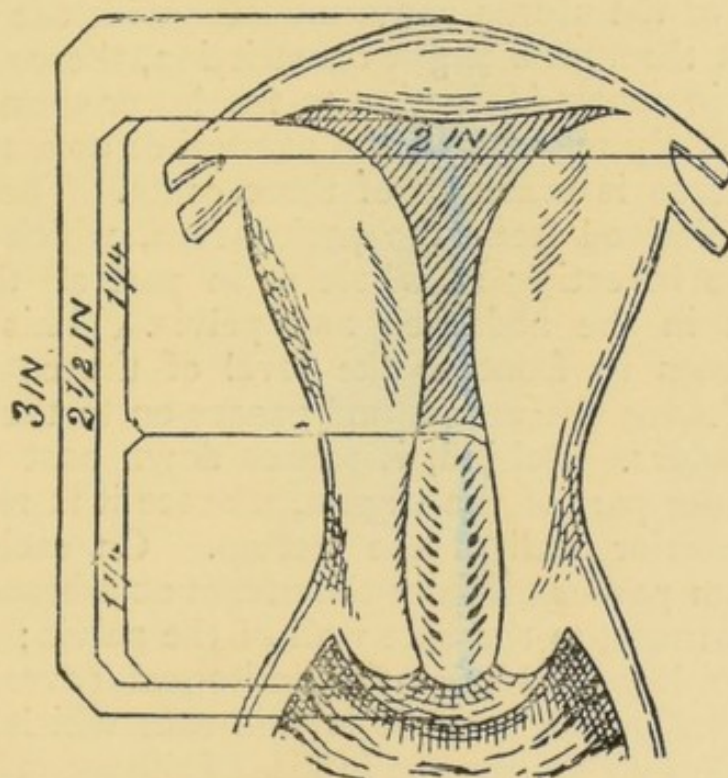
FIG. 9.—The Uterus : on Section (after Croom).

that is to say when it is not the seat of a fertilised ovum, is a hollow, muscular, pear-shaped or more or less triangular organ with its broad end directed upwards. It lies in the cavity of the pelvis, in the axis of the pelvic inlet, having the bladder in front of it and the rectum behind it. It is divided into two parts, namely, (1) the upper expanded portion, the body ; and (2) the lower narrower

portion, the neck or cervix. The latter projects into the vagina, with which it communicates by an orifice, the os uteri (mouth of the uterus). This, the lower opening of the uterus, enlarges, as we shall see, during labour for the passage of the child and the after-birth. The interior of the uterus corresponds in shape with the exterior. The upper lateral angles are prolonged into the Fallopian tubes. That part of the body of the uterus which lies above the openings of the Fallopian tubes is known as the fundus. The two surfaces of the unimpregnated uterus are normally in contact. The uterus is three inches long, two inches wide in its broad part, rather less than one inch thick, and weighs about ten drachms. The interior of the body of the uterus is small as compared with the size of the organ. The lower end of the body of the uterus communicates with the interior of the cervix through a slight constriction, the os internum, so called in contradistinction to the lower opening of the cervix, already referred to, the os uteri or os externum.

The uterus is made up of three coats. The most external is derived from the peritoneum, which is a thin membrane investing in whole or in part all the viscera contained in the abdomen and pelvis. This covering passes down in front to the level of the os internum, where it leaves the uterus and passes on to the back wall of the bladder. Behind, it passes down past the cervix to the upper part of the vagina, whence it is reflected on to the anterior wall of the rectum. On each side the peritoneum passes off from the uterus as a broad fold, the broad ligament, to the side wall of the pelvis; to this we shall refer later. Under the peritoneal covering is the thick muscular coat, and it is this coat which is mainly responsible for the increase in size of the pregnant uterus. The *most* internal coat consists of mucous membrane, which we may define as a soft spongy lining, rich in blood-vessels, the surface of which secretes and is lubricated by mucus. To this coat is given the name endometrium when we are referring to the body of the uterus. When speaking of the mucous membrane of the cervix we prefix the adjective " cervical " to the term endometrium. The reason of this distinction is that the mucous membrane of the body of the uterus and that of the cervix differ in

some important characteristics, one of these being that the endometrium proper is smooth whereas the cervical endometrium is thrown into folds. The uterus is well supplied with arteries, veins, lymphatics and nerves. Next we must consider the position of the uterus. The body of the uterus is liable to considerable variations in position, changing with the distension and emptying of the bladder and rectum, with which we have seen it to be in close contact.

The body of the uterus is bent on the cervix so that it looks forwards while the os uteri is directed downwards and backwards towards the hollow of the sacrum. In connection with this subject we must understand what is meant by anteversion, anteflexion, retroversion and retroflexion, terms that are in common use in describing the position of the uterus. Anteversion (Lat. *ante*, before; *verto*, I turn) refers to a bending forwards of the whole organ ; by anteflexion (*ante*, before ; *flecto*, I bend), on the other hand, we mean a bending forwards of the body of the uterus on the cervix so that in this case there is an alteration in the direction of the uterine canal. In the same way we may interpret the words retroversion and retroflexion, substituting backwards (*retro*, back) for forwards. Now the natural position of the uterus is one of anteversion and anteflexion, its degree varying not only with the condition of the bladder and rectum, as we have said, but with every movement of respiration, so we see that one characteristic of the body of the uterus is that it is an eminently movable organ.

The organ is kept in position or slung, as we may say, by certain ligaments, two connecting it with the bladder in front, two passing to the hollow of the sacrum behind and embracing the rectum, and the two broad ligaments which we have seen to pass outwards on each side to the sides of the pelvis. The broad ligaments contain in their folds the ovaries, the utero-ovarian ligaments, by which they are attached to the uterus, the Fallopian tubes (in their upper margin), numerous blood-vessels, nerves and lymphatics, and two ligaments, the round ligaments, right and left, which run forwards to the abdominal wall. The uterus is also retained in position by virtue of its attachment to the roof of the vagina, and the structures

forming the perineum prevent it from falling down. When the pelvic floor becomes deficient then the uterus begins to fall, and the degree of its descent depends on the amount of the deficiency.

Lastly, the function of the uterus is to receive the ovum from the ovary and Fallopian tube, and, after conception has taken place, to support and nourish the embryo and fœtus, and thirdly, to expel the fœtus when it has arrived at maturity.
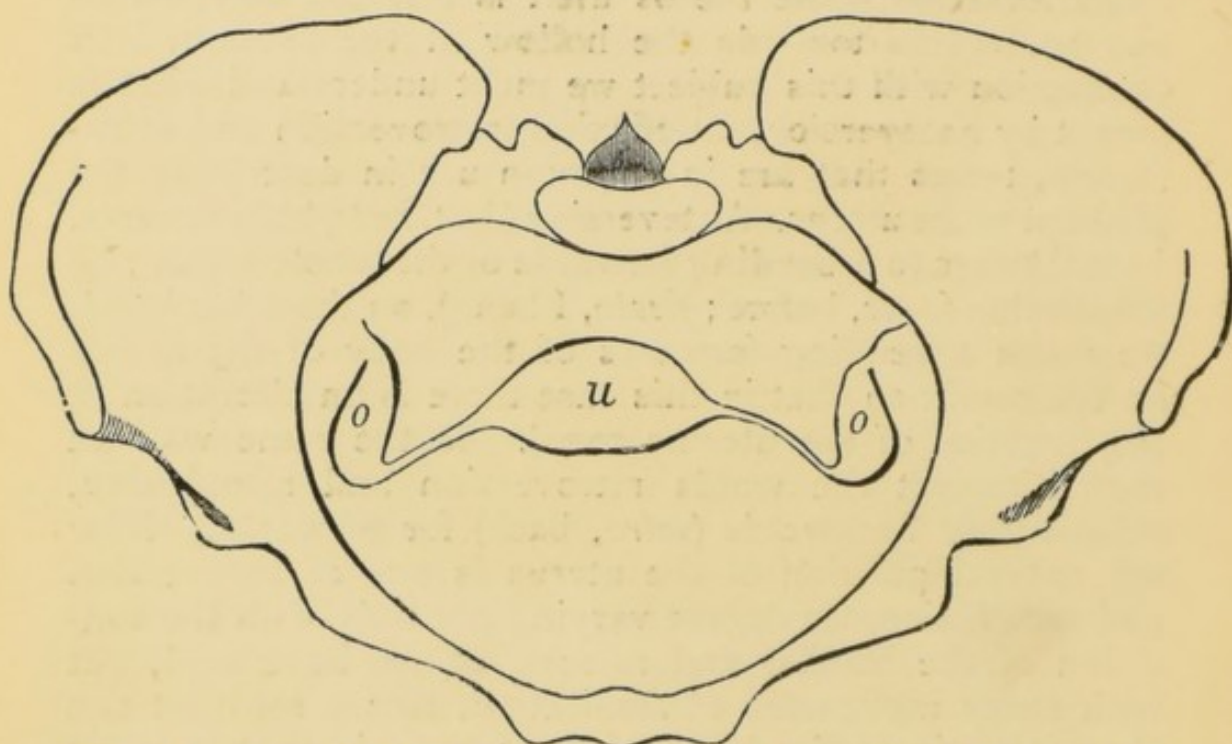
FIG. 10.—Fundus Uteri and Ovaries in Position.   Bladder distended (Schultze).

The ovaries are two small almond-shaped solid bodies about one and a half inches long lying in the posterior fold of the corresponding broad ligament and a little below the pelvic inlet. Together with the Fallopian tubes they are known as the uterine appendages. The diagram (Fig. 10) shows the brim or inlet of the pelvis in outline as it would appear seen from above and the uterus lying in the middle, with the appendages on each side of it. We have already seen that each ovary has a ligament attaching it to the uterus and lying with it in the broad ligament of the same side. We shall have to refer to

the function of the ovaries and the Fallopian tubes when we come to speak of Menstruation.

The Fallopian tubes are the channels by which the ova are carried from the ovaries to the uterus. We have seen that they pass outwards from the upper angle of the uterus. Each tube is about four inches long. Their course is a somewhat sinuous one, ending about an inch beyond the ovary by a trumpet-like opening, the infundibulum, which is surrounded by several fringe-like processes named fimbriæ, one of which, the ovarian fimbria (*fimbria ovarica*), is
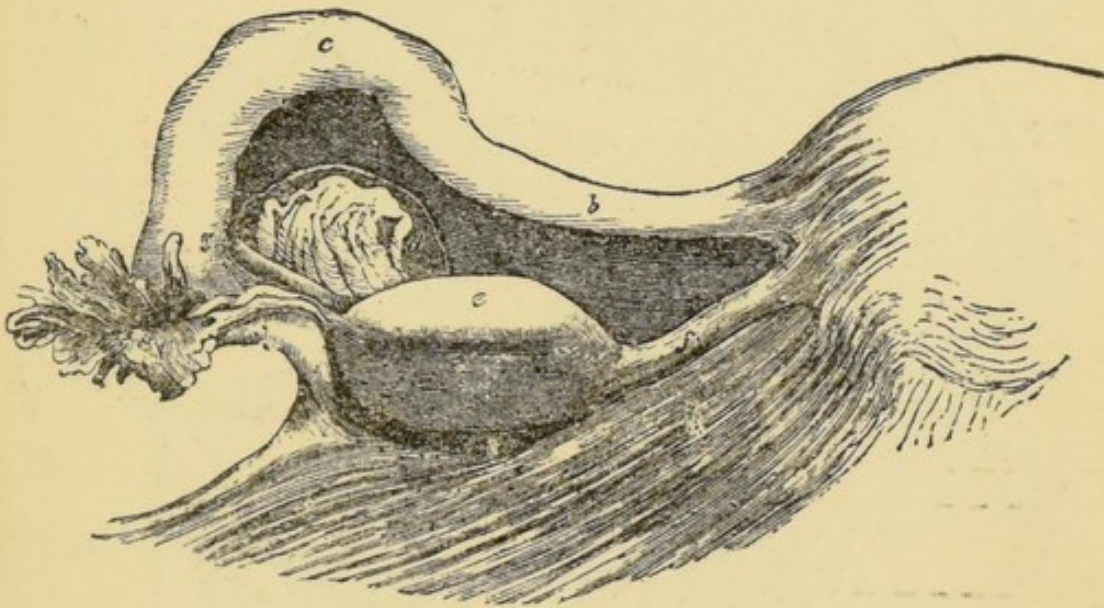
FIG. 11.—View from behind of Lateral Angle of Uterus with part of the Left Broad Ligament, Fallopian Tube, and Ovary (Henle).

a, Uterus; *b*, Isthmus of fallopian tube; *c*, Ampulla of fallopian tube; *e*, Ovary; *f*, Ovarian ligament; *g*, Fimbriated end; *h*, One of the fimbriæ of the fallopian tube.

in close connection with the corresponding ovary. It is important to note the fact that this trumpet-like orifice opens into the peritoneal cavity. This cavity in the male is a closed cavity, but in the female it communicates as we see directly with the outside air by way of the vagina, the uterus and the Fallopian tubes. Thus, if a stream of water is passed into the uterus with any degree of force, and especially if its escape alongside of the syringe is prevented, such fluid may be forced along the Fallopian tubes into the peritoneal cavity and may set up peritonitis.

Hence the necessity of using a double-channelled tube whenever a uterine douche is given.

The upper edge of the broad ligament is continued from the tube to the side wall of the pelvis, and to this
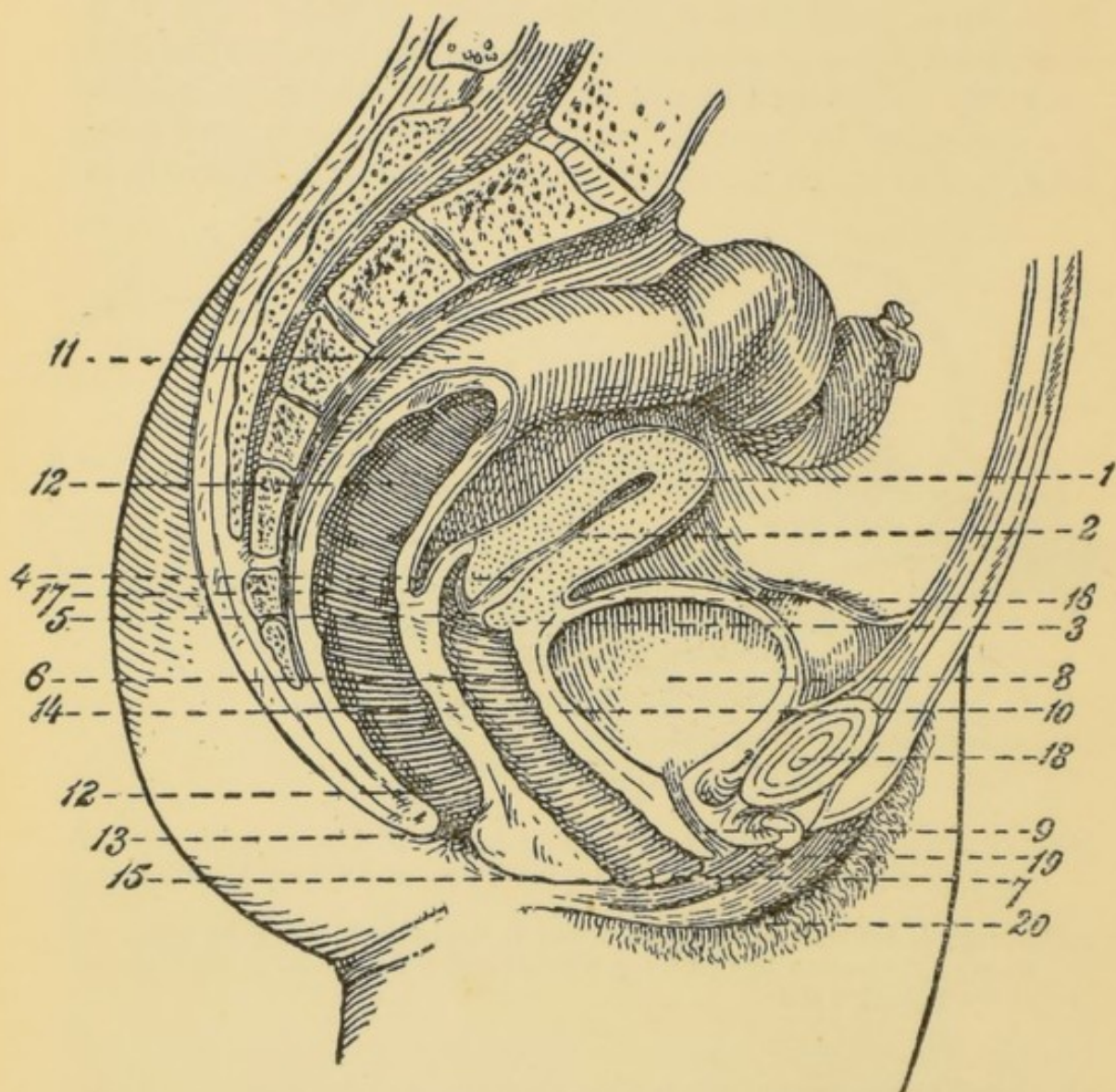
FIG. 12.—Section of Female Pelvis showing Position of Organs.

1, Wall of uterus; 2, Cavity of uterus; 3, Anterior lip of cervix; 4, Cavity of cervix; 5, External os; 6, Vagina; 7, Vaginal orifice; 8, Bladder; 9, Urethra; 10, Anterior vaginal wall; 11 and 12, Rectum; 13, Anus; 14, Posterior vaginal wall; 15, Perineum; 16, Utero-vesical pouch of peritoneum; 17, Utero-rectal pouch of peritoneum.

part of it is given the name infundibulo-pelvic ligament. This is illustrated in Fig. 11. The same figure shows the three parts into which each tube is divided, namely, a nar-

rower part nearest the uterus, the isthmus; next a broader part, the ampulla; and thirdly, the expanded part, which we have already spoken of as the infundibulum. Whereas the isthmus will only admit a bristle or a fine probe, the ampulla will allow the passage of an ordinary uterine sound. The ova are transmitted along the tube to the cavity of the uterus, partly by muscular contractions taking place in the walls of the tube analogous to those which occur in the walls of the bowel, and partly by what is known as ciliary action, which may be described as a sort of lashing or driving motion given to the ova by little projections called cilia which line the cavity of the tube.

Connecting the internal with the external generative organs is the vagina, which may be regarded as a curved, flattened canal passing forwards and downwards, following in part of its course the hollow of the sacrum. Its front wall, which lies in relation to the bladder, and contains in its lower half the urethra, is from two to two and a half inches long, while the posterior wall, which is connected to the front of the rectum, is almost an inch longer than the anterior. The lower portion of the cervix uteri projects into the vagina in such a manner that the vagina ascends to a higher point behind the cervix than in front of it. This is well seen in Fig. 12. The spaces in front, behind and on each side are called the anterior, posterior and lateral fornices.

The vagina is lined by a coat of mucous membrane which has folds (*rugæ*) running outwards transversely from a vertical ridge on the anterior and posterior walls. Underneath this is a coat of muscular fibres. The vaginal orifice is partially closed in the virgin by a fold of mucous membrane termed the hymen. It ordinarily appears as a crescentic fold with the aperture at the anterior margin just behind the urethra. After rupture the remains, which appear as fleshy nodules, are known as carunculæ myrtiformes. External to the hymen are the external generative organs which are collectively known as the vulva or pudendum.

The mons veneris is a rounded pad of fat lying over the pubes, which surmounts the vulva and is directly continuous with the labia majora, which pass directly

backwards from it to the anterior end of the perineum. The labia are united in front and behind, and these points are known respectively as the anterior commissure and the posterior commissure.   Just in front of the posterior commissure is a thin band of skin termed the
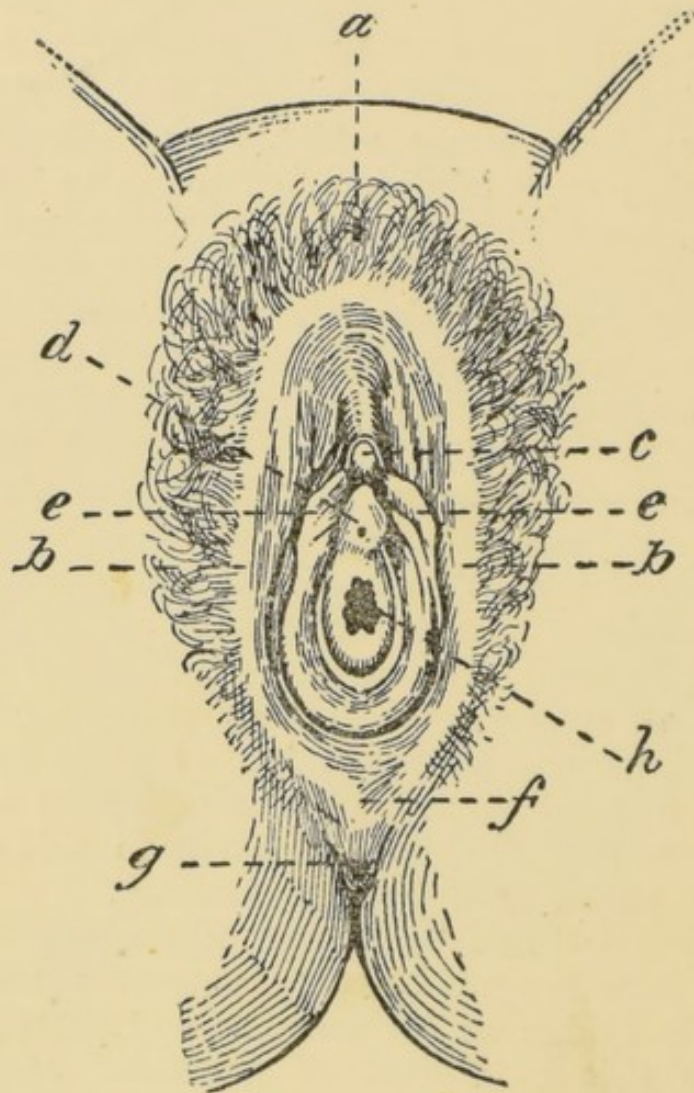
FIG. 13.—The External Organs of Generation.

a, Mons veneris ; *b, b*, Labia majora ; *c*, Clitoris ; *d*, Urethral orifice ; *e, e*, Labia minora or nymphæ ; *f*, Fourchette ; *g*, Anus ; *h*, Hymen.

fourchette which is always torn at a first labour.   The labia minora (lesser lips) or nymphæ, as they are often called, are internal to, and concealed by, the labia majora when the latter are in contact.   They commence about the middle of the labia majora, and, passing forwards, increase in size until they approach the clitoris,

when each divides into two folds which encircle the clitoris and unite with the corresponding fold of the opposite side.

Between the two labia minora and under their anterior or upper fold which forms its prepuce or fore skin lies the clitoris. This is a highly sensitive structure and it is important that in making a vaginal examination or in passing the catheter the clitoris should not be touched. As the orifice of the urethra (*meatus urinarius*) is situated about an inch below the clitoris outside the vagina, the latter can easily be avoided. Similarly, in making a vaginal examination the finger should always be passed forwards from the perineum and not in the contrary direction. Between the clitoris and the vaginal orifice is a small, smooth, triangular area having its apex at the clitoris; this is called the vestibule. At the base of this triangular area in the middle line lies the meatus urinarius. All these points are well illustrated in Fig. 13. On each side of the orifice of the vagina lies a gland, called after Bartholin. The gland opens by a duct just outside the hymen. Sometimes these glands may become inflamed or a cyst may form in connection with them and it is on this account that we mention them.

The urethra may be referred to here. This is a narrow canal about an inch and a half long placed underneath the symphysis pubis and passing from the meatus urinarius to the neck of the bladder. The urethra has a diameter of about a quarter of an inch, but it is possible to dilate it very considerably so as to allow even of an examination of the bladder with the finger without fear of any permanent incontinence.

Before concluding our account of the generative organs it will be convenient to allude here to the perineum. The word is used in two senses: (1) as signifying the skin surface between the posterior commissure and the anus; and (2) more correctly as describing the mass of tissue, *viz.*, skin, connective tissue and muscles, which closes the bony outlet of the pelvis. It is a wedge-shaped, triangular, firm, dense structure, an inch and a half long, having its apex directed upwards and its base downwards. It is better to use the term " perineal body " rather than

" perineum " when we refer to the perineum in the latter sense.

We have said that the perineal body closes the outlet of the pelvis; in fact it acts as the floor of the pelvis. Removal or partial destruction of it leads to a collapse, more or less complete, of the organs contained in the pelvis.

PART II.

MENSTRUATION, CONCEPTION, AND NATURAL PREGNANCY.

CHAPTER III.

OVULATION AND MENSTRUATION.

CONSIDERED from the point of view of the activity or otherwise of the organs of generation or reproduction, the life history of the female is divisible into certain fairly well-marked epochs. There is in the first place the period of childhood which passes into that of puberty or adolescence. This gradually merges into the stage of nubility when a woman becomes fitted to marry. This stage closes with the cessation of reproductive activity. We are at present concerned with but one of these periods, namely, that of puberty. There are certain changes which take place at this time; for example, there is a specially marked development of the throat and chest, the breasts become fuller and more rounded, and there is also an enlargement of the pelvis. These outward signs are combined with certain internal changes affecting especially the ovaries and the uterus, and these changes we shall now discuss under the terms ovulation and menstruation.

We have seen that it is the function of the ovaries to produce ova; these are contained in cavities termed ovisacs.

The ovisacs, which are also known as Graafian follicles, are scattered through the ovary; sometimes an ovisac contains more than one ovum, but usually each ovisac contains but one. The smallest are nearest the surface of the ovary, the larger are deeper in the organ. When the ovary becomes functionally active some of the

ovisacs in the deeper part of the organ increase in size and move towards the surface. One of these ovisacs at given periods will continue to increase and move still nearer the surface of the ovary till the ovisac actually bursts and sets free an ovum. While this development of the ovisac has been taking place there is a special flow of blood to the pelvic contents, and the fringe-like processes of the Fallopian tube, one of which we have
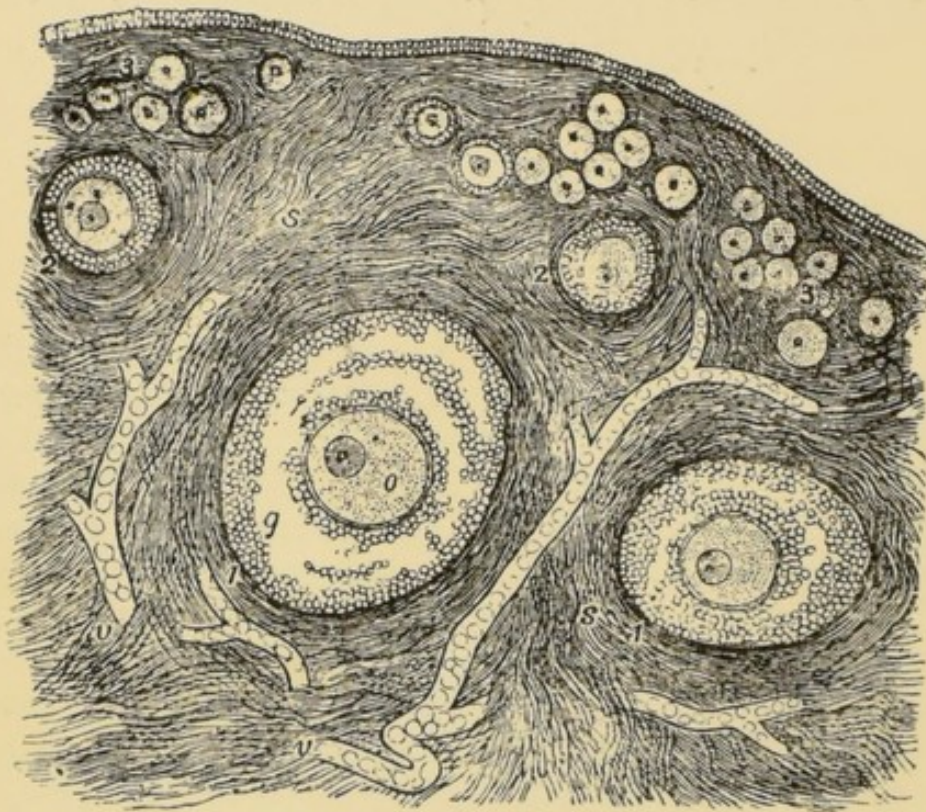
FIG. 14.—Section through part of Ovary (Turner).

1, 1, Large sized ⎫
2, 2, Middle sized ⎬ Graafian follicles.
3, 3, Small sized ⎭

seen to be in close connection with the corresponding ovary (*fimbria ovarica*), become still more closely applied, so that a cup is formed by the fimbriated extremity of the Fallopian tube into which the ovum drops. These phenomena, to which is given the name ovulation, are probably closely connected with menstruation, the former occurring at the commencement of or shortly preceding a menstrual period. We see, then, that ovulation consists in a cycle of changes whereby a young ovisac in-

creases in size and, after a preliminary movement into the deeper part of the ovary, passes towards the surface of the organ and, gradually approaching maturity, at length bursts and discharges an ovum into the corresponding Fallopian tube, the maturity and bursting of an individual ovisac in each ovary agreeing with or slightly preceding a menstrual period. Eventually the ovum reaches the cavity of the uterus and, unless it becomes fertilised or impregnated, it is in due course cast off from the uterus in the menstrual discharge and perishes. Probably an ovisac takes several months to develop. When the uterus has become the seat of a fertilised ovum there is no further ripening of ovisacs in the ovaries.

After the escape of an ovum from an ovisac the follicle is filled with blood, and this takes part in the formation of a structure known as the corpus luteum which is formed within the burst ovisac.

The corpus luteum varies in its development according as the ovum becomes fertilised or not. If pregnancy takes place it remains to its close, but if the ovum is not fertilised it disappears in about three months. It may be said, then, that the ruptured ovisac always contains the elements of a corpus luteum, but its development depends on the fate of the ovum.

We do not yet know the precise relation which ovulation bears to menstruation. Some say that the two are independent. Ovulation has been said to commence before menstruation. Ovisacs may, it has been averred, ripen and burst in childhood. A case has been recorded where a woman was delivered of a child before menstruation had set in, which would form an argument for their independence.

We now turn to discuss menstruation. This may be described as a discharge of blood from the uterus, occurring periodically. It is peculiar to the human female. It is variously called "the menses," "the catamenia," and women are accustomed to refer to it as their "period" or "unwell time". We have seen the changes which take place in the ovaries at this time. The blood is derived from the mucous membrane of the uterus (endometrium) and not from that of the cervix. The endometrium becomes swollen and thickened, and thrown

into numerous folds prior to the commencement of the flow and the blood-vessels are turgid. So great is this swelling that the uterine cavity becomes filled up just before menstruation commences. With the beginning of the flow this swelling gradually diminishes. Part or whole of the endometrium is cast off during menstruation —different observers are not agreed whether some only or all of the endometrium is shed—and this is regenerated
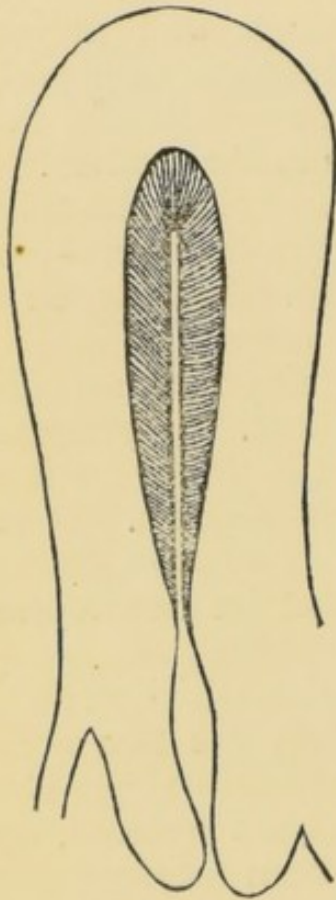
FIG. 15.—Uterus just before Menstruation (J. Williams).

Shaded part, Mucous membrane (endometrium).
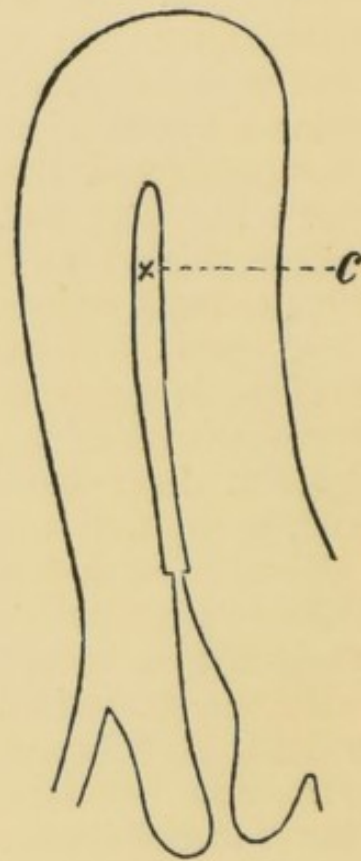
FIG. 16.—Uterus just after Menstruation (J. Williams).

c, Cavity with no mucous membrane.

during the interval between the periods. Menstruation is best regarded as a cycle of changes, in the same way as is ovulation. There is (1) a time when the uterus is preparing for menstruation ; (2) the time when menstruation is in progress ; and (3) the so called recuperative stage which passes round again to the preparatory period. The mucous membrane of the uterus is thus never at rest until menstruation ceases for good.

We have referred to the changes which take place in the uterus in connection with menstruation. There are certain other general changes which are more or less marked in different individuals, no two being precisely alike in this respect. There is frequently a feeling of malaise, languor and even faintness are common, and often a sense of fulness in the pelvis is experienced. There are four terms which are in common use in speaking of menstruation which may be explained here :—

1. Absence of the flow, from whatever cause, is known as amenorrhœa.

2. Excessive flow is called menorrhagia.

3. The loss of blood from the uterus between the periods and independently of them is referred to as metrorrhagia ; and lastly

4. Painful menstruation is known as dysmenorrhœa.

Taking these, briefly, seriatim ; amenorrhœa is present during pregnancy and nearly always during nursing. It may, however, be present as a sign of disease or disorder local or general.

Menorrhagia may be slight or very excessive (flooding) and may be due to many causes.

Metrorrhagia is generally associated with menorrhagia and is, when occurring later in life, a suspicious symptom of uterine cancer.

Dysmenorrhœa can only be properly applied to menstruation when a woman is incapacitated by her period, and it does not refer to the malaise or discomfort experienced by most women when they are unwell.

Menstruation is characterised by three stages : (1) invasion, when the discharge is scanty and pale, which is soon followed by (2) stage of persistence, when the discharge is of a bright red colour, and (3) the period of decline, when the fluid becomes more scanty and is darker and at length clearer until it disappears.

The quantity of blood lost at each period varies from about three to about twelve ounces, each diaper being usually reckoned as representing one ounce of blood. The duration of the flow varies from about four to six days as a rule. Anything below two and above eight days should be considered abnormal. These two elements go to make up what is known as the " menstrual habit ",

The frequency of return or the periodicity of menstruation is generally known as the type. This is reckoned from the commencement of one to the commencement of the next period; the commonest types are twenty-eight, thirty, twenty-one and twenty-seven days in order of frequency.

It will be seen that the menstrual habit and type are very variable in different women. It is important, however, to note any deviation from the usual habit and type in an individual case.

Menstruation usually commences between fourteen and fifteen, but it occurs earlier in warm climates, also among the richer classes of society.

The periods cease as a rule between forty-five and fifty, though they may persist till fifty-five or stop as early as forty.

The active sexual period of a woman's life is generally considered to be thirty years, say from fifteen to forty-five.

The period of cessation of menstruation is known as the menopause, the climacteric period, or, popularly, as "the change of life". This is a time of importance in a woman's life, as at this time there is a tendency to various diseases and minor disturbances of the system. If menstruation have entirely disappeared for twelve months and then reappear it is most important to advise such a woman to be examined, as this is a most suspicious symptom of cancer. The generative organs commence to decay and shrink after the menopause.

CHAPTER IV.

CONCEPTION AND THE CHANGES WHICH TAKE PLACE IN THE UTERUS CONSEQUENT TO IT. THE CONTENTS OF THE PREGNANT UTERUS.

WE are now in a position to study the changes which take place in the uterus when the ovum becomes impregnated. We say the woman has conceived. For conception to take place it is obvious that there must be two elements, the male and the female. The former consists of the spermatozoa contained in the semen, the latter is, as we have seen, the ovum. The exact site where fertilisation of the ovum occurs is not known, but it is usually said to take place in the Fallopian tube, near its ovarian end. Probably the ovum may be fertilised anywhere in its course from the ovisac to the uterus. Cases have been recorded where an ovum, which has been shown to have come from one ovary, has passed through the uterine cavity into the opposite Fallopian tube where it has become fertilised. We shall not discuss the changes which take place in the ovum consequent on its fertilisation as that is hardly within the province of this book, but we shall pass on to the changes in the uterus. Certain changes take place in the uterus preparatory to the arrival of the fertilised ovum. These changes may be compared to those occurring before a menstrual period, only they are exaggerated. The whole organ enlarges; it contains more blood than before; the mucous membrane becomes soft, spongy and enormously thickened and is thrown into folds. This altered lining of the uterus, which is now adapted for the reception of the fertilised ovum, has received a special name; it is known as the decidua vera. It is simply the thickened mucous membrane. The ovum is generally caught at the upper end of the cavity near the Fallopian tube, falling probably into the first fold in the decidua vera which it encounters,

That part of the decidua vera where the ovum becomes attached and where the placenta afterwards is to form is called the decidua serotina (late decidua). The presence of the ovum acts as an irritant to the spot where it lodges and active growth takes place here insomuch that the
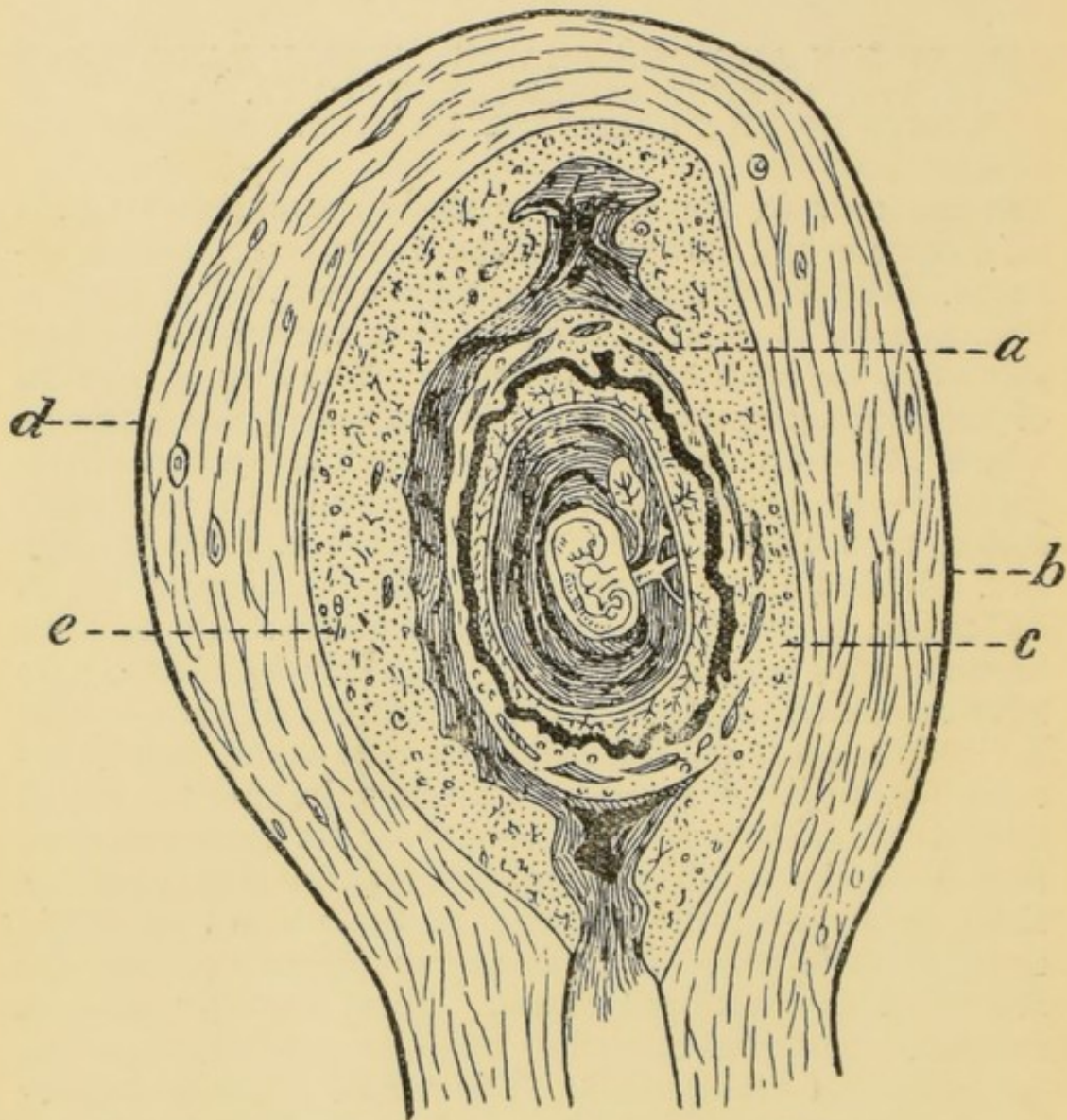
FIG. 17.—The Deciduæ at an Early Stage of Pregnancy.

a, Decidua reflexa; *b*, Anterior uterine wall; *c*, Decidua serotina; *d*, Posterior uterine wall; *e*, Decidua vera.

folds of the decidua vera by which it is surrounded grow forward from each side around the ovum until they meet in the middle. These folds of the decidua vera which grow up around the ovum constitute the decidua reflexa.
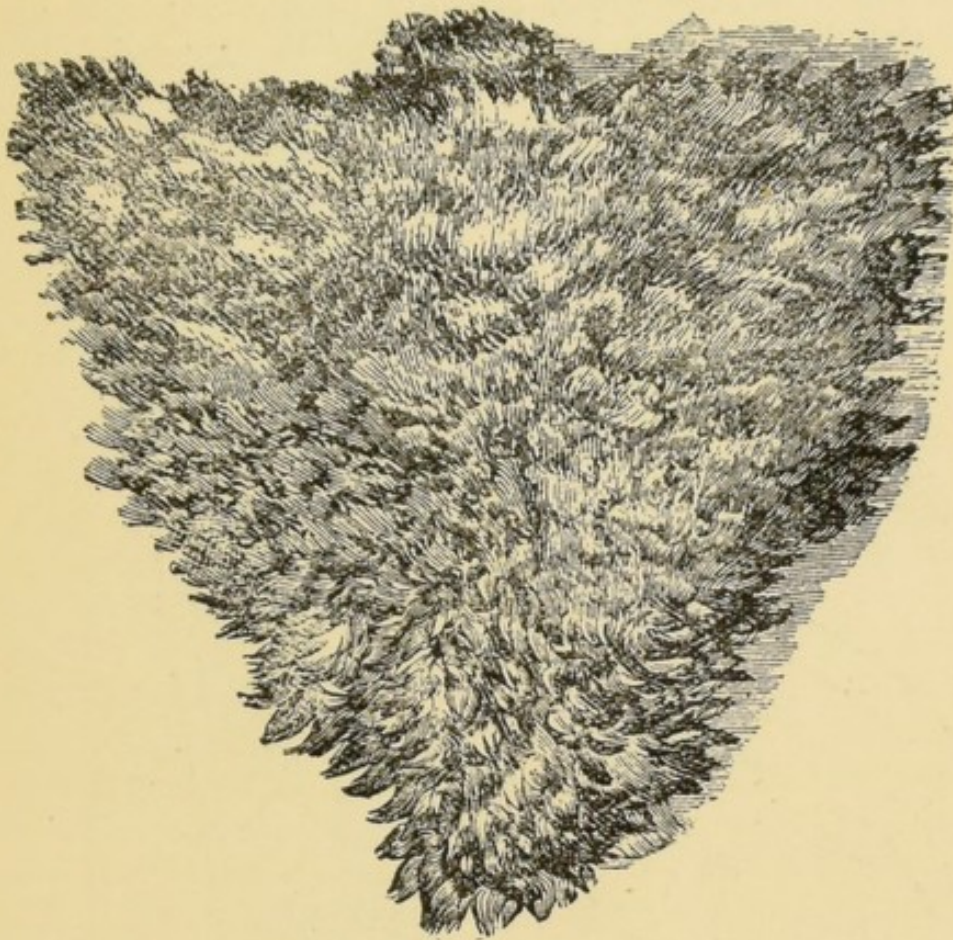
FIG. 18.—Decidua Vera. Outer Surface (Simpson).
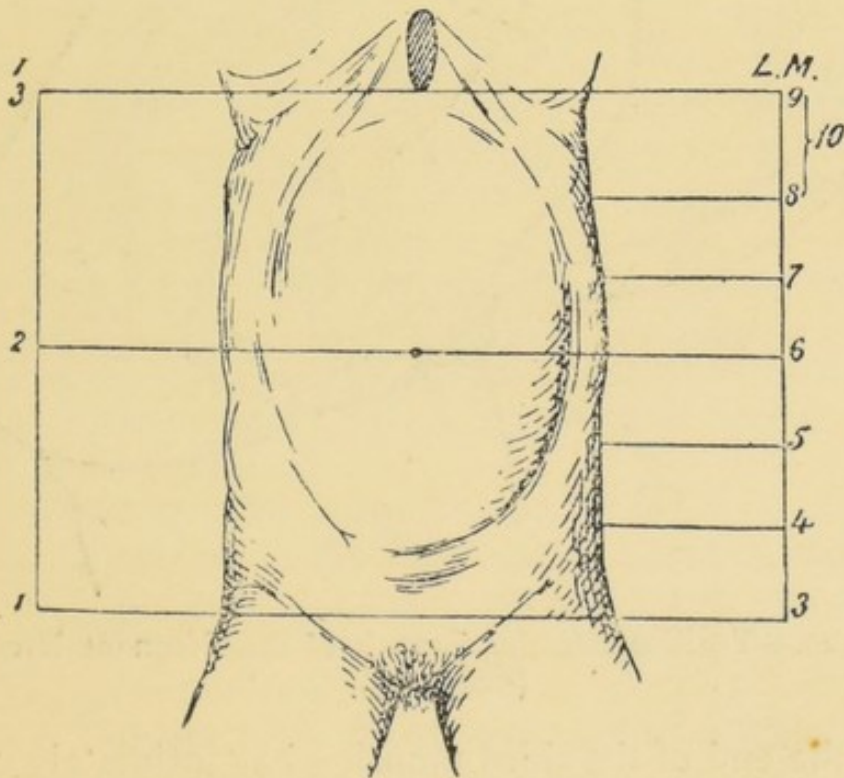
FIG. 19.—To illustrate the Growth of the Pregnant Uterus.

As the ovum develops the decidua reflexa expands until it fills the decidua vera at the end of the second month,
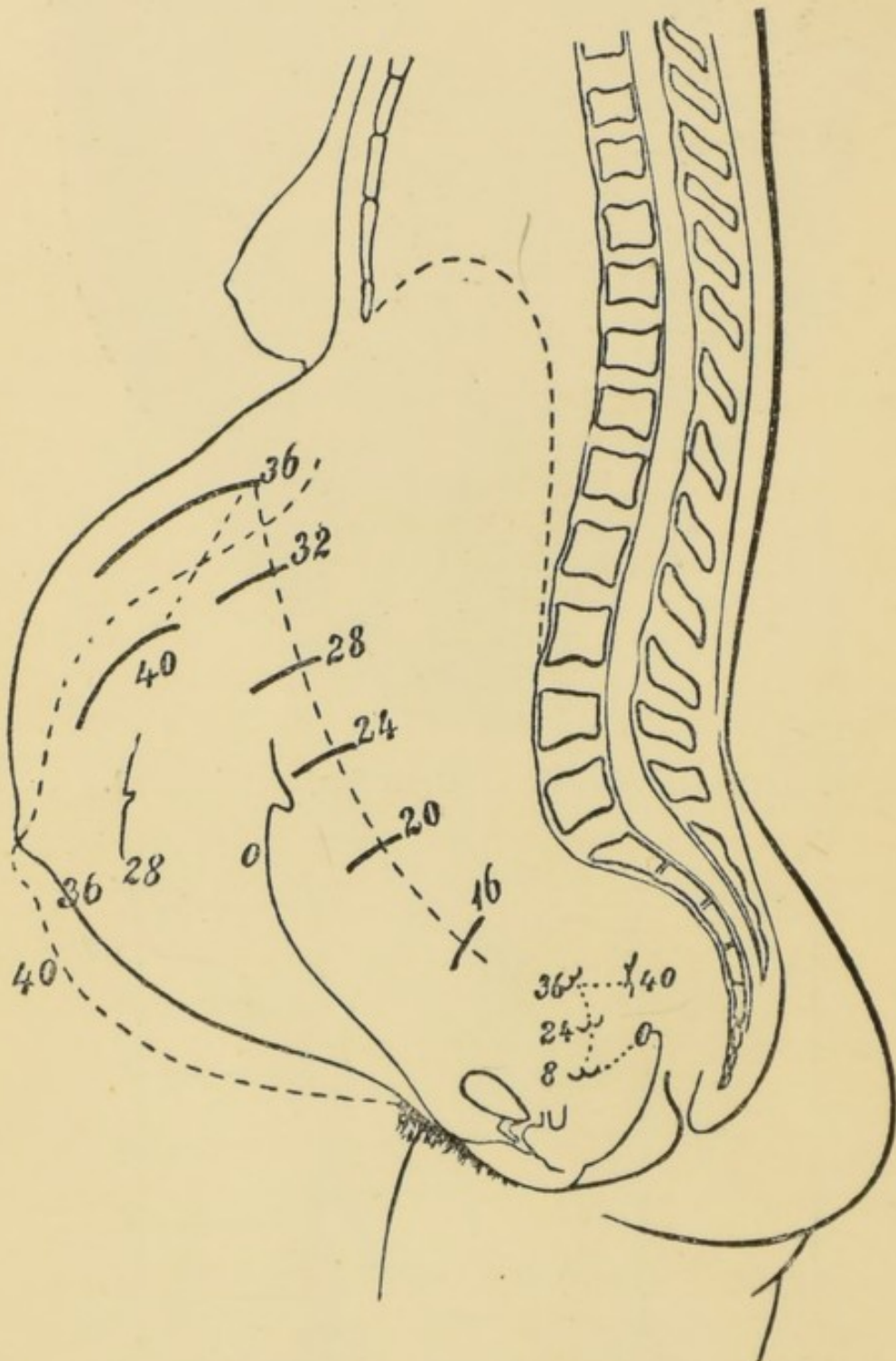
FIG. 20.—To illustrate the Growth of the Pregnant Uterus (Simpson).

and by the end of the third month it has intimately united with the decidua vera to form one membrane. Until

these two membranes have coalesced the ovum is not free in the uterine cavity, but is enclosed in the decidua reflexa.

The decidua vera is really a cast or mould of the interior of the uterus, having a triangular shape with the three orifices corresponding with those of the uterus. The external surface is rough where it has been torn from the underlying surface of the uterus, and the internal aspect which is in contact with the ovum is smooth and contains the folds which we have mentioned. The decidua vera is of a brownish red colour as seen when shed from the uterus. It is thickest at the third month; after this time, when the decidua reflexa has coalesced with it, the membrane becomes thinner and thinner, until at the close of pregnancy it is nothing more than a thin attenuated structure, which is cast off with the placenta.

We have been speaking of changes in the structure of the uterus after conception has taken place, but there are other changes which take place in it. The unimpregnated uterus is pyriform in shape. As pregnancy advances the organ becomes rounded, and after the sixth month it gradually assumes an ovoid shape. As pregnancy proceeds the uterus ceases to be a pelvic organ; at the end of the third month it has reached up to the brim of the pelvis. By the sixth month it is level with the umbilicus, and by the ninth month it has reached to the tip of the sternum. During the last fortnight the organ sinks a little, and this relieves to some extent the shortness of breath which has been caused by pressure on the diaphragm.

The uterus in its growth generally inclines to the right side, rarely lying in the middle line of the body. Its weight increases twenty-four fold and its length five fold, the pregnant uterus at term measuring about thirteen inches without the cervix.

The contents of the pregnant uterus with which we are concerned here are, I. the membranes covering the ovum; II. the organs by which the fœtus (the ovum is called the fœtus after the fourth month) is attached to the uterus; and III. the fœtus itself.

The following table shows the growth of the uterus at various periods during pregnancy :—

State of Uterus.	Length.	Breadth.	From Front to Back.
Empty	3 inches	2 inches	1 inch
3rd month	3½ inches	3½ inches	3½ inches
4th month	4 inches	4 inches	4 inches
6th month	8½ inches	6¼ inches	6¼ inches
9th month	13 inches	9¼ inches	8½ inches

I. *The Membranes.*—These are the deciduæ, the chorion and the amnion. The first named we have already referred to. Inside the decidual membrane we find the chorion and the amnion. Whereas the deciduæ are maternal structures the chorion and the amnion are derived from the ovum. The chorion is the more external of the two fœtal membranes; it soon surrounds the ovum and throws out processes (villi) into the decidua reflexa and serotina. These processes are at first formed equally all over the chorion, but those which lie in connection with the decidua reflexa become absorbed from the time that the reflexa ceases to grow; those passing into the decidua serotina grow more rapidly in size and complexity and remain to form part of the placenta. These villi we shall have to refer to again when we describe the placenta.

The membrane in which the fœtus actually lies is the amnion. Contained within the amnion is more or less fluid, the liquor amnii in which the fœtus rests as on a water-bed. This has several functions: it permits of free movements on the part of the child in the uterus; it protects the child from violence from the outside; it equalises the pressure on the uterine walls, preventing pressure on the cord and placenta; and during labour it assists in the dilatation of the os uteri and lubricates the maternal passages. From it, too, the fœtus derives its supply of water. At full time the liquor amnii amounts to about

twenty ounces. Its quantity may be much increased, a condition spoken of as hydramnios. In such a case the uterus reaches to a higher level than corresponds to the length of the pregnancy; for instance, a uterus of three months' pregnancy may be as large as one of six months'. Such a condition might be mistaken for an ovarian tumour.

These three layers are closely apposed to each other to form the membranes, but occasionally water may form between them, so that when it is believed that the membranes have burst in labour, the chorion may rupture and not the amnion and " the waters " between them be discharged. In like manner water which has formed between the decidua and the chorion may come away. These, then, are two sources of fluid which may be discharged from the vagina in labour when the amnion is intact.

II. *The Organs by which the Fœtus is Attached to the Uterus.*—(1) The umbilical cord is a whitish glistening structure twisted somewhat like a rope, springing from the fœtus at the centre of the abdomen and passing to the internal aspect of the placenta. It varies in length from eighteen to twenty-four inches, an average length being twenty-two. It is rarely shorter than twelve inches, and when it is may endanger the life of the child. It contains two arteries (umbilical arteries) and one vein (umbilical vein) surrounded by a gelatinous material (Wharton's jelly), the whole being covered with a layer derived from the amnion. The twisting of the cord lessens the danger of compression which might otherwise occur, and also tends to regulate and equalise the circulation of the blood through its vessels.

The cord is usually inserted towards the margin of the placenta, about half an inch from the centre. There are certain variations met with in this respect; for instance its insertion may be at the margin (battledore placenta), it may be attached by two forks or branches, or it may run along the membranes for some distance before reaching the placenta (vilimentous insertion). When the fœtus fills up the cavity of the uterus the cord becomes coiled round it when it is fairly long. When the coils are numerous a delay in the labour may be caused.

(2) The placenta or " after-birth " is a rounded or oval, spongy, cavernous organ having a complex structure.   It has a circumference of from twenty to twenty-four inches and a weight of from twelve to twenty ounces.   It is made up of two elements, fœtal and maternal.   The fœtal surface is that to which the umbilical cord is attached, and is smooth and glistening, being covered by the
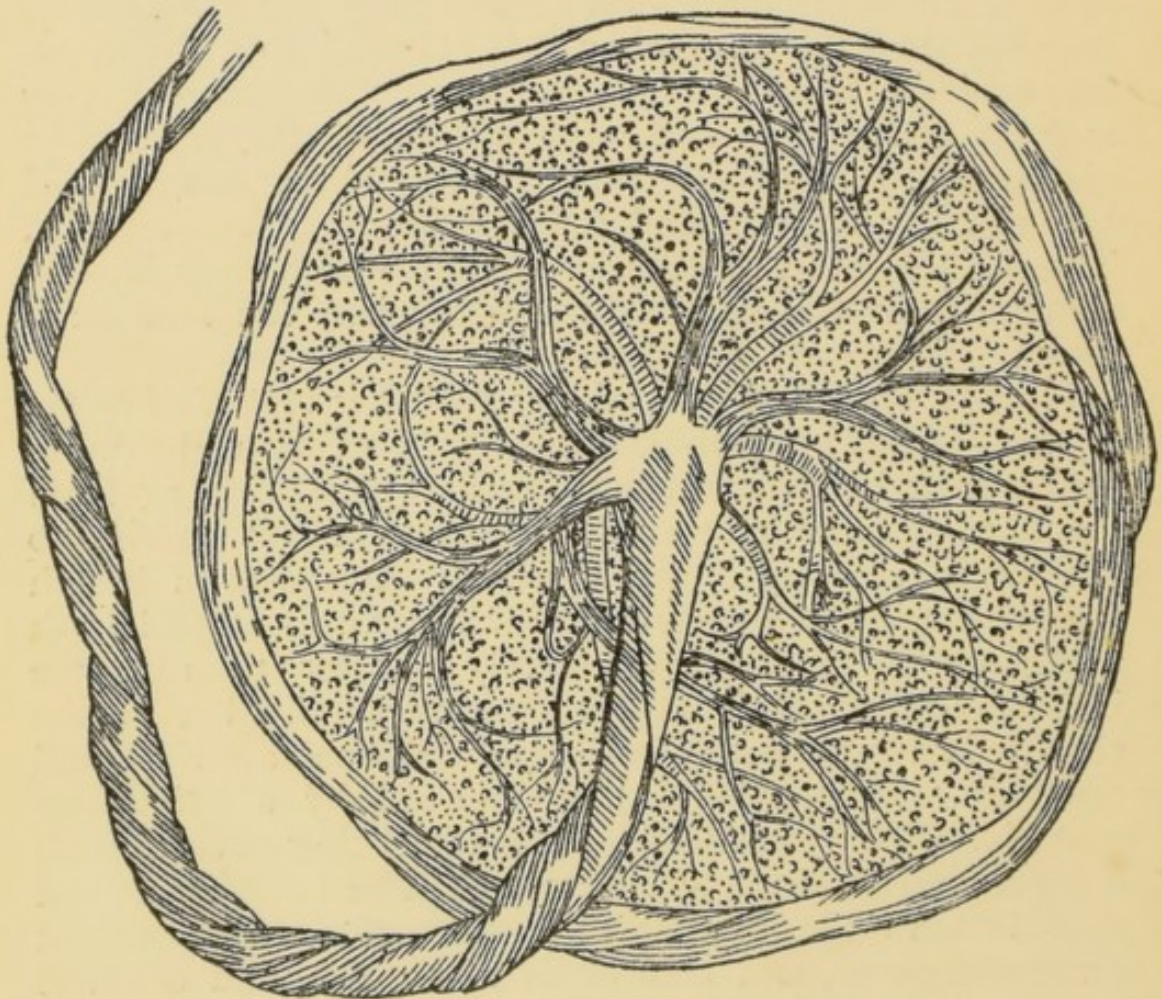
FIG. 21.—The Internal or Fœtal Surface of the Placenta.

amnion.   This part is derived from the chorion, the finger-like processes or villi of which penetrate into the maternal part of the organ.   These villi are vascular (containing blood-vessels) and non-vascular.   The former project into the blood sinuses (blood spaces) of the decidua serotina ; the latter are smaller processes which simply serve to fix the chorion to the uterine mucous membrane. The vascular villus is made up of a capillary loop lying

imbedded in a connective tissue, the blood-vessels being derived from the umbilical vessels.

The maternal part is represented by the decidua serotina as we have seen.

Its surface is rough and irregular, being broken up
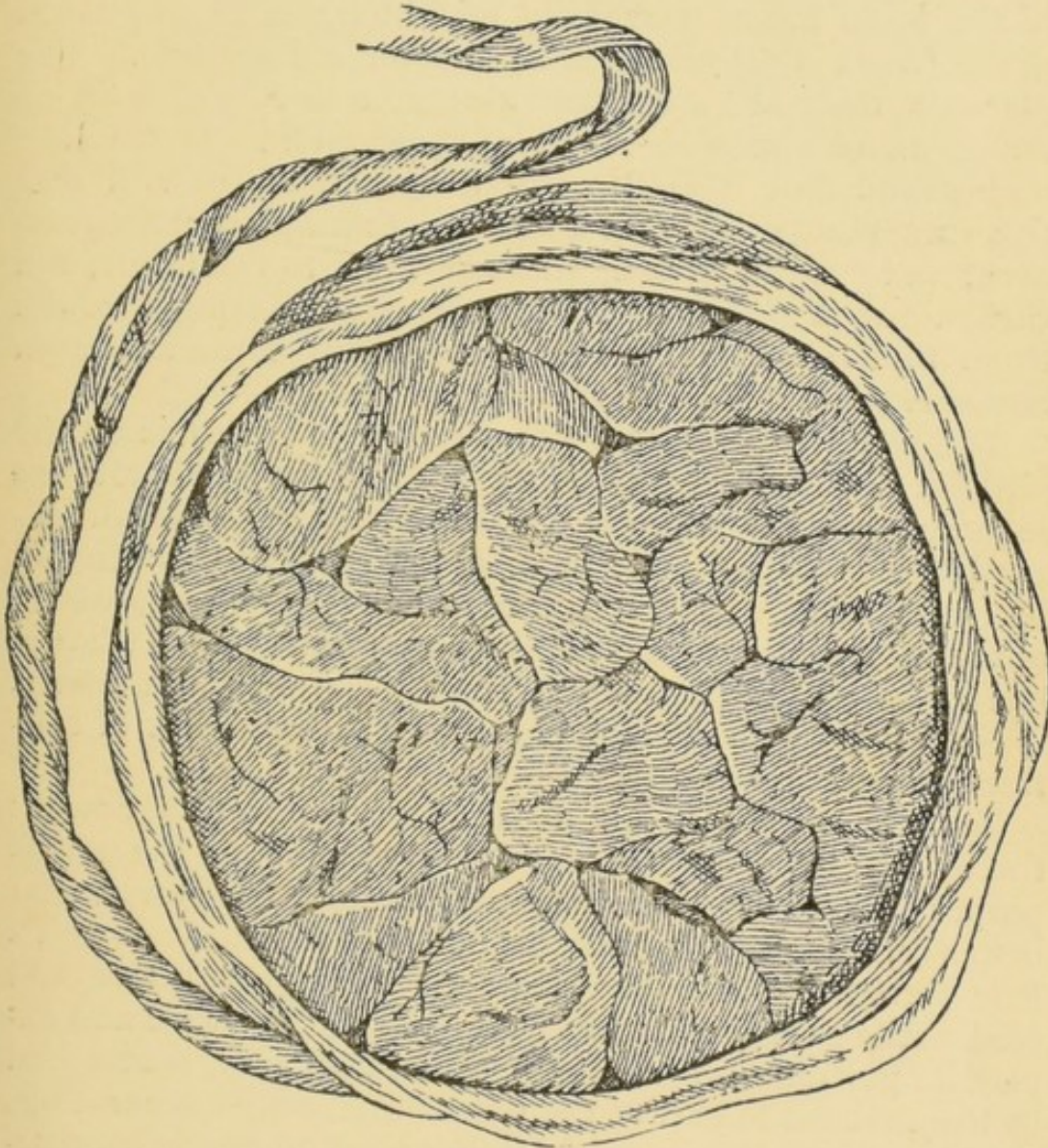
FIG. 22.—The External or Uterine Surface of the Placenta.

into segments or cotyledons. It is made up of three layers. These are from without (*a*) the uterine layer, lying next the muscular wall of the uterus, this being the layer where separation of the placenta from the uterine wall takes place; (*b*) the trabecular layer, which runs through the spongy part of the organ; and (*c*) the sub-chorionic

layer, which is in immediate apposition with the chorionic part of the placenta. The maternal part of the organ contains large cavities or sinuses which are formed by a dilatation of the blood-vessels in the wall of the uterus. Into these blood spaces dip, as we have said, the chorionic villi, and it is here that the necessary changes in the fœtal blood take place by which the impure blood of the fœtus is recharged with oxygen and purified. The placenta thus has a two-fold function in acting both as an organ of circulation and of respiration. It must be understood that it is through the walls of the villi that this interchange of gases and fluids takes place; nourishment and oxygen passing through them to the fœtus, and carbonic acid gas and waste materials passing through them to the mother; there is no direct communication between the fœtal and the maternal blood.

The usual site of attachment of the placenta is on the anterior or posterior wall of the uterus. It is sometimes attached to the fundus of the uterus, but this is an abnormal site and is liable to be associated with dangers in the third stage of labour or after delivery. In speaking of the attachment of the placenta we must refer to what is known as Bandl's retraction ring. The pregnant uterus is essentially a contractile organ, it has the power of contracting and relaxing as an ordinary muscle does.

But the whole organ does not possess this power; there is a large part of the lower portion of the uterus proper which plays the same part as does the cervix, that is to say, this part expands but does not contract. Bandl's ring forms the boundary between the upper, active and contractile part of the uterus and the lower, passive and expansile portion. Now, the placenta, normally, is attached to the contractile part of the uterus and, on its separation, the blood-vessels are, so to speak, sealed up by the contraction of the uterine wall. But should the placenta be attached below Bandl's ring or partly above and partly below it then as the expansile part expands in labour with each pain there is a separation of the placenta and consequent hæmorrhage in greater or less amount according to the degree of separation. This condition, to which we shall have to refer later, is known as placenta prævia or unavoidable hæmorrhage (since the cause cannot be pre-

vented). The placenta may be divided into two or more portions, or one or more of its cotyledons may be detached from the rest of the organ and have their own vascular supply (succenturiate placenta). The importance of this lies in the fact that after the placenta is expelled these isolated masses may be left and give rise to hæmorrhage or blood-poisoning.
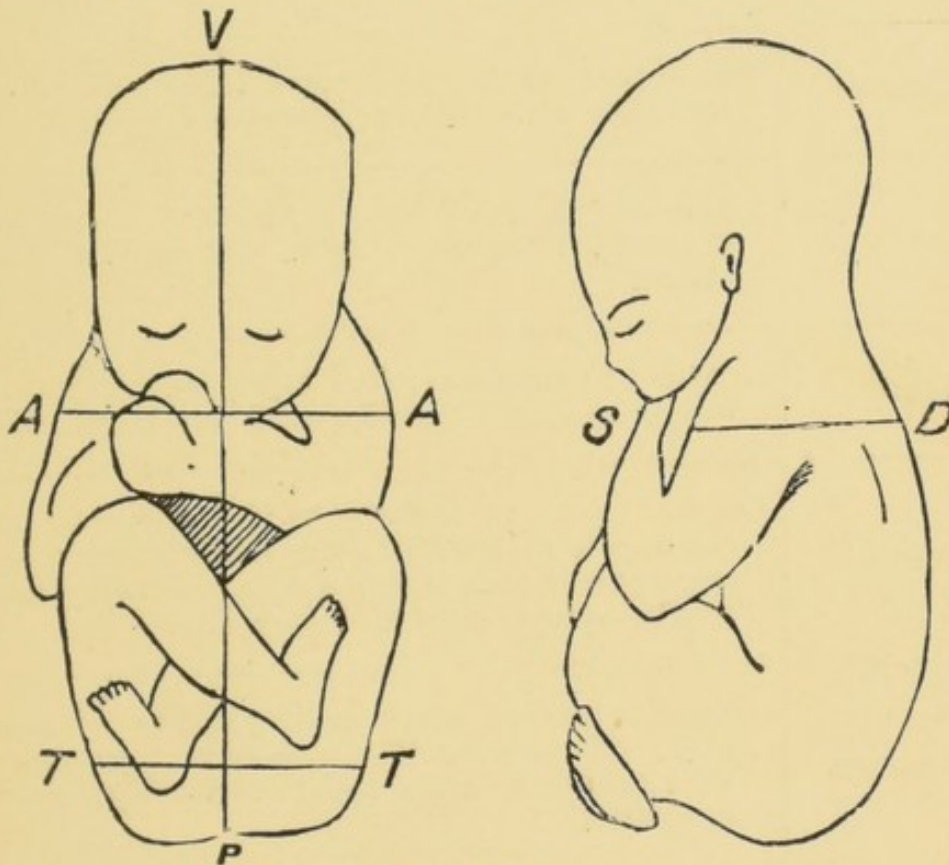
FIG. 23.—Fœtal Measurements.

Bis acromial.	A, A, $4\frac{3}{4}$ in.
Bi-trochanteric.	T, T, 4 in.
Dorso-sternal.	D, S, $3\frac{1}{2}$ in.
Vertex to breech.	V, P, $9\frac{1}{2}$-10 in.

III. *The Fœtus.*—The table on page 38 shows the growth of the fœtus at each month during pregnancy.

The importance of knowing the facts in such a table as this is shown when we desire to ascertain the approximate age of an embryo or fœtus in a case of abortion, miscarriage or premature labour. Of course the size and the weight of the mature child vary considerably; for example a first child is usually lighter than one born subsequently and a boy is rather heavier than a girl.

Month (of four weeks).	Growth and Characteristics of Fœtus at each Month.
FIRST.	Ovum the size of a pigeon's egg; embryo about $\frac{1}{2}$ inch long.
SECOND.	Ovum size of hen's egg; embryo 1 to 2 inches long; permanent form; extremities have three divisions.
THIRD.	Size of goose egg; length 3 to 5 inches; fingers and toes have nails distinct; placenta formed.
FOURTH.	Embryo now called fœtus; length 6 inches; sex distinctly recognised; eyes, nostrils and mouth closed.
FIFTH.	Length 7 to 10 inches; hair appearing on head and body; nails well formed; head very large.
SIXTH.	Length 11 to 13 inches; weight about 20 oz.; fat begins to be deposited beneath skin; head disproportionately large; if born makes inspiratory efforts, moves limbs and soon dies.
SEVENTH.	Length 15 inches; weight about 3 lb.; eyelids separated; skin red, covered with vernix caseosa. If born moves, breathes and cries weakly; usually soon dies.
EIGHTH.	Length 16 inches; weight over 4 lb.; skin still red; child still delicate and easily dies.
NINTH.	Length 17 inches; weight 5 to 6 lb.; body rounded; greater mortality than mature child, but with care can be reared.
MATURE CHILD.	Length 20 inches; weight 6$\frac{1}{2}$ lb.; skin white; nails project over finger tips; bones of skull hard; when born cries loudly, moves extremities freely, passes urine and meconium.

N.B.—Roughly speaking the length of the fœtus amounts to twice as many inches as its age in months: eight months = 16 inches.

The duration of pregnancy is 270 to 280 days. It is best divided into ten periods of four weeks each; this is equivalent to nine calendar months and one week.

The other points which we shall now refer to in connection with the fœtus are (1) the fœtal circulation; (2) the fœtal heart sounds; (3) the fœtal head; and (4) the position of the child in the uterus.

(1) An elementary knowledge of the circulation of the blood after birth is presumed. We shall now describe how the circulation before birth differs from that after birth. To assist in an understanding of the fœtal circulation it must be borne in mind that (a) the fœtus is nourished by the mother's blood by means of the placenta, which not only extracts nourishment from the maternal blood, but also aerates and removes waste products from it; (b) the action of the lungs is now in abeyance, and only sufficient blood goes to these organs to nourish them; (c) there is a direct communication between the right and left auricle through the foramen ovale (oval opening) which closes after birth; and (d) there is also a direct communication between the pulmonary artery (the large trunk which carries venous or impure blood from the right ventricle to the lungs) and the aorta (the large artery which springs from the left ventricle and conveys arterial blood throughout the body by means of its branches). The scheme, Fig. 24, will render the description more intelligible. It should be contrasted with that showing the circulation after birth.

The blood leaves the placenta by the umbilical vein, which, with the arteries of the same name, is contained in the umbilical cord. The cord enters the abdomen at the umbilicus. The umbilical vein empties itself into the inferior vena cava, which opens into the right auricle. Instead, however, of passing on into the right ventricle, this stream passes through the foramen ovale into the left auricle, and thence into the left ventricle. Leaving the ventricle in the usual way by the aorta, it is distributed to the body generally, but more especially to the head and upper limbs. The venous blood from the latter parts is returned by the superior vena cava into the right auricle, and this stream passes on into the right ventricle, and thence into the pulmonary artery. We see, then,

SCHEME TO REPRESENT

CIRCULATION BEFORE BIRTH.   CIRCULATION AFTER BIRTH.

```
 ┌──────┌Abdominal ←──┐          ┌──Superior vena cava←──┐
 │       ↓   aorta  Arch of aorta   ↓         ┌Inferior       │
 ↓ ┌Umbilical                   ┌Right←──  ┤vena cava ┌ Head
 ↓ ┤ arteries         ↑     ↑   ┤auricle             ┤ and upper
Lower limbs │      ┌Left side  │  │             ┌Abdomen  ┤  limbs
 │           ↓     ┤ of heart  │  ↓             ┤and lower limbs ↑
 │        Placenta      ↑  ┌Ductus  ┌Right           ↑           │
 │           ↓         ↑  ┤arteriosus ┤ventricle       ↑          │
 │        ┌Umbilical   │  │  ↑        │          Arch of aorta
 │ │      ┤ vein     Lungs   │         ↓              ↑
 │ │                 ↑     ↑  ┌Pulmonary          Left ventricle
 ↓ ↓     Pulmonary artery    ┤  artery              ↑
Inferior vena cava    ↑        ↓              Left auricle
        ↓         Right ventricle  Lungs          ↑
  Right auricle         ↑        │       ┌Pulmonary  ∧
        ↓          Right auricle  └→ ┤  veins    ─┘
Foramen ovale          ↑
        ↓        Head and upper limbs
  Left auricle         ↑
        │          Arch of aorta
        └→ ┌Left      ∧
           ┤ventricle─┘
```

FIG. 24.

that in the right auricle there are two streams of blood, one stream passing from the inferior vena cava through the foramen ovale, the other from the superior vena cava into the right ventricle. The blood in the pulmonary artery goes in part to the lungs, from which it is returned into the left auricle by the pulmonary veins, and in part directly into the arch of the aorta through a channel, the ductus arteriosus, which, after birth, becomes shrivelled up. This blood becomes mixed with that which we saw to enter the arch from the left ventricle, and goes to the abdomen and lower limbs, the chief part, however, passing along the umbilical arteries back to the placenta, the point from which we started.

(2) The fœtal heart sounds[1] are very distinct and definite as a rule. They are heard through the back and upper part of the thorax. They are generally audible

[1] It must be understood that the midwife is not required to undertake the examination of the fœtal heart, but that is no reason why the subject should not be alluded to.

between the fourth and fifth months. The rate is from 120 to 140 per minute, being double that of the mother's pulse, and the sounds are sometimes compared to the ticking of a watch under a pillow. When the child is lying in the commonest position, which we shall see later on to be
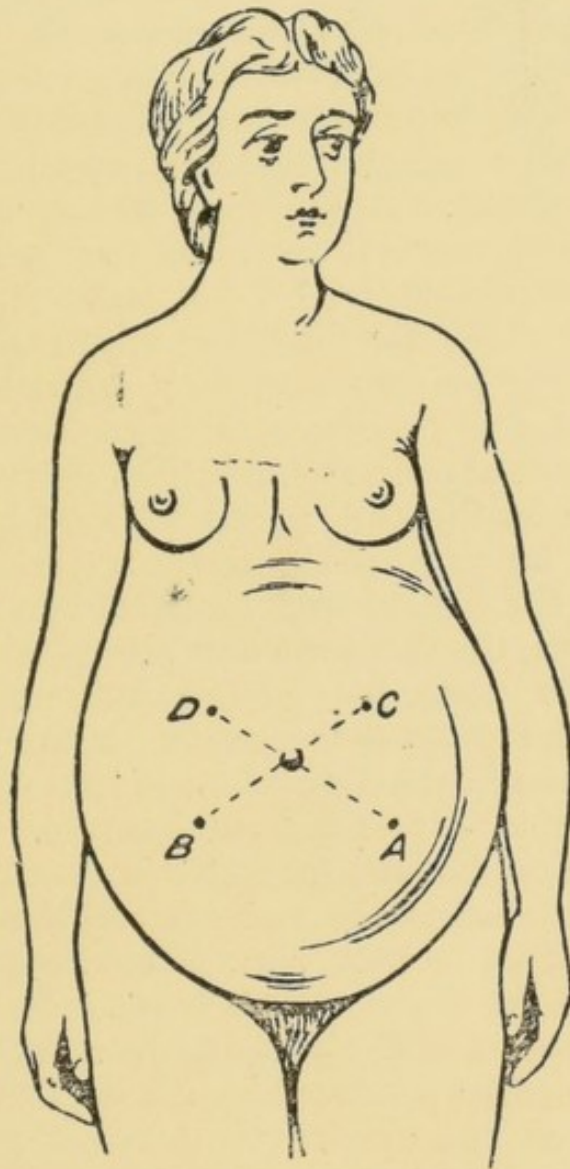
FIG. 25.—Points of Greatest Intensity of Fœtal Heart Sounds.

A and *B*, Head first labours ; *C* and *D*, Head last labours.

that in which the back is to the front and to the left, the sounds are best heard at a point midway between the crest of the ilium on the left side and the umbilicus. In breech cases the sounds are heard at a spot above the umbilicus as the chest is of necessity higher up in the

uterine cavity. The doctor is able to gain much information from the fœtal heart sounds. He learns (*a*) that the child is alive; (*b*) whether the child is vigorous or weak according to the intensity of the sounds; (*c*) in which position the child is lying and whether it is a " head first " or a breech case; and (*d*) sometimes he may be able to say if more than one child is present.

(3) The fœtal head plays an important part in labour. It passes through the pelvis first in a natural labour, it is not fully ossified, but can be compressed or moulded, the edge of one bone telescoping, so to speak, under or over the edge of another. Again, from feeling the fœtal head when making a vaginal examination, we are able to detect the position in which the child is lying. It is unnecessary to describe the bones which go to make up the skull for our present purpose; suffice it to say that the skull proper is made up of eight bones, the frontal bone in front, the occipital bone behind; the roof is formed in greater part by the two parietal bones, right and left, and the floor by part of the temporal bones, right and left, partly by the frontal and occipital bones and also by two other bones, the sphenoid and the ethmoid. Between the bones of the upper part of the skull are membranous intervals which represent the sutures of the ossified skull. The frontal bone in the fœtal skull is in two lateral halves and these are joined by the frontal suture. Between the frontal bones and the parietal bones is a transverse suture, the coronal. Between the two parietal bones is a suture running from front to back parallel to the frontal; this is the sagittal (Lat. *sagitta*, an arrow). Lastly, between the parietal bones and the occipital bone is the lambdoidal suture. The spaces produced by the widening out of the sutures between the angles of three or more adjacent bones are called fontanelles. Of these there are two, the anterior fontanelle or bregma and the posterior. The anterior is the larger; it is a fairly large lozenge-shaped space with four angles formed anteriorly by the corners of the two frontal bones and posteriorly by the corners of the two parietal bones. It is a distinct, definite, membranous interval having an average measurement of one inch from front to back and about half an inch across. It remains unclosed for eighteen months after birth.

The posterior fontanelle is only a small space and is made up of the corners of three bones, the two parietals and the occipital. It is triangular in shape instead of quadrangular as is the anterior. It is by far the more important of the two in midwifery as it is a guiding point when making a vaginal examination in labour. When the finger makes gentle pressure on the posterior fontanelle we feel that the three angles of bone are on the same level, but on making further pressure one angle can be made to press between the other two; the occipital angle always goes underneath the other two. This overriding of the bones of the fœtal skull is known as equitation (Lat. *equitare*, to ride). There are three other terms applied to parts of the fœtal head. The vertex is that part which lies between the two fontanelles, extending outwards to the most prominent points on the parietal bones. The occiput is that part of the head which lies behind the posterior fontanelle, while the term sinciput is applied to that part which lies in front of the anterior fontanelle.

Just as we measure the pelvis so do we measure the head which has to pass through it. There are seven diameters taken, which will be more easily understood on referring to the diagram; three are longitudinal, two are transverse and two are perpendicular.

(*a*) *Occipito-mental.*—This is the largest, measuring five inches; it passes between the posterior fontanelle and the point of the chin.

(*b*) *Occipito-frontal.*—This measures four and a half inches and reaches from the occipital protuberance (a bony eminence situated about an inch behind the posterior fontanelle) to the root of the nose.

(*c*) *Sub-occipito-bregmatic.*—This diameter passes from the under surface of the occipital bone, below the occiput, to the anterior fontanelle. It varies from four to three and a quarter inches according as it ends at the front or back part of the anterior fontanelle. These three diameters are longitudinal.

(*d*) The biparietal is represented by a line drawn between the most prominent points (parietal eminences) on the parietal bones. It measures three and a half inches.

(*e*) The bitemporal diameter is the distance between

the lowest ends of the coronal suture; it is the smallest diameter, measuring two and a half inches. These two diameters are transverse.

(f) The fronto-mental diameter extends from the top of the forehead to the centre of the chin. This measures three inches.

(g) The trachelo-bregmatic reaches from the posterior end of the anterior fontanelle to the anterior margin of the foramen magnum in the floor of the occipital bone. This also measures three inches, and, like the former, is a perpendicular diameter.
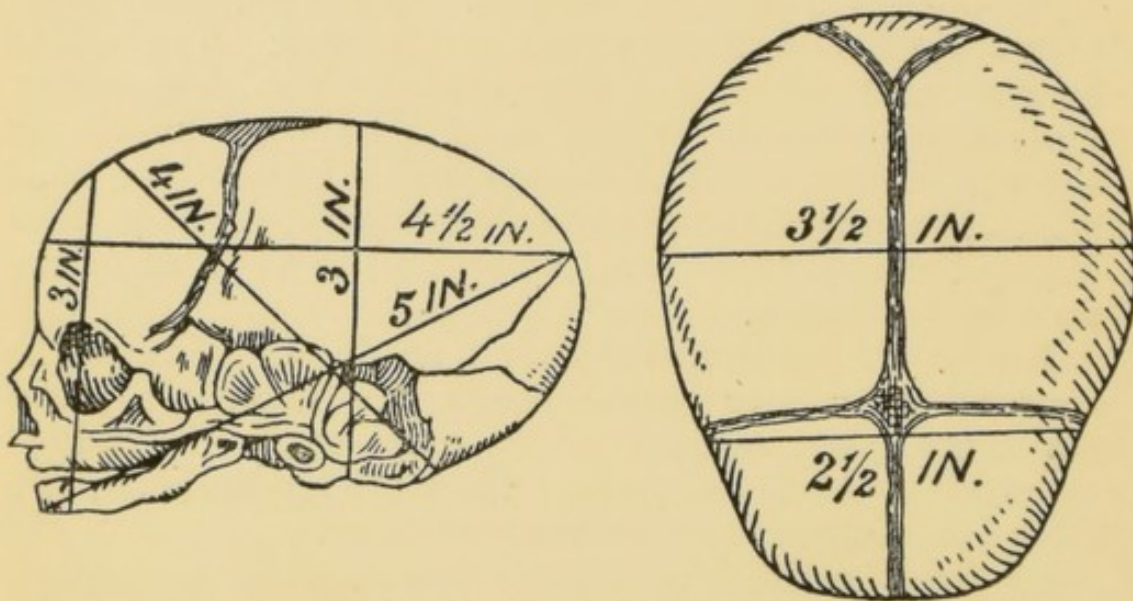
FIG. 26.—The Fœtal Head.

Table of the Diameters of the Fœtal Head.

Longitudinal	Occipito-mental	=	5	inches.
	Occipito-frontal	=	$4\frac{1}{2}$	,,
	Sub-occipito-bregmatic	= 4 to	$3\frac{1}{4}$	,,
Transverse	Biparietal	=	$3\frac{1}{2}$	,,
	Bitemporal	=	$2\frac{1}{2}$	,,
Perpendicular	Fronto-mental	=	3	,,
	Trachelo-bregmatic	=	3	,,

The circumference of the head at the level of the occipito-frontal diameter is fourteen inches.

When the head passes through the pelvis the bones, as we have seen, overlap, and so the shape of the head is altered; moulding of the head takes place, the occipital

and frontal bones being overlapped by the parietal bones. The posterior part of the head becomes flattened. By this compression the fœtal head is much diminished in size and is consequently able to pass more easily through

FIG. 27.—Head Moulding—Breech (after Croom).

the pelvis. The compression is chiefly from side to side, so that the biparietal diameter is diminished while the occipito-frontal diameter is considerably lengthened.
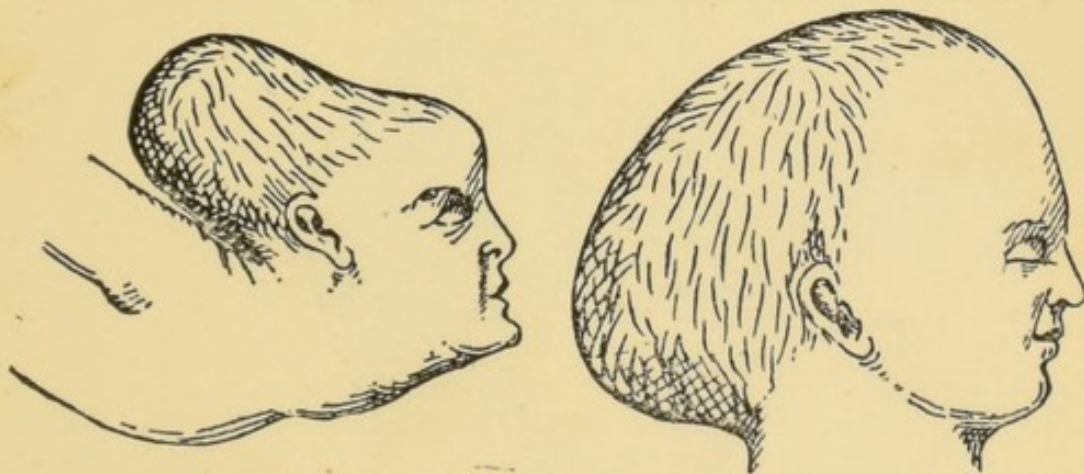
FIG. 28.—Head Moulding—Face (after Croom).

(4) *The Position of the Child in the Uterus.*—In this connection there are three terms which require explanation ; these are attitude, presentation and position.

By the attitude is meant the relation of one part of the fœtus to another. The fœtus is flexed on itself, its attitude is one of extreme flexion. The head is bent

forwards so that the chin approximates to the chest. The upper limbs are folded over the chest, the thighs touch the abdomen, the legs are bent on the thighs so that the heels touch the buttocks. This is the most easy
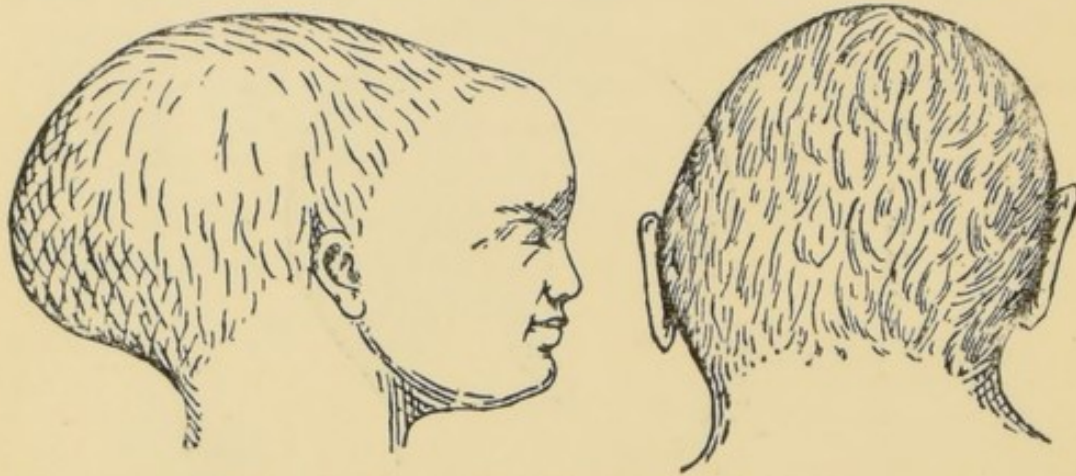
FIG. 29.—Head Moulding (after Croom).

Normal labour
(L. O. A.).

The same showing
asymmetry.

attitude and any disturbance of it is apt to interfere with labour.

The presentation of the child signifies the relation of the fœtus to the uterine cavity. By some obstetricians

FIG. 30.—Head Moulding—Cæsarian Section (head unaffected by labour) (after Croom).

the presentation is defined as the part felt at the os uteri by the examiner's finger. The fœtus is, when flexed, ovoid in shape, corresponding to the ovoid shape of the pregnant uterus, and the narrow end of the ovoid, the

head, corresponds to the narrow lower end of the uterus in a natural labour. The long diameter of the fœtus and of the uterus may correspond, but the broad end of
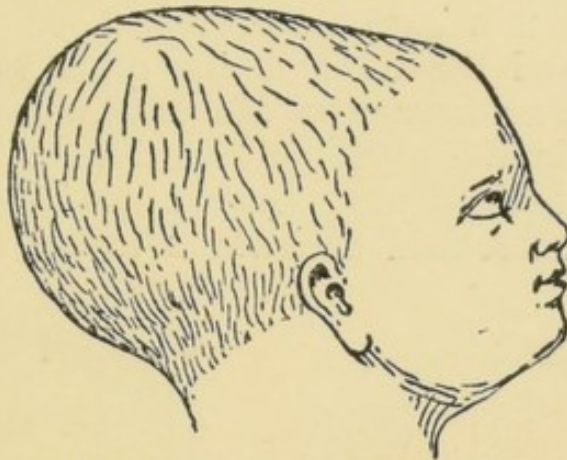
FIG. 31.—Head Moulding—Brow (after Croom).

the fœtal ovoid, the breech, may occupy the narrow end of the uterine ovoid as happens in breech or pelvic presentations. But the long diameter of the fœtus may
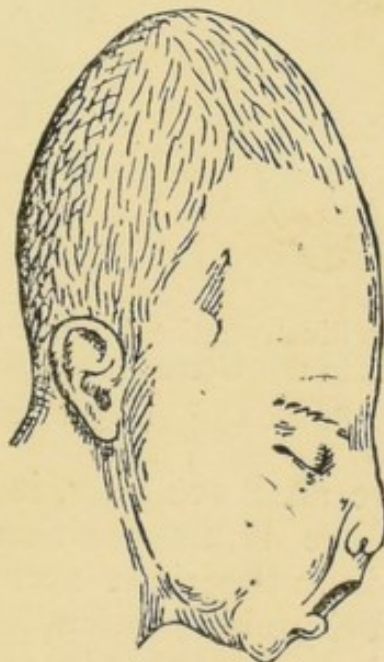
FIG. 32.—Head Moulding—Persistent Occipito-Posterior (after Croom).

not correspond with the long diameter of the uterus, but may be oblique or transverse. This produces transverse presentations or cross-birth (sometimes called shoulder presentations).

The position of the fœtus may be defined as the relation of the presentation or presenting part to the brim of the pelvis or as the relation of the back of the child to the mother's abdomen. In the diagram we see two head presentations; in one case the back of the child points to the left and the front, in the other to the right and the back. The former is the commonest position, the child lying in the right oblique diameter of the pelvis, with the occiput pointing forwards and to the left thyroid foramen, the forehead backwards to the right sacro-iliac
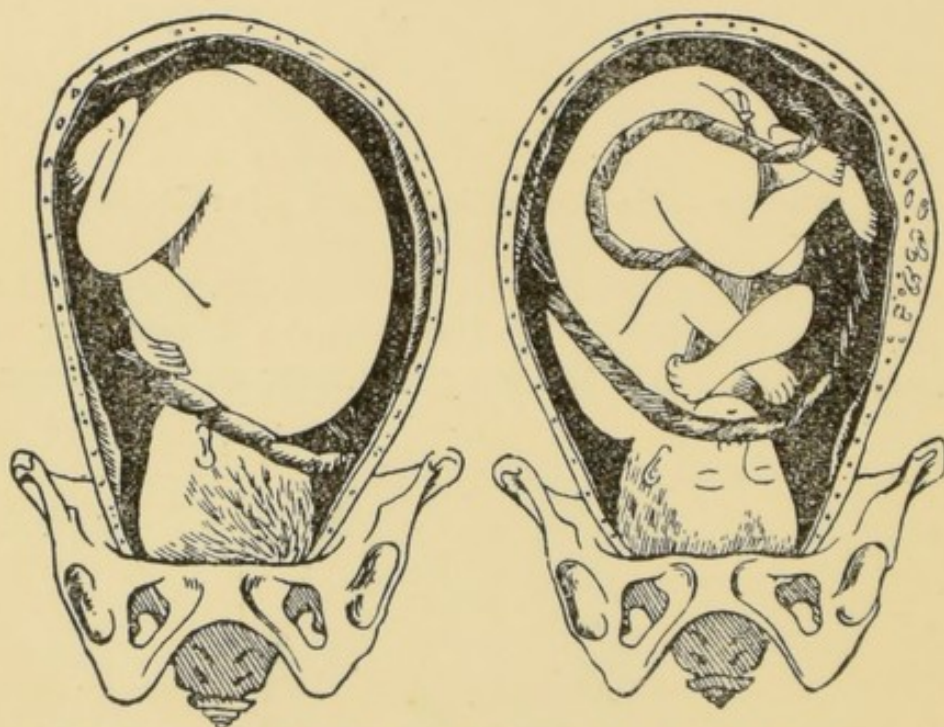
FIG. 33.—Diagrams to illustrate the Attitude and the Positions of the Fœtus in the Uterus (after Simpson).

(Left Occipito-Anterior Position.)   (Right Occipito-Posterior Position.)

joint. This, as we shall see later, is known as the first cranial position, the latter position, with the occiput pointing backwards to the right sacro-iliac joint and the forehead to the left thyroid foramen, being the third cranial position. It will be noticed that in each of these positions the head lies in the right oblique diameter of the pelvis. When the child's head lies in the left oblique diameter the back of the head (occiput) may, in like manner as before, lie to the front, that is to say, pointing to the right thyroid foramen, with the forehead pointing backwards to the left sacro-iliac joint, or *vice versâ*. The

former constitutes the second cranial position, the latter the fourth.

With regard to the frequency of these four positions of the head, Naegelé, a well-known obstetrician, has given us some figures based on observations at the Heidelberg Lying-in Hospital. We have said that the first cranial position with the occiput forwards and to the left is by far the commonest. Next comes the position in which the head lies in the same diameter, but with the occiput behind. Very far behind come those cases in which the head lies in the left oblique diameter, the position in which the occiput is to the front being probably a little more frequent than those cases where it lies to the back. Here are the figures : R = right, L = left, A = anterior, P = posterior, O = occiput. (In each presentation, as we shall see, the most prominent or pointing part is called the denominator. In head presentations this is the occiput).

3,491 *Head Presentations.*

Occipito-anterior cases.
  L. O. A. 1st cranial position, 1st in frequency, 2,262 cases.
  R. O. A. 2nd ,, ,, 3rd ,, ,, 8 cases.

Occipito-posterior cases.
  R. O. P. 3rd ,, ,, 2nd ,, ,, 1,217 cases.
  L. O. P. 4th ,, ,, 4th ,, ,, 4 cases.

When we come to speak of cases with the occiput lying to the back of the pelvis (occipito-posterior cases) we shall find that the labour is more tedious, as a rule, and more troublesome to manage. Probably the reason why the head enters the oblique diameter of the pelvis is that these diameters are more roomy than the others and the right oblique is certainly more roomy than the left, because the sigmoid flexure of the colon and the rectum pass into the pelvis on the left side of the sacrum and appropriate some of the space in the left oblique diameter.

The head is the presenting part in about 96 per cent. of all labours.

CHAPTER V.

NATURAL PREGNANCY; THE SYMPTOMS CONNECTED THEREWITH; ITS DIAGNOSIS AND MANAGEMENT.

WE have now to consider the various symptoms which we are accustomed to meet with in a natural pregnancy and the means whereby we are able to decide that a patient is pregnant. Unnatural pregnancy will be discussed separately. The information which the doctor or midwife obtains from a woman who is pregnant must be regarded as private and is on no account to be divulged without her full permission; especially does this refer to those cases where a woman has no right to be pregnant, as in the case, for example, of a young girl in domestic service. Some of the symptoms of pregnancy are only probable or even possible symptoms, some, on the other hand, are absolute. The former have to be taken into conjunction with each other before an opinion can be expressed. The importance of this lies in the fact that it is only these probable symptoms which we have to depend on for our diagnosis during the earlier months of pregnancy, and it is during these earlier months that the doctor is generally consulted and asked to give an opinion. The symptoms of pregnancy we elicit from the patient by our questions, and for the accuracy of the answers she is responsible; the physical signs of pregnancy we obtain from our examination of the patient, and for the true interpretation of these we are responsible.

I. SYMPTOMS.

1. *Suppression of the Menses.*—This is, of course, an important symptom, and, as it occurs soon after conception has taken place, it is commonly used to calculate the probable date of the confinement. But the midwife must

be warned against relying on this symptom alone, since the suppression of the periods (amenorrhœa) may be due to various causes. By itself, amenorrhœa may in some cases be suspicious of pregnancy, especially in a healthy married woman, who is not nursing and who has been previously regular, but beyond this we have no right to go. Let us now see under what conditions other than pregnancy we may meet with amenorrhœa.

(*a*) Amenorrhœa may be due to general or local disorder or disease; for example, it is a common symptom of anæmia, of phthisis (tuberculosis or "consumption" of the lungs) and some other general disorders. As an example of those diseases of the generative organs which may account for this symptom we may mention ovarian tumour.

(*b*) It may be due to lactation (nursing); the periods are usually, but not always, suppressed during nursing, and during such a time a woman may conceive.

(*c*) The cessation of the periods may be due to the commencement of the menopause ("change of life"). On the other hand, a woman may conceive and yet menstruation may continue. Such a state of affairs is not uncommon during the first two months, but it is very seldom that a woman menstruates throughout her pregnancy. When this does occur it is nearly always due to the uterus having two compartments or "horns" in its interior, to which the name bicornuate is given (Lat. *bis*, twice; and *cornu*, a horn). The one horn contains the ovum, whereas the other horn may be empty, and then behaves as does the non-pregnant uterus.

Lastly, it is possible that conception may take place before the periods are established. We have already referred to the duration of pregnancy. To calculate the date of confinement from the date of the last period a good plan is to add on one week and then to go back three months in the calendar. This makes up the forty weeks. For example, the last period occurred on 17th March; add one week = 24th March; go back three months in the calendar = 24th December. This is approximately correct; if anything it overestimates the time by a couple of days.

2. *Morning Sickness.*—This sometimes occurs as soon

as conception takes place, but more commonly it is deferred till after the first period has been missed, and it usually persists for the next two or three months. Its cessation is generally coincident with the rising of the uterus out of the pelvis.

There are various degrees of morning sickness: (*a*) in many cases there is merely a slight feeling of sickness (nausea) or this may be entirely absent; (*b*) there may be nausea with occasional vomiting during the second and third months; (*c*) the nausea and vomiting may be long-continued and persistent without actually injuring health; and (*d*) the health may be seriously impaired or life even be endangered by this symptom. As its name implies morning sickness is usually confined to the morning either on first rising or after breakfast, but it may occur at other times of the day. The first three degrees of morning sickness are those with which we are concerned here since we are only speaking of natural pregnancy. These forms require no treatment beyond care in dieting, and possibly if a doctor be consulted he may see fit to prescribe one of the commoner digestive or sedative mixtures. What is the cause of morning sickness? Many reasons have been assigned. Probably it is best considered as a reflex symptom brought about by the stretching of the muscle fibres and nerves in the walls of the growing uterus. Occasionally it takes place in the later months of pregnancy, when it is due to an over-distension of the uterus, as occurs, for example, in twin pregnancy or when there is an excess of liquor amnii (hydramnios). It must be remembered that this symptom taken alone is of even less value in diagnosing pregnancy than is the suppression of the menses.

3. *Quickening or Stirrage.*—This is a symptom to which women pay much attention, but it is not, after all, of so great importance, especially in a first pregnancy, as the pregnant woman may easily be deceived. It is the sensation which the mother experiences from the movement of the fœtus. When first felt it is like a flutter, but as the fœtus grows in size and strength the movements become more marked and are often so strong as to cause severe pain and keep the patient awake at night. Quickening occurs as soon as the uterus comes in contact with the

abdominal wall. It is usually first felt between the fourth and fifth months, but may be experienced occasionally as early as the third month or be deferred until the sixth. Sometimes women calculate the date of confinement from the time when they first feel the quickening, but this is often fallacious. After the seventh month the movements become only partial; till this time the whole fœtus moves. Quickening may cease as pregnancy progresses, either for a time or permanently; in the latter case this may point to death of the child, but by no means invariably so.

The sensation of quickening is simulated by contractions taking place in the walls of the bowels or in the abdominal walls, and it is the experience of every medical man to have had women come to him and assert they are pregnant because they have "quickened" when they are not pregnant at all.

4. *Enlargement of the Breasts and Abdomen.*—These are noticed by the pregnant woman, but it is more convenient to deal with them under the signs of pregnancy, which we elicit on our examination. There are, however, certain symptoms sometimes referred to the breasts, such as throbbing, a feeling of fulness and a tingling sensation at the nipples.

5. *Lastly*, there are certain minor symptoms to which we shall refer very briefly; these are by no means always present, but they are not uncommonly met with. They include bad dreams, headache, neuralgia, various gloomy forebodings, increased secretion of saliva (salivation), depraved appetite, when the patient may desire outrageous or unusual things; disturbances of the blood circulation, constipation or diarrhœa due to pressure on the rectum, pressure on the bladder, causing frequency of desire to pass water, these symptoms of pressure being experienced chiefly in the early stages, while the uterus is still a pelvic organ, and at the close of pregnancy, when the child's head has entered the pelvic brim.

II. Physical Signs.

These may be conveniently divided into those which pertain to the mother (maternal signs) and those which pertain to the fœtus (fœtal signs).

A. *Maternal Signs.* 1. *The Breasts or Mammæ.*—In young women suffering from amenorrhœa the doctor notices the appearance of the breasts when he is examining the chest, and from this he may be able to tell fairly conclusively whether or not the patient is pregnant.

The alterations in the mammæ in first pregnancies (primiparæ) are more marked, more reliable and therefore more valuable than in those who have borne children (multiparæ).

The changes in the breasts in pregnancy may be considered under five heads :—
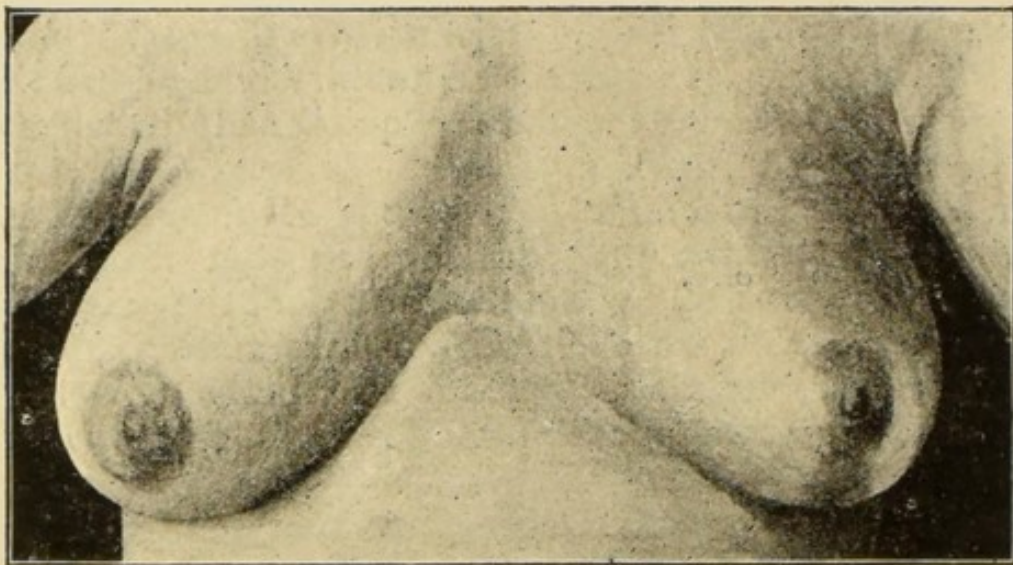
Fig. 34.—The Breasts in Pregnancy (Blonde).

(*a*) *Enlargement.*—There is a general enlargement which is quite traceable from the second month onwards.

(*b*) *Consistence.*—The enlargement might be due to fat, but on feeling the breasts we find this is not so, for they are firmer than before and more uneven, as a result of an increase in the glandular elements of the organs.

(*c*) *Vascularity.*—From the fourth month the veins enlarge and may be seen as purplish streaks running across the breasts.

(*d*) *Secretion.*—After the third month it is generally possible on pressing the breasts and stroking them towards the nipple to obtain some secretion (colostrum). This is an important sign in a primiparous woman, but is of much less consequence in second and later preg-

nancies. Rarely secretion can be obtained from the breast of a virgin; this must be regarded merely as a curiosity.

(e) *Areola.*—At the base of the nipples early in pregnancy there is a deposit of pigment, varying in the intensity of its colour according as the patient has a dark or fair skin. This, the primary areola, is accompanied about the fifth month by the secondary areola, which is found at the spot where the primary areola fades into the skin. In this areola, which has a radius of about three-quarters of an inch from the nipple, may be seen various
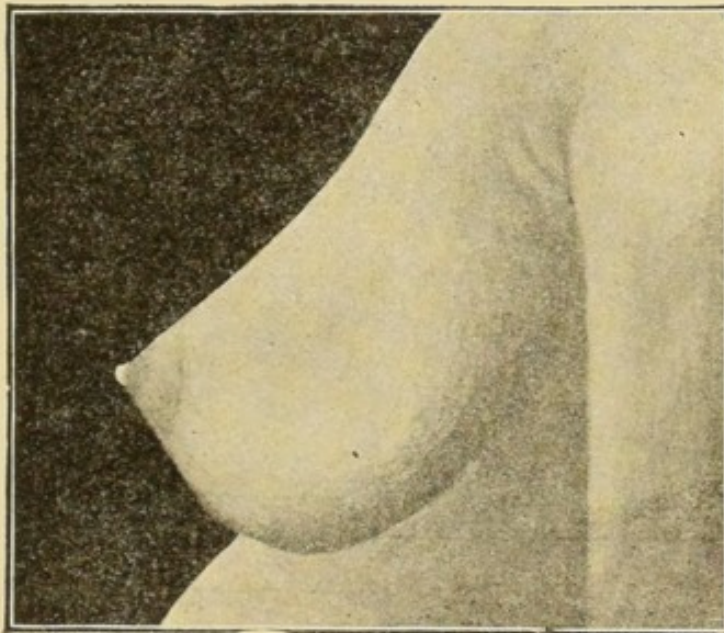
FIG. 35.—The Breast in Pregnancy (Blonde).

glandular projections, the tubercles of Montgomery; they are about twelve to twenty in number and increase in size as pregnancy progresses. The areola is very strong evidence of pregnancy if the woman has not borne a child before. In multiparæ the changes are not so important, as these remain more or less throughout life. A chronic inflammatory condition round the nipple or long-continued uterine disease may cause the breasts of a non-pregnant woman to resemble more or less those of a primipara, but the mammary areola in a primiparous woman is usually considered to be almost diagnostic of pregnancy.

2. *The Abdomen.*—The changes in the abdomen may be classified as follows :—

(*a*) *Enlargement.*—This is due to the growth of the pregnant uterus and the rate of growth we have already described (see p. 32). It is only after the third month that the abdomen projects, as until that time the uterus remains in the pelvis.

(*b*) *The State of the Umbilicus.*—During the first three months the umbilical depression is said to become deeper, at the fourth month it is normal, at the seventh month the depression is filled up, the cicatrix being flush
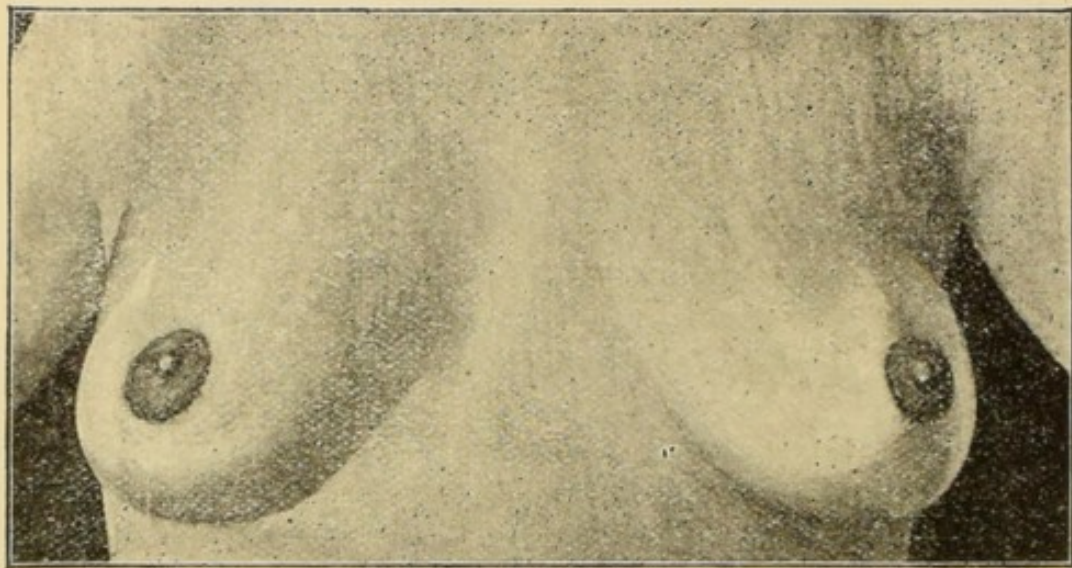
FIG. 36.—The Breasts in Pregnancy (Brunette).

with the abdominal wall; and during the last two months or so the scar protrudes.

(*c*) *The Skin of the Abdomen.*—There is a deposit of pigment in the skin of the abdomen which forms a dark line, the linea nigra (Lat. *niger*, black), running from the umbilicus to the pubes. There are also seen scars on the abdominal walls, purplish in colour when fresh, and having a whitish shining aspect when old; these are known as striæ gravidarum, or, when the result of a former pregnancy, as lineæ albicantes (white lines). They are due to the rapid distension of the abdomen, when the skin tears in its deeper layers. These lines are corroborative, but not certain evidence of pregnancy. They are first seen in the groins and then between the umbilicus and pubes; they

are present in 94 per cent. of pregnant women. From the method of their causation it is obvious that any condition which causes rapid distension of the abdomen may produce them ; for example, a woman with a large ovarian tumour may present these scars on her abdomen. They may sometimes be seen on the mammæ and on the outside of the thighs.

(d) Sometimes there is great protrusion of the abdomen, due to the perpendicular muscles in the abdominal wall having torn, which allows of the uterus sagging forwards
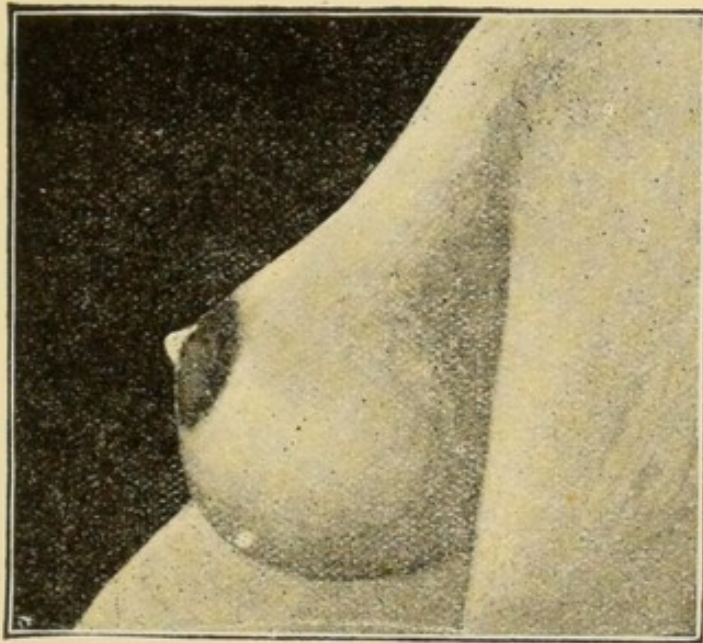
FIG. 37.—The Breast in Pregnancy (Brunette).

between them. This is known as eventration (Lat. e or ex, out; and venter, the belly) or pendulous belly.

(e) The fœtal movements may be felt through the abdominal walls during the latter months of pregnancy, as the child moves about in the liquor amnii, especially in multiparous women with lax abdominal walls (see Fœtal Signs of Pregnancy, p. 60).

3. The Uterus.—We have already noted the growth of the uterus and the changes which take place in its size and shape as pregnancy advances.

If the hand, especially when cold, is placed on the abdomen over the pregnant uterus, waves of contraction are felt periodically, when the organ becomes firm and solid,

In the intervals of these contractions, when the muscular fibres of the uterus relax, the sensation produced is one of softness or doughiness.   Almost no other condition produces these contractions, and we are thus able to differentiate the abdominal swelling of pregnancy from other enlargements of the abdomen.   Internal combined with external examination is necessary to appreciate certain other characteristic changes in the pregnant uterus; for example, the absolute painlessness of the organ and the
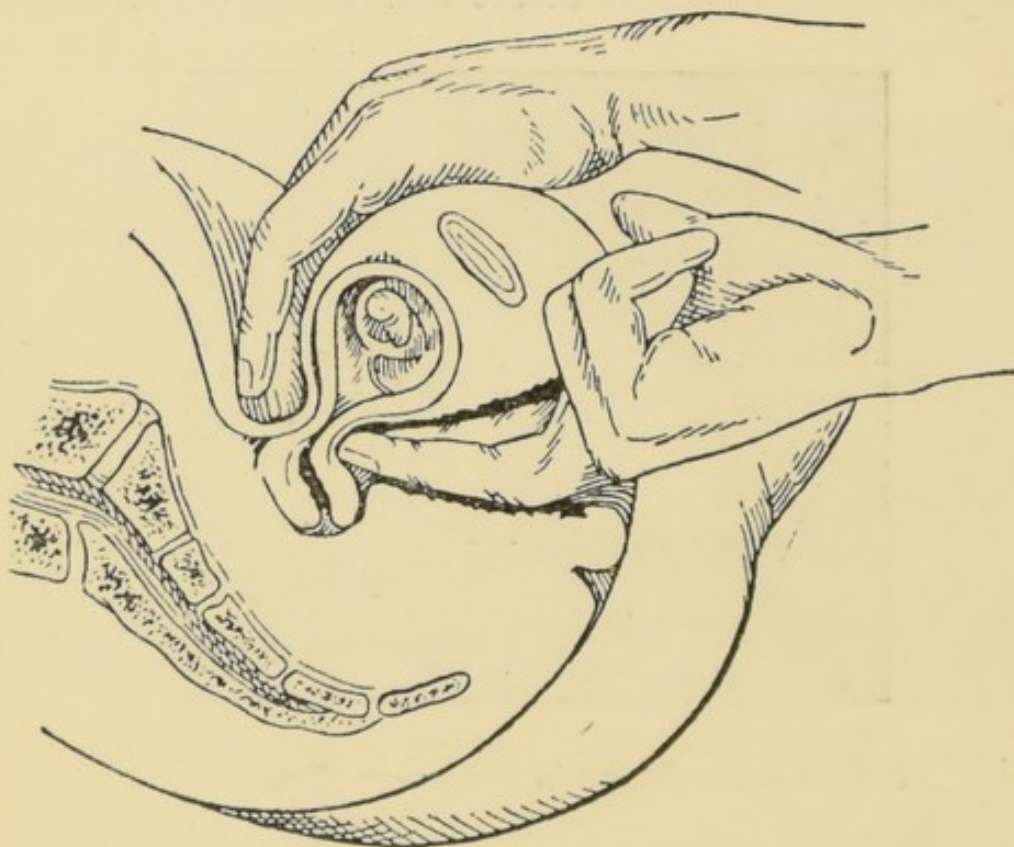
FIG. 38.—Compressibility of the Lower Uterine Segment.

compressibility of the lower uterine segment, namely, that portion of the pregnant uterus which lies below Bandl's retraction ring and above the cervix, and which we have already referred to as being the passive expansile part of the organ in contradistinction to the upper contractile part. This compressibility of the lower uterine segment, known as Hégar's sign, is of considerable value as an aid to detecting pregnancy between the first and second months. It is due to the muscular wall in this situation being thinner and the bundles of muscular fibres more easily separable.   This combined examination is known as the

bimanual and is well illustrated in Fig. 81. It is a most important method in all explorations of the pelvic organs. We shall refer later on to the way in which it is carried out (see p. 153).

Turning to the cervix we find on vaginal examination that the lips of the os uteri have become much softer. The mouth of the unimpregnated uterus is said to resemble in touch the tip of the nose, whereas that of the pregnant uterus feels more like the lips of the mouth. This change is most noticeable during the last weeks of
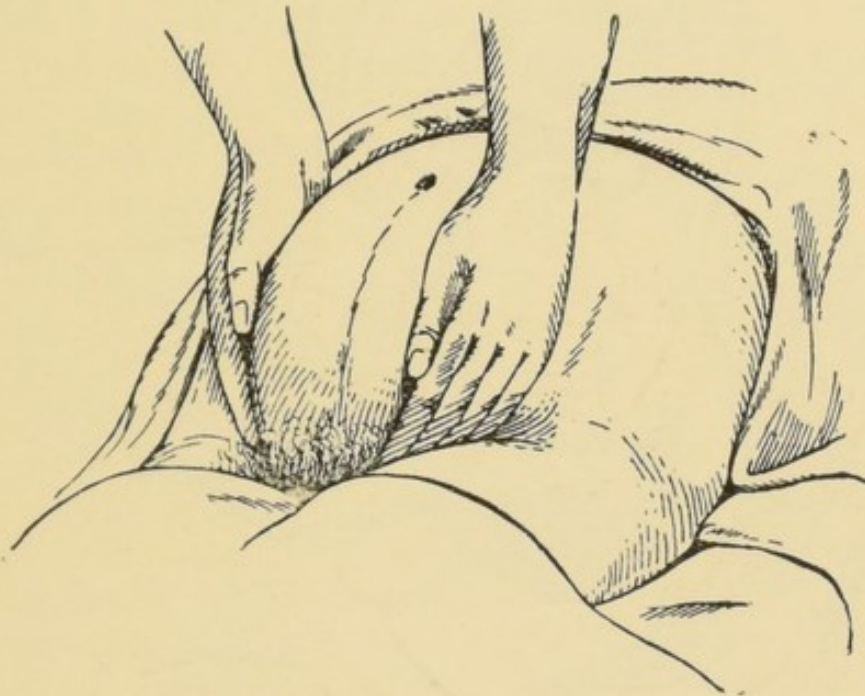
FIG. 39.

pregnancy. Another change in the cervix is the shortening that takes place in it ; this, again, is specially marked towards the close of pregnancy. The os uteri is filled with a tenacious plug of mucus which seals the uterine cavity from the external air. In a primipara the os uteri is circular, in a multipara it is divided, more or less completely, into an anterior and a posterior lip, according to the degree of laceration during a previous labour. It may be fissured in various directions.

4. *The Vagina and the Vulva.*—The external organs enlarge and the labia become thicker and everted. If

we separate the labia we see that the vagina is bluish instead of red. This is due to a varicose state of the veins surrounding the vaginal orifice and is referred to as Jacquemier's test for pregnancy. The finger in the vagina appreciates the pulsation of the arteries from the fourth month onwards. There is, too, an increase of secretion in the vagina which may amount to an actual discharge.
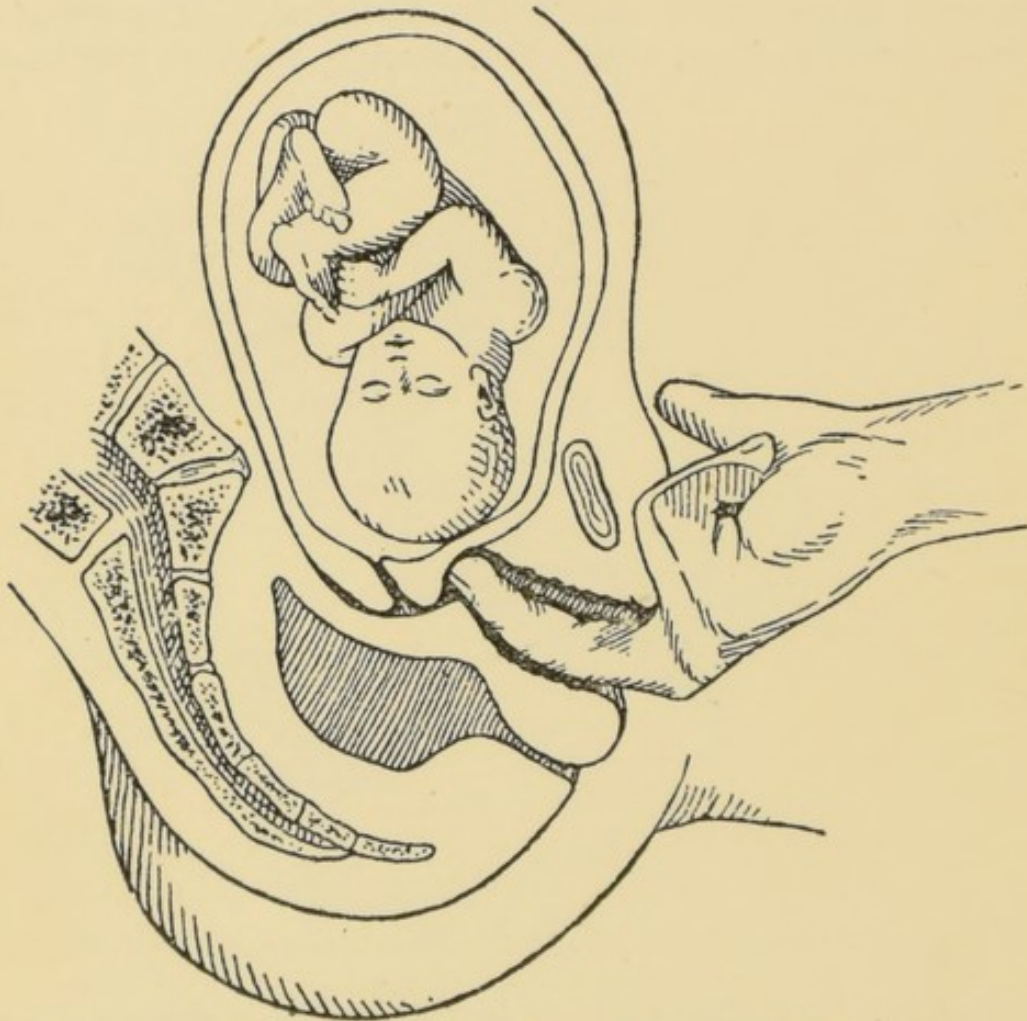
FIG. 40.—Method of Examination for Internal Ballottement.

B. *Fœtal Signs.* 1. *Fœtal Movements.*—The fœtus performs active and passive movements. The former, which may be partial or total, we have already referred to, and we have seen that such movements may actually be seen through the abdominal walls. The passive movements are those we impart to the fœtus by the hands applied externally to the abdomen (external ballottement) or internally through the roof of the vagina (internal bal-

lottement). To perform the former we apply the hands vertically over the uterus, the patient lying on her back with the legs drawn up, and press them downwards towards the pelvis and we find a solid mass between them. By relaxing one hand the head impinges on the other. This is due to the fœtus floating in a liquid—the liquor amnii. The head may thus be tossed, so to speak, from one hand to the other. In thin individuals with plenty of liquor amnii the fingers may be used to thrust away the head or other part of the child, which bobs back again against the finger tips.

To perform internal ballottement the patient should be half-sitting and half-lying down at the edge of the bed so that the uterus is in a vertical position. The first two fingers of the right hand are carried up to the roof of the anterior fornix of the vagina, pressing against the cervix, and a sudden push is given to that part of the child which lies against the front wall of the uterus. This causes the child to float upwards in the liquor amnii and returns again, impinging, as before, against the finger tips. The requirements for ballottement to be obtained are (1) sufficient size and weight of the fœtus to allow its movements to be appreciated by the fingers ; (2) a sufficiency of liquor amnii to permit of its floating freely ; and (3) a sufficiency of room in the uterus to allow of the fœtus moving freely. Ballottement is only therefore of value between the fifth and seventh months. Internal ballottement can usually be obtained a few weeks earlier than external. Sometimes ballottement cannot be obtained at all, and, on the other hand, it may be got in conditions other than pregnancy, as for example in the case of a bladder full of urine containing a stone (calculus).

2. *Fœtal Heart Sounds.*—These we have already referred to (see p. 40). To examine the patient for the fœtal heart sounds, she should lie on her back and the room should be perfectly still. Some observers find that the heart sounds can be heard better with the unaided ear, and, as the midwife does not, as a general rule, make use of a stethoscope, there is no reason why she should not practice listening to the heart. The best position to adopt is the kneeling posture, on the left side of the patient near her shoulder and facing the feet. Lay the right ear

firmly against the abdomen over the spot already men-
tioned (see p. 40), that is to say in a normal case (head
in the right oblique diameter and occiput to the front,
L. O. A.), a thin towel, unfolded, intervening. Patience,
perseverance and some little experience are required.
Remembering that the rate is double that of the mother's
pulse keep a finger on the pulse during the observation
and count for one minute. What are the fallacies we
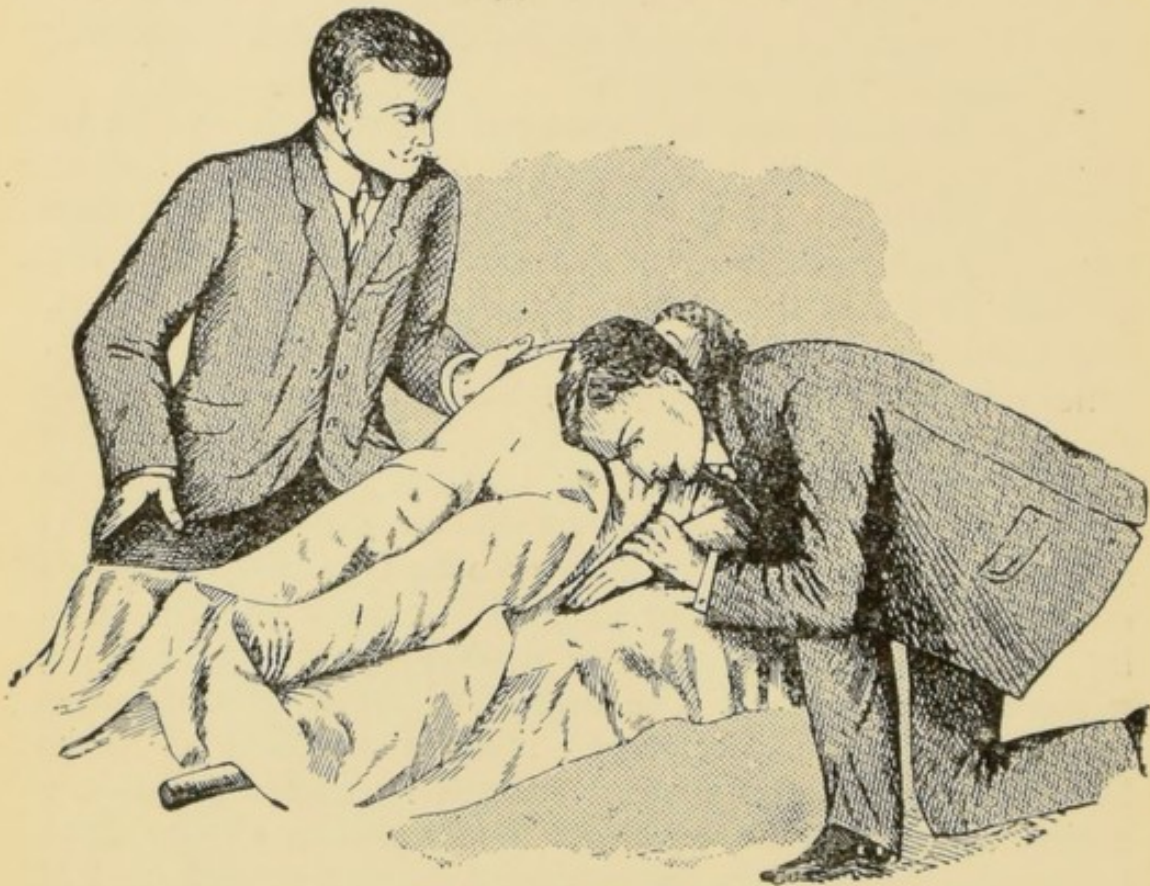
FIG. 41.—Position to Adopt for Listening to the Fœtal Heart with
the Unaided Ear.

may encounter in listening to the fœtal heart ? We may
mistake the mother's heart or arterial pulsation in the
aorta or our own heart for it, and we may also be confused
by a sound known as the uterine souffle, which is like the
mother's heart, synchronous with, that is to say having
the same rhythm as, the mother's pulse. The uterine
souffle is best heard along the left edge of the uterus; it
is a blowing sound, quite unlike the sound of the fœtal
heart, and its origin is the rushing of the blood through
the enlarged and twisted uterine arteries. Other sounds

such as the splashing of the child in the liquor amnii need not detain us.

We have now completed an account of the symptoms and signs of pregnancy, and before referring to its diagnosis and management it may be well to give a table pointing out at what period or periods of pregnancy these symptoms and signs are available as a means of diagnosis.

Table of Signs and Symptoms of Pregnancy.

Months.	1	2.	3.	4.	5.	6.	7.	8.	9.
Suppression of menses	x?	x?	x	x	x	x	x	x	x
Morning sickness		x	x	x	?	?	?	?	?
Fœtal movements				x	x	x	x	x	x
Areola of breasts			x	x	x	x	x	x	x
Enlargement of abdomen				x	x	x	x	x	x
Uterine contractions					x	x	x	x	x
Ballottement				?	x	x	x		
Fœtal heart sounds				?	x	x	x	x	x
Vaginal pulsation		?	x	x	x	x	x	x	x
Hégar's sign (compressibility of lower uterine segment)		?	x	x	x	x	x	x	x
Shortening of the cervix				apparent					x
Bluish colour of vagina			?	x	x	x	x	x	x

The diagnosis of pregnancy we shall consider briefly from two standpoints. In the first place we shall see how a supposed case of pregnancy is to be investigated, in other words how we are to apply the knowledge we have obtained to the examination of an individual case, and secondly we shall refer very briefly to some of the conditions which have to be differentiated from pregnancy.

There are two points which must be kept in mind in investigating a case of pregnancy, namely, the necessity

of a routine method of carrying out the investigation ; and here let us emphasise the value of making written reports as a training in orderliness and method ; secondly, the difficulty which is occasionally found in coming to a conclusion as to the presence or absence of pregnancy even by experienced medical men, this for the most part applying to the earlier months. The following is an example of the method of procedure which we may adopt :—

I. *Patient's History.*—Name, address, age, married or single (if necessary to ascertain), number of pregnancy, account of previous pregnancies and confinements, miscarriages or abortions (if any), date of last menstrual period, previous menstrual history, morning sickness, date of " quickening," if such is believed to have occurred; note the presence of any of the minor constitutional symptoms. It may be advisable also to inquire about previous general health.

II. *Examination of the Patient.*— 1. Examine the breasts, noting especially the presence or absence of the areola and of secretion. Let the patient sit facing a good light. It is always a good rule in every examination to look before you touch. Learn to observe ; this is a lesson we must practise all through life. We can never afford to disregard it. After looking, then, feel or, as we say, palpate the breasts, noting the points concerning them which we have described, namely, enlargement, areola, vascularity, consistence and secretion.

2. *Examine the Abdomen.*—The preparation of the patient is important. The clothes should be unfastened, the corsets removed, all waistbands loosened, and the bladder emptied. The patient lies comfortably on her back with the head and shoulders well raised. The legs and thighs are bent in order to relax the muscles of the abdomen. The vulva and lower limbs are covered with a light rug or sheet. The order of examination we pursue is to look (inspection), to touch and feel (palpation), and to listen (auscultation). (The midwife contents herself with listening to the abdomen with the unaided ear in the way we have described, the doctor makes use of this method or employs a stethoscope or combines the two methods.)

(*a*) *Inspection.*—Note size of the swelling, condition of the skin and state of the umbilicus.

(*b*) *Palpation.*—Warm the hands before applying them to the abdomen, and make very gentle pressure. Undue pressure at the commencement of the examination causes contraction of the abdominal muscles (as do cold hands) and makes the examination more difficult. We wish to have the muscles as relaxed as possible. Note the height, the direction and the intermittent contractions of the uterus. Try to ascertain the presentation of the fœtus and also its position by finding out the direction of the back of the child. Examine, too, for the fœtal movements and also, if the period of pregnancy be appropriate, for external ballottement.

(*c*) *Auscultation.*—Examine for the presence of the fœtal heart sounds and then note the position where best heard, their frequency and the strength of the sounds. It is not necessary to examine for the uterine souffle, as here a stethoscope is almost necessary.

3. *Internal Examination.*—We recommend that the midwife abstain from this for the detection of pregnancy, as being hardly within her province. She will understand from what has already been said the points to which the doctor's attention would be directed. It is only when called to attend a labour that internal examination is called for, and this should always be preceded by external examination.

We do not wish to infer that the midwife is to go through the whole of this procedure whenever she is asked to attend a woman in her confinement. Frequently it is either unnecessary or impossible. We cannot treat a pregnant woman as a " case " to be handled and examined at our will. What we have endeavoured to do is to outline a scheme to assist the midwife in pursuing an orderly and methodical course when she is about to investigate a case of pregnancy ; and it should be her endeavour to obtain all the knowledge she can without worrying or annoying her patient, so that she may be in a position to make herself all the more useful at the time of the confinement. Pregnancy has to be differentiated from a variety of conditions ; but as this is a subject which the midwife

can hardly be expected to be familiar with, since it implies a knowledge of the symptoms and signs of the conditions which pregnancy may be mistaken for, no good purpose will be gained by dwelling on it at any length.   The abdomen may be distended with fluid lying free in its cavity (ascites), an ovarian cyst, a fibroid tumour of the uterus or tumours of other abdominal organs.   The bladder when greatly distended may reach up to the umbilicus.   The bowels may be filled with flatus (tympanites).   The uterine cavity may be distended with fluid or blood.   The abdominal walls may contain a thick deposit of fat.   As a rule all these conditions can be differentiated by careful medical examination, occasionally examination under an anæsthetic being made use of.   Especially is this of value in diagnosing the so-called phantom tumour, such as is encountered in what is known as spurious pregnancy or pseudocyesis (Grk. *pseudo*, false).   Here we may meet with suspicious changes in the breasts, the abdomen may be enlarged with flatus or fat and imaginary movements felt.   Under chloroform or ether all these abdominal symptoms are cleared up.   Hysterical women and those who are specially anxious to become mothers are the subjects in which we are apt to find this condition.

Lastly, a few words about the management or hygiene of pregnancy.   What advice is the midwife to give to the expectant mother?

1. *Diet, etc.*—The regulation of this must depend on individual idiosyncrasies.   After the morning sickness has been got rid of, a simple, easily digested, generous diet is indicated both for the mother's sake and on account of the growing fœtus.   During the latter part of pregnancy less food at each meal will be able to be taken on account of the pressure of the growing uterus on the stomach, so food must be taken more frequently. It is a good rule to avoid all alcoholic stimulants during pregnancy, and no drugs other than simple, mild aperients should be used except under medical supervision.

2. *Dress.*—The clothing should be loose so as not to press on the abdomen, and corsets should be discarded after the fourth month.   Special pregnancy corsets are sometimes recommended, but if worn they should be easy

fitting, especially round the waist. Clothes should hang from the shoulders as much as possible, only light articles hanging from the waist.

3. *Exercise and Rest.*—Exercise is to be recommended, but should be moderate and chiefly confined to walking during the latter half of pregnancy. The cycle should be given up after the fifth month, and while it is allowed no hill climbing or rapid riding should be permitted. Plenty of sleep is necessary, if possible from eight to ten hours during the latter months. There should be an hour of rest with the feet up after the mid-day meal.

4. *Breasts and Nipples.*—The nipples are often retracted. They should be drawn out daily during the last couple of months with the thumb and finger for a minute or two at a time. The nipples may also be hardened by the use of a little spirit or eau de Cologne. These manipulations accustom the breasts to being handled. They should be kept very clean, and daily washing with cold or lukewarm water has been recommended as a means to prevent that painful and troublesome condition, a cracked nipple.

5. *Urine.*—It is advisable that the urine be examined periodically during the latter half of pregnancy by the doctor in order to detect the presence of albumin, and, if present, to take proper precautions.[1]

6. Vaginal douches during pregnancy are required no more than at other times unless there be a white discharge (leucorrhœa).

7. The pregnant woman must be specially careful to avoid infection, as she not only runs a risk on her own account, but endangers the life of the child. Especially does this apply to the period just before labour. We shall see later on that the puerperal woman is very susceptible to scarlet fever.

8. Lastly, it is common knowledge that the pregnant woman is very apt to be easily upset by any mental excitement or emotion. She may be irritable and depressed. Her husband and those with whom she comes into intimate contact, especially in the home,

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[1] The midwife may have the opportunity to do this herself; she is referred to the Author's *Examination of the Urine,* which gives full particulars.

should, if necessary, be prepared for these mental changes. How these changes may influence her offspring we do not probably know, but that there may be an injury done to her child by such changes, especially when of a sudden nature, taking place in the mother's mental condition, cannot be denied. We all know that a woman who has had a fright, or accident, or who has exhibited marked mental changes during her pregnancy, may give birth to a child who is defective physically, or who turns out as development proceeds, to be deficient morally and intellectually.

PART III.

UNNATURAL PREGNANCY (THE PATHOLOGY OF PREGNANCY).

CHAPTER VI.

PLURAL CONCEPTIONS.

By the term plural conception we understand either the fertilisation of more than one ovum at the same time or else the division of the essential part of the ovum (the germ cell), after fertilisation has taken place, into two or more parts, giving rise to twins or more rarely triplets or even quadruplets. It is by no means easy to say what is the cause of plural conceptions although various theories have been formulated. That there is a hereditary tendency in many such cases there can be no doubt so far as the mother is concerned. It would be hard to establish any influence on the side of the male parent. There is a tendency for a recurrence of twinning to take place. Of one thing we can have no doubt, namely, that plural conceptions are unnatural in the human species. It has been shown that (1) they are more frequent among idiots and imbeciles; (2) in families where twinning is frequent bodily deformities are more common; and (3) these generalisations apply equally to triplets. The frequency of plural conceptions is shown by the following figures recorded by G. Veit. Of 13,000,000 births twins occurred once in 89, triplets once in 7,910 and quadruplets once in 371,126 cases. Twins are more often found in multi-

paræ than in primiparæ. Out of 240 cases of twins, 168 occurred in multiparous women.

When twins are developed from a single ovum they are called uniovular. When they arise from two ova they are known as binovular. In the latter case the ova may be contained in one ovisac, in which case the ovisac discharges two ova, both of which become fertilised, and, as a result, only one corpus luteum develops. But each ovum may develop in its own ovisac, in which case the two ovisacs come to maturity at the same time either in one ovary or one in each ovary.

Binovular twins are more common than uniovular, in the proportion of eight of the former to one of the latter. When two ova reach the uterus they are engrafted on a single decidua vera, but they may become attached to different parts of it, in which case each ovum will have its own decidua serotina and decidua reflexa.

In all cases of twins each has its own amnion. The chorion is common in uniovular twins, double in binovular. The placenta is common in uniovular twins as far as the maternal part is concerned, but there are two cords, the vessels of the two cords sometimes communicating with one another. In binovular twins each has its own placenta, or when the ova are engrafted close together on the uterine wall the placental mass has some distinct mark, showing that the twins are developed from two ova. The vessels of the cords do not anastomose when the twins are bin-ovular. The following tables will make these points more clear :—

```
                    Mode of origin of twin conception
          ┌────────────────────────┴───────────┐
developed from one            developed from two ova
ovum (uniovular)                   (binovular)
         │              ┌──────────────┴──────────────┐
   one ovisac      one ovisac                    two ovisacs
         │              │            ┌───────────────┴──────┐
  single corpus   single corpus   one from    both from one ovary
     luteum          luteum      each ovary           │
                                            double corpus luteum
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Arrangement of the membranes,
placenta and umbilical cord

uniovular twins	binovular twins
single decidua vera	single decidua vera
common decidua reflexa and decidua serotina	common or double decidua reflexa and decidua serotina
common chorion	double chorion
double amnion (or vestiges of such)	double placenta (or distinct mark in single mass showing origin from two ova)
common placenta	two cords (the vessels of which do not anastomose with each other).
two cords (may be anastomosis between vessels of the two cords).	

Uniovular twins are more likely to belong to the same sex than are binovular. The former are not usually so well developed as the latter.

Twins are apt to be expelled prematurely. When mature a twin is usually smaller than a single infant. An average weight for the two is nine and a half pounds, but commonly one twin is larger and better developed than the other. One twin may die and be expelled early in pregnancy, but if the dead twin be placed higher up in the uterus than its fellow, it may remain in the uterus till labour occurs and be cast off in a degenerated state, with its liquor amnii absorbed, with the " after-birth ". To such the name fœtus papiraceus has been given.

In those rare cases where the uterus is bicornuate (having two compartments or horns) each horn may contain a fertilised ovum, and it is possible that these fertilised ova may come to maturity at different periods, giving rise, in such an event, to separate labours. This is one explanation of superfœtation, a term which was formerly used to denote a supposed subsequent conception (a conceiving anew, when already pregnant).

It is often possible for the doctor to diagnose the presence of twins during the latter half of pregnancy. The abdomen in such a case is seen to be of excessive

size from the great distension of the uterus, and a length of more than eleven and a half inches between the highest point of the uterus, near the close of pregnancy, and the presenting part arouses our suspicions. On palpation of the abdomen a sense of tension is experienced and there is a limitation of the fœtal movements as we should expect. Two heads may be felt, one in the lower part of
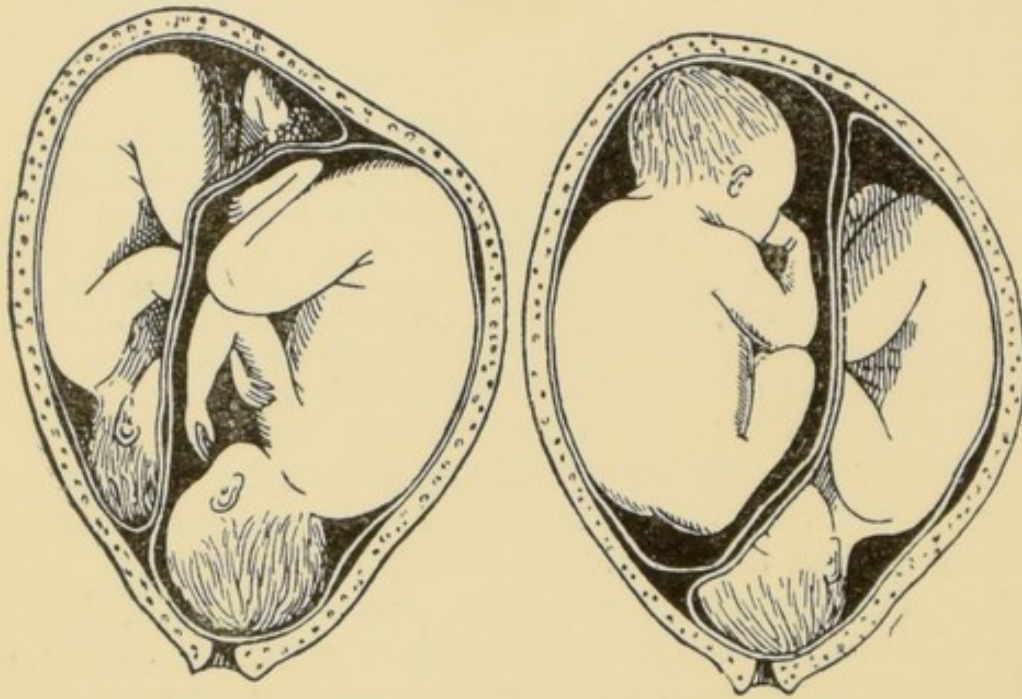
FIG. 42.—Twin Pregnancy—The left-hand figure shows both twins presenting by the head ; the right-hand figure, one presenting by the head, the other by the breech (after Simpson).

the uterus and one at the higher level ; in the same way a duplication of other parts may lead to the diagnosis. On listening for the fœtal heart we may find evidence of two heart sounds in different localities, one on each side in the lower part of the uterus or one below the umbilicus and the other above it. This we referred to when the fœtal heart sounds were under discussion. It must, however, be remembered that one of the twins may be dead, and even when both are living it is often impossible to hear the two hearts. One point in the examination of all pregnant women, but especially in such cases where a multiple pregnancy is believed to exist, the doctor is careful not to lose sight of, namely, the examination of the urine ; for twin-bearing women are more liable to

albuminuria[1] and, as we shall see later on, there is a close connection between albuminuria and a serious condition known as eclampsia. Albuminuria in a multiparous woman causes us to be on the look-out for a multiple pregnancy. We need not trouble to refer to triplets here. The effect on labour of twins and the management of such a labour we shall consider when we come to speak of complex labours.

[1] The occurrence of albumin in the urine.

CHAPTER VII.

INTERRUPTED PREGNANCY.

THIS subject is one of great importance to the midwife, for she may at any time be called to a case of abortion and it is right that she should know how to act, although it is our opinion that, whenever possible, a doctor should be called in. It must be remembered that here we are dealing with an unnatural condition, and such cases should be regarded as requiring even more care and attention than a perfectly natural labour. We have so far been dealing more especially with the theory of our subject ; the study of interrupted pregnancy introduces the midwife to the practical part of her work and this is an additional reason for insisting on its importance. And, in the first place, what do we mean by abortion ? The term abortion is used to signify the expulsion ot the ovum or fœtus from the uterus before the sixth month of pregnancy. Up to this period the fœtus is unable to live apart from its mother, in other words it is not viable. Another definition of abortion, therefore, is birth before the child is viable. Premature labour means birth after the child is viable, but before it is mature. The term " miscarriage " has no definite significance, but it refers generally to an interruption of pregnancy occur-ring between the time of quickening and that of the viability of the fœtus, that is to say, between the fourth and sixth months.

We must regard abortion as causing an enormous sacrifice of fœtal life and also as constituting to the patient an immediate and a remote risk.

The frequency of abortion is not easy to ascertain. It has been said that 90 per cent. of all women who have passed through the child-bearing epoch have aborted at some time or another. Many abortions occur at a very

early stage of pregnancy, insomuch that the patient does not even realise she is pregnant. A common state of affairs is this. A previously regular woman misses one or possibly two periods and then the menses return, probably rather profusely. It does not occur to her that she has aborted, but probably she has done so. Abortion is much more frequent in multiparæ.

The commonest time for abortion to occur is during the third month of pregnancy, and especially at that time when the menses would be expected if the woman were not pregnant. What is the reason of this? Important changes are now taking place in the cavity of the uterus, the placenta is being formed and the surface of attachment of the ovum to the uterine wall is now diminishing, as those chorionic villi which are not to assist in the formation of the placenta are arrested in their growth; at the same time the ovum becomes more deeply attached to the decidua serotina. These changes, coupled with the determination of blood to the serotinous area, all favour abortion even where no exciting cause, such as an accident, can be adduced.

The varieties of abortion may be classified as follows: I. spontaneous, II. accidental and III. provoked.

Let us take the latter two first :—

II. *Accidental Causes.*—A fall or a blow may cause abortion, but by no means necessarily so. One woman may have a severe accident and not abort; another woman may abort as a result of the slightest mishap, even a nasty sight may be quite sufficient.

III. *Provoked Abortion.*—This is divided into two divisions, criminal and legitimate. Firstly, with regard to criminal abortion. This hardly falls within our province, but we cannot let the opportunity pass without warning the midwife that if she values her peace of mind, her character and her reputation, she will be most careful to avoid having anything to do with the procuring of abortion. She must use her best endeavours to point out to her fellow-women, as occasion arises, the wrong they are doing both morally and physically when they take drugs and use other measures to procure abortion. Every woman knows that there are people who are ready to take the risk of procuring abortion, and indeed this risk is greater

than we might imagine; for a provoked abortion is much more dangerous than one occurring spontaneously. An abortion may, however, be provoked quite legitimately, but this is always done by a doctor, and, if he is wise, he will always endeavour to be assisted by a colleague. The circumstances under which this is done are exceptional, and perhaps the best example of such an exceptional circumstance is the obstinate vomiting of pregnancy which is endangering the woman's life.

I. *Spontaneous abortion* is by far the largest division. It is usual to divide its causes into (1) paternal; (2) maternal; and (3) fœtal.

1. *Paternal.*—The influence of the husband is in some cases clear; for example, a woman may persistently abort with her husband; she may remarry and cease to abort with her second husband and carry her child to full term. The commonest cause in the husband is syphilis (a contagious venereal disease, which may be conveyed to the unborn child by one of the parents). Other causes are alcoholism, tuberculosis and extremes of age in the husband.

2. *Maternal.*—These causes are numerous and all we shall do is to give an outline of them. They may be conditions which affect the body as a whole, such as over-indulgence in food or drink, indolence; these we should expect to find in the richer classes of society. Among the lower classes the opposite conditions may act, want of good nourishing food, general privation, hard manual work. Again, diseases and disorders of the different systems of the body may bring about abortion; for example, various nervous affections, heart and lung diseases and the more serious fevers. But the cause of abortion may be a local one, affecting either the uterus itself or its surrounding organs. The decidua vera may be inflamed (decidual endometritis), there may be a tumour or a displacement of the uterus, or the seat of the trouble may lie in the ovary, the tube, the bladder or rectum. Local causes account for most cases of abortion.

3. *Fœtal.*—Anything which destroys the life of the fœtus is a fœtal cause of abortion; these are, however, often hard to trace. Briefly, the fœtal causes may be divided into those which act on the fœtus itself and those

which affect its coverings and appendages, and of the latter there are many.

The symptoms of abortion may be classified as four in number; they are (1) premonitory or warning; (2) hæmorrhage; (3) pain; and (4) other discharges.

1. Premonitory symptoms are usually absent in an abortion before the second month, which, as we have said, resembles a delayed and profuse menstrual period. Such symptoms are shivering, sickness or actual vomiting, a general feeling of "poorliness" (malaise), a feeling of bearing-down in the pelvis and backache. They are uncertain and not of much importance.

2. Hæmorrhage may occur in various ways. It may be slight or profuse and may extend over a few hours or over two or three days, or sometimes over much longer periods. It usually precedes the pains, and, beginning slightly, may stop or increase until abortion actually takes place. What does this symptom signify? It means that the ovum is being separated from the cavity of the uterus. Supposing a woman has slight hæmorrhage only at night and she is free in the day time, one explanation of such a phenomenon is that the ovum has died as a result of separation from the decidua, but it has not been expelled. In the erect posture it acts as a plug to the os and prevents blood escaping, but when lying down it falls to one side and so allows the blood to pass. The ovum may or may not come away with the blood clots that are often passed; hence the importance of having everything which is passed carefully preserved for the doctor's inspection.

3. Pains, which usually follow the hæmorrhage, vary from a slight colic to moderately severe labour pains. They are usually intermittent and rhythmical like true labour pains, and they signify the efforts of the uterus, by its contractions, to throw off the separated ovum.

4. Other discharges are the ovum and its coverings with the liquor amnii.

We have now considered the symptoms of abortion and the next step in the investigation of a case is to discover by physical examination if the case is one of abortion or not. Some cases are so self-evident that we

have already made up our mind, but sometimes one
meets with considerable difficulty in coming to a diag-
nosis. We have in the first place to make up our mind
whether or not the patient is pregnant. Having done
this we wish to know whether she has actually aborted,
whether she is about to abort, or whether she is only
threatened with this mishap and there is a chance of
averting it. This we proceed to find out by vaginal and
bimanual examination. As a matter of routine we ex-
amine the breasts and abdomen, but in early cases we
may not learn much, especially in a multiparous woman.
The midwife should not undertake such an examination
as this if it is at all possible, as it must nearly always be,
to get a doctor. Here let us emphasise the great import-
ance in the use of antiseptics in conducting a vaginal
examination. The subject of antiseptics in midwifery
we shall fully discuss at a later period, but the midwife
must constantly keep this before her in her practical work.
If the os uteri is found quite open the abortion, if it have
not already occurred, is inevitable. If it is slightly open
the abortion is probably inevitable. It is also nearly
always inevitable when the pains and hæmorrhage occur
together, especially if the latter is profuse. When the
pains and hæmorrhage do not occur together and the
latter is not profuse the abortion is but threatened, es-
pecially if the os uteri is closed. When the os uteri is
open we may be able to feel the ovum, if separated, but
not expelled, just beyond it as a smooth, rounded, more
or less elastic substance. Bimanual examination is next
undertaken to ascertain the size and position of the body
of the uterus. If its size corresponds with the number of
periods missed this practically settles the diagnosis. The
management of a case of abortion depends entirely on
what our object is. The first question to be settled is
whether the abortion is only threatened or whether it is
inevitable. In the former case we wish to avert the
abortion; in the latter case it is our endeavour to hasten
it and to empty the uterus as completely as possible.
Note the word "completely"; for sometimes abortion
is incomplete and a portion of the ovum has remained
behind; especially is such likely to happen if the patient
has treated the matter as a trivial one (as is so often done)

and no advice has been sought, until uterine hæmorrhage has been found to persist and the health has suffered in consequence of the continued loss of blood.

Having decided that an abortion is but threatened we may hope to avert it so long as the ovum is not dead; and we may certainly act as if the ovum were not dead, unless there has been profuse hæmorrhage lasting over a week. We order complete rest in bed until the date of the next menstrual period has passed, the least permissible time being one week, and by complete rest in bed we mean that the patient is not allowed to sit up, nor is she to leave her bed on any pretext. The diet should be light; milk and broths for the first three days, after which a little fish or poultry may be allowed. Visitors and friends are not to be permitted and all excitement must be guarded against. The temperature of the room should be kept from 60° to 62° F. Our most valuable drug in such a case is opium. This is best given as a suppository, either one grain of opium or one-quarter to half a grain of morphia. This prevents the stomach being upset and digestion interfered with. In cases of severe pain it may be necessary to give morphia hypodermically. Some doctors have obtained good results with drugs; such as viburnum prunifolium, which acts like opium, but in a much milder way, as a uterine sedative. Such a drug as this is probably of more use in those cases of habitual abortion where, from the patient's past history, we are afraid of her again aborting, although no symptoms may have actually presented themselves. Such treatment as this is preventive in the more strict sense of the word, as compared with what we may regard as the preservative treatment, with which we are now concerned. Supposing the hæmorrhage is profuse in a threatened abortion the nurse should elevate the patient's hips with pillows and she may also apply an ice-bag carefully protected or cloths wrung out of cold water to the vulva, in the meantime having sent for medical assistance. No application should be made to the abdomen as this is apt to set up uterine contractions and this is what we wish to avoid. The midwife will meet with trouble in keeping her patient in bed after the acute symptoms have subsided. We cannot get the public to appreciate the gravity of

abortion.   If we could there would be a great diminution in the diseases of women.

Now, we have been talking of what is to be done; let us point out two things which are not to be done. Never plug the vagina or else the abortion becomes inevitable; for the same reason never give ergot.   If the doctor finds the uterus displaced he replaces it; and he may require to introduce a pessary, when he thinks this is necessary, to keep the organ in its proper place, until it has risen up out of the pelvis.
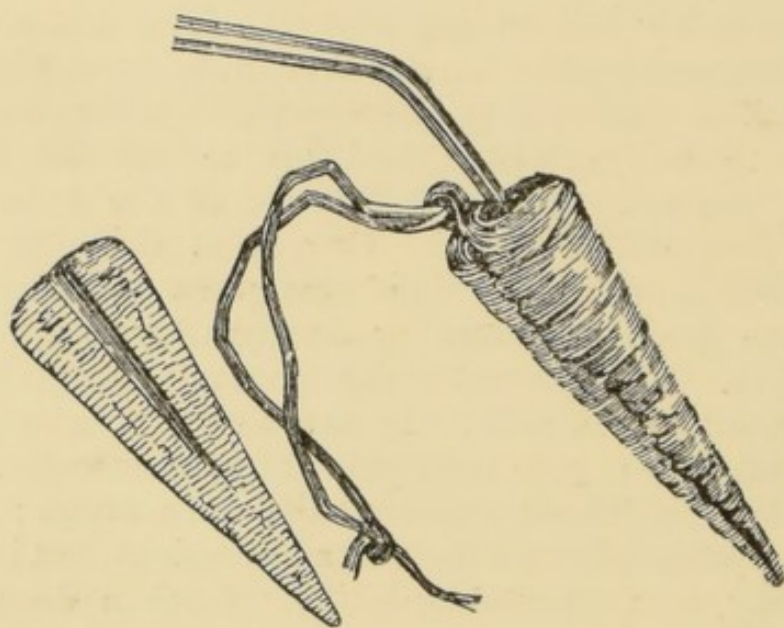
Fig. 43.—Tent.

As soon as we are satisfied that an abortion is inevitable we aim at promoting it as far as we possibly can. Many such cases require no interference on our part.   If the bleeding is only moderate and the uterine contractions are fairly strong we keep the patient quiet in bed and await the result.   But we must be quite sure that the whole contents of the uterus are expelled, and, as we have already said, all clots and substances passed must be carefully preserved for the doctor's inspection.   The doctor will usually order moderate doses of ergot, say half a teaspoonful thrice a day, to assist the uterus in emptying itself and to control the hæmorrhage.   During this time the temperature and pulse must be recorded every four hours.   Any rise in the temperature may

indicate septic trouble. Supposing the ovum has not been expelled, what is to be done? If the os is dilated it may be possible on vaginal examination to remove the ovum if separation has occurred. Pressure is made on the fundus uteri with the left hand applied to the abdomen and an effort is made to reach the ovum with one or two fingers of the right hand. It may be advisable to do this under an anæsthetic. If the ovum is not detached or if
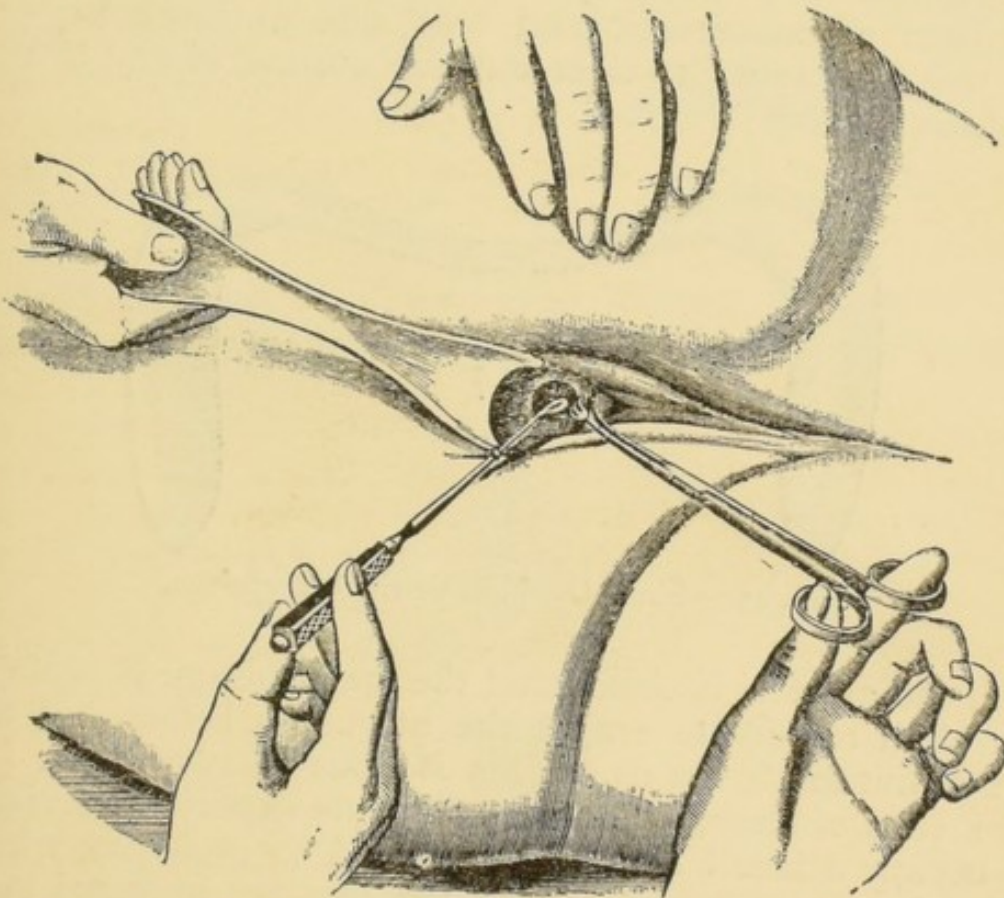
FIG. 44.—To shew the Use of the Curette in the Left Lateral Position (after Simpson).

(Sims' Speculum drawing back the posterior vaginal wall, and Volsellum drawing down the cervix. Curette about to be introduced.)

it is separated but cannot be reached, a good plan is to plug the vagina with pieces of cotton-wool wrung out of warm boracic lotion or with long strips of iodoform gauze. The vagina should be packed as tightly as possible, the pledgets of wool being united to each other by a string. If this is done thoroughly the bleeding is arrested and the uterus is stimulated to contract by the presence of a

foreign body. The plug should not be left in longer than six hours. While it is in the vagina ergot is given by the mouth;[1] for example, a drachm of the liquid extract every two hours. This also favours uterine contraction, and on removal of the plug the ovum comes away as a rule. If the result is unsuccessful the plugging must be repeated even more carefully than before. If, after a second period of six hours there is no result, then the doctor will probably summon a colleague to administer an anæsthetic and with one or more fingers he will endeavour to clear out the uterine cavity in the manner already described.

FIG. 45.—Sims' Duckbill Vaginal Speculum.

If the os uteri is closed and the hæmorrhage is profuse we shall require to empty the uterus as before, but we must first dilate the os. This is done in two ways: (1) by means of tents, which are substances specially devised to occupy a small bulk until exposed to moisture, when they slowly swell and stretch the passage or canal into which they have been introduced. They take some few hours to act; those in most common use are made either of a roll of sponge coated with a mixture of lard and wax or of a special kind of wood named tupelo. Tents are not used nowadays nearly so often as they used to be since they are believed to be a possible source of infection and rightly so. (2) A better way to proceed is to rapidly dilate the os under an anæsthetic by means of various kinds of dilators, those in common use being Hégar's

[1] It may also be used in the form of a suppository or ergotine may be injected hypodermically.

graduated rods. They are best made of metal so that they can be sterilised more easily. The patient is placed
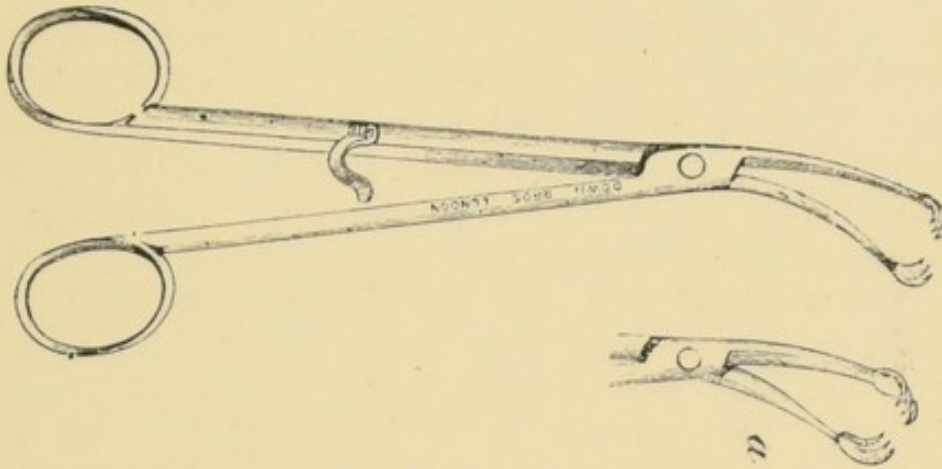
FIG. 46.—Volsellum.

in the lithotomy position,[1] that is to say, the buttocks rest on the edge of the table, the legs and thighs being flexed
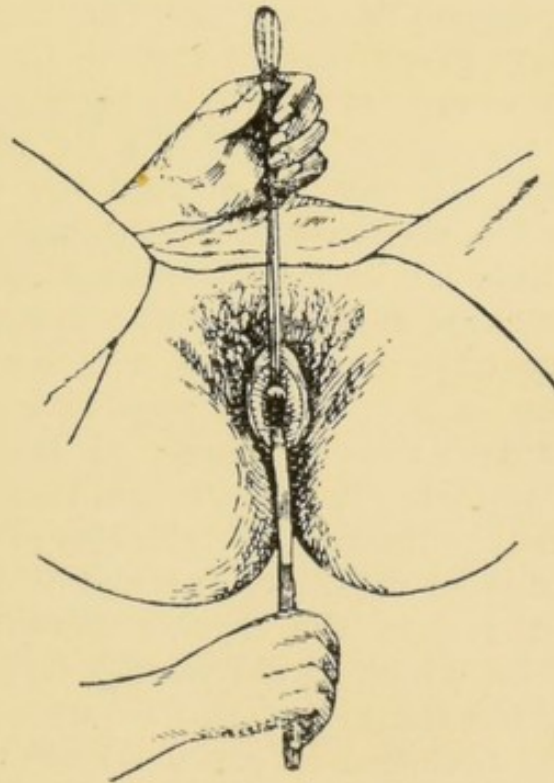
FIG. 47.—Patient in Lithotomy Position ready for Curettage.

on the abdomen and fixed there by some such apparatus as a Clover's crutch. The operator sits in front of the

[1] Some operators make use of the left lateral position as shown in Fig. 44.

perineum while the nurse or midwife stands on the patient's right side. The posterior wall of the vagina is held back by a Sims' duckbill speculum which she holds in her right hand. The cervix is pulled down by a volsellum (a long pair of catch or toothed forceps) which is fixed to its anterior lip. The volsellum is handed to the nurse who holds it in her left hand which rests on the abdomen. A reference to Fig. 47 will make this clear. Before the instruments are introduced into the vagina they are to be sterilised, and a hot vaginal douche is to be given with recently boiled water. The vulva and surrounding parts should also be well scrubbed. The patient is to be covered up as far as possible, only the vulva need be exposed; this is surrounded with sterilised towels. The graduated dilators are now passed into the cervical canal one after the other, the cervix being fixed by the volsellum, until the operator has dilated the canal as far as he thinks necessary. He is then in a position to clear out the uterus. The description we have given applies also to the preliminaries required for the operation known as curetting or scraping the cavity of the uterus; here the os uteri has to be dilated as before, but instead of applying the fingers to the uterine wall a special instrument called a curette is employed. There are various shapes of curette, but the principle is the same in all, a scraping instrument usually having a sharp edge being used, whether it be in the shape of a loop or a spoon, to remove from the uterine walls all remnants of the pregnancy. It is more especially in cases of incomplete abortion, where there is long-continued hæmorrhage from the remains of an abortion, that the curette is so valuable, one might say indispensable. In such a case the trouble may be due to an adherent decidua which could hardly be detached from the uterus without the aid of the curette. Probably the best results are obtained in cases where the os has to be dilated and in those cases where the vaginal plugging has failed to completely empty the uterus by a judicious combination of the fingers and the curette.

After emptying the uterus, whether by the fingers or by the curette, its cavity is washed out with antiseptic solution. Tincture of iodine is a favourite substance with

some for this purpose, but probably perchloride of mercury (corrosive sublimate) is one of the applications most commonly used. Corrosive sublimate is a strong poison and therefore it must not be used in a stronger solution than 1 in 3,000, and after it has been used the uterine cavity must be washed out with recently boiled water to remove all traces of the corrosive sublimate. If carbolic acid is used the strength should be 1 in 40. Once again, we must remind the midwife that after an abortion or a confinement and especially after a curettage the uterine wall or part of it resembles a wound; it has a raw surface and by means of this raw surface it is able to absorb poisons of various kinds and thus to give rise to

FIG. 48.—Thomas's Dull Wire Curette.
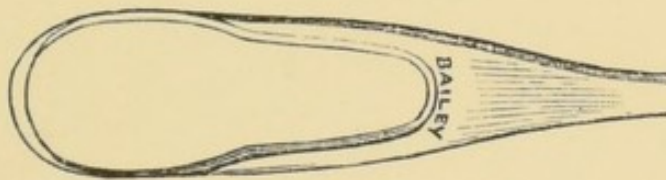
FIG. 49.—Loop of Récamier's Curette.

blood-poisoning (see Puerperal Fever). Such a condition is evidenced by a rise of temperature and by an increased frequency of the pulse; and whenever such signs are present no time must be lost in sending for a doctor. If a doctor is already in attendance he will, when satisfied that sepsis exists, promptly explore the uterus and wash out its cavity in the way described. This may require to be done frequently, even every four or six hours. It is only by such prompt measures that a mild sepsis may be prevented from developing into a very serious and often fatal disease.

By using the same precautions in curetting the uterus as we should in performing a surgical operation we do not anticipate any rise of temperature following it; where we do get such a rise we are probably to blame for having

introduced poison into the uterus by our fingers, our instruments or by other means.

A woman may be threatened with abortion, but it may not occur. However, the fœtus has perhaps died and a few months later it may be expelled with the placenta. Such a set of events is known as a missed abortion.

We have not yet referred to premature labour. A labour may take place prematurely from the operation of the same causes as those which we have seen may produce an abortion. Here we would have to decide in the same way as we should in the case of an abortion whether the labour was threatened or inevitable. If we decided that the labour was inevitable we should act as if the labour were a natural one; if, on the other hand, we decided to try and avert it, general management on the same lines as in a threatened abortion would be followed, but with one exception. Opium at this stage of pregnancy is apt to affect the fœtus and the doctor would probably prefer to rely on other sedatives such as the bromides.

CHAPTER VIII.

EXTRA-UTERINE PREGNANCY.

THE term extra-uterine pregnancy explains itself and that is why we are using it. By it we mean pregnancy occurring outside the uterus; but still the term is not quite correct, for, as we shall see, pregnancy may occur outside the cavity of the uterus and yet not outside the uterus
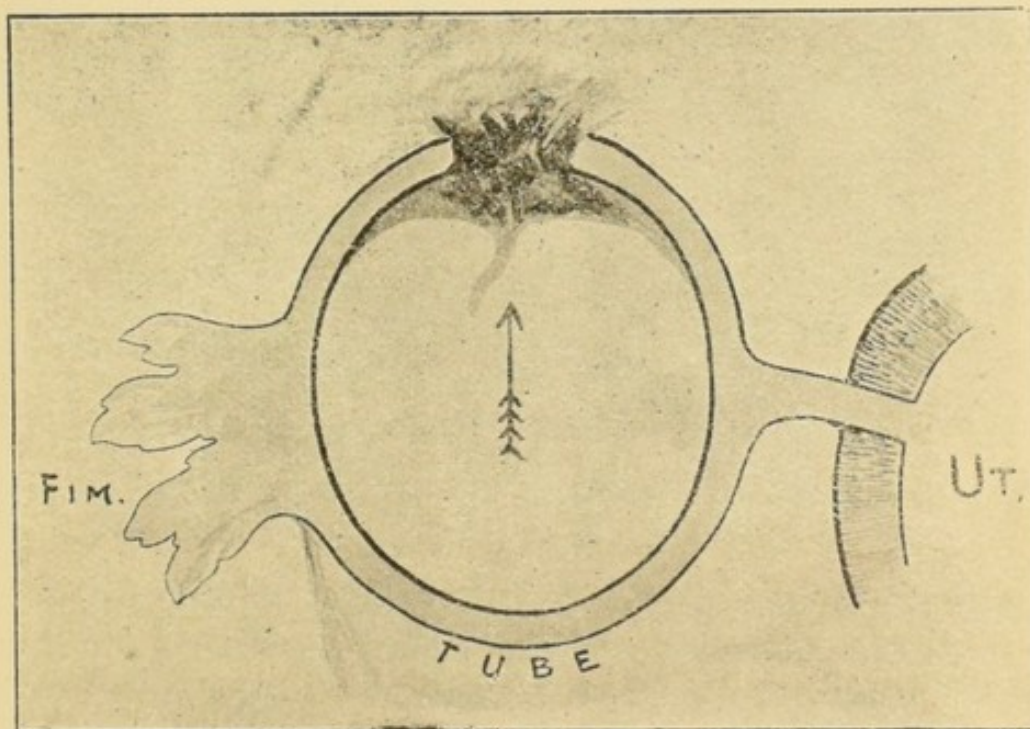
FIG. 50.—Rupture into Peritoneal Cavity. Primary Peritoneal Rupture (Cullingworth).

itself, that is to say, we may have the fertilised ovum developing in that part of the tube which runs through the uterine wall. Therefore a more correct term is ectopic pregnancy, the word ectopic being derived from the Greek prefix "ec" or "ex" signifying outside, and the word "topos" which means a place. Ectopic therefore means

(87)

outside the (proper) place.   We have traced the course of the ovum from the ruptured ovisac in the ovary to the uterine cavity.   But the fertilised ovum may conceivably be arrested somewhere in its course between these two points.   As a matter of fact, however, it is now generally agreed that all ectopic pregnancies in the first instance are tubal and that one of five things may happen as development proceeds: (1) The ovum may continue to grow in the tube; (2) it may burst through the upper part of the wall of the tube into the peritoneal cavity (intra-peritoneal rupture); (3) it may burst through the
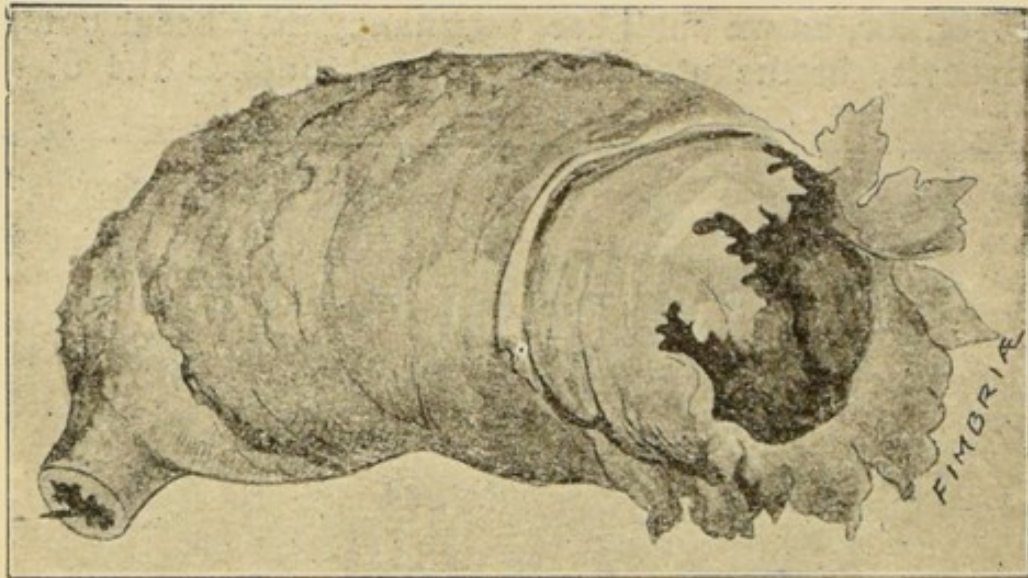
FIG. 51.—Fallopian Tube distended with Blood-clot (Cullingworth).

lower part of the wall of the tube which is uncovered by the peritoneum when it escapes between the layers of the broad ligament (extra-peritoneal rupture); (4) it may pass on to the uterus and be arrested in that part of the tube which is situated actually in the uterine wall; and (5) it may pass out through the open fimbriated end of the tube and, if living, continue to grow there.   Whether any other form of ectopic gestation occurs we shall not stop to discuss.   It is sufficient for our purpose to confine ourselves to tubal pregnancy, that is to say, the development of a fertilised ovum within the Fallopian tube. Tubal pregnancy occurs most commonly in the outer part of the tube.

As to the cause of tubal pregnancy so little is known which will explain the various cases met with that the less said about this the better. We do not even know for certain where impregnation of the ovum normally takes place and it is probable that the site of impregnation has a definite bearing on the cause of ectopic gestation.

What happens when a fertilised ovum lodges and begins to develop in the tube? There is an increased
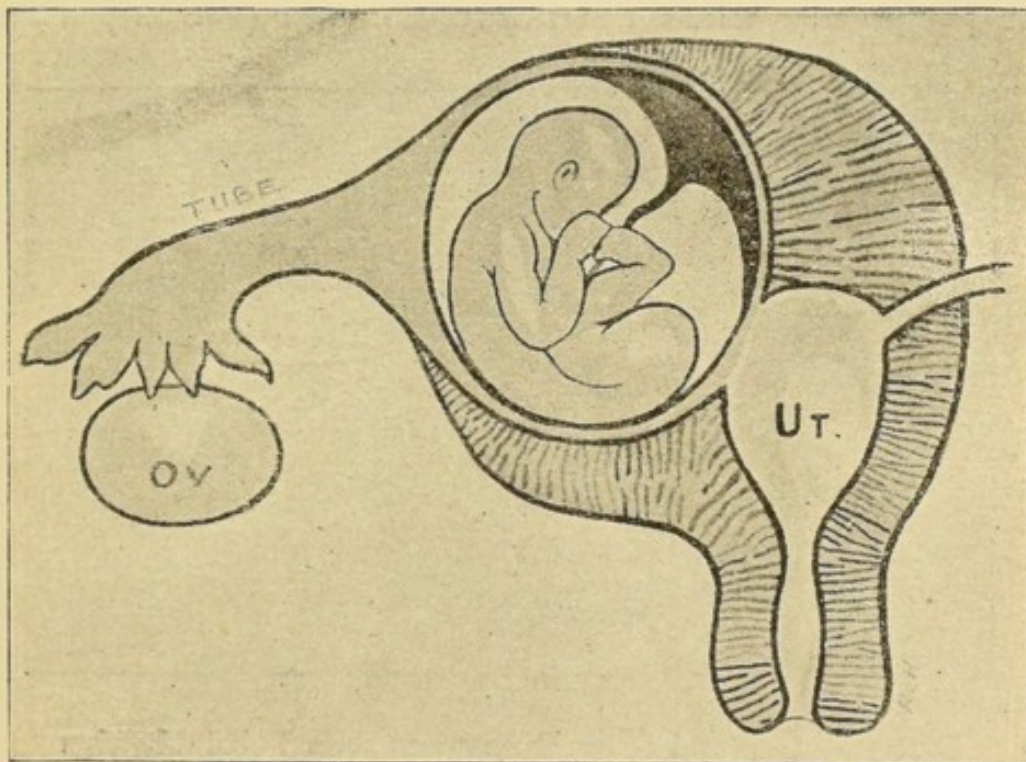
Fig. 52.—Interstitial or Tubo-Uterine Pregnancy (Auvard and Cullingworth).

supply of blood to that part of the tube and, with the growth of the ovum, there is a corresponding stretching of that part of the tube which covers it until a time comes when the thinned-out wall of the tube bursts. When the ovum occupies the outer part of the tube the fimbriated end has usually closed up by the eighth week if the ovum has continued to grow unchecked to that time. Until this time it is usually open. Fig. 51 gives us an admirable picture of the calibre which may be attained by the fimbriated end of the tube. The rupture of the tube may

occur without any apparent cause or it may follow some slight exertion or strain. We have seen that the rupture may take place into the peritoneal cavity or into the broad ligament.

This sequence of events is what might be expected, but of late years it has been pointed out that a more frequent ending to a tubal pregnancy is for an abortion to take place. There is a greater liability for hæmorrhage to occur in connection with a tubal than a uterine pregnancy, and it commonly happens that at a very early stage in the pregnancy when the fimbriated end (ostium) is still
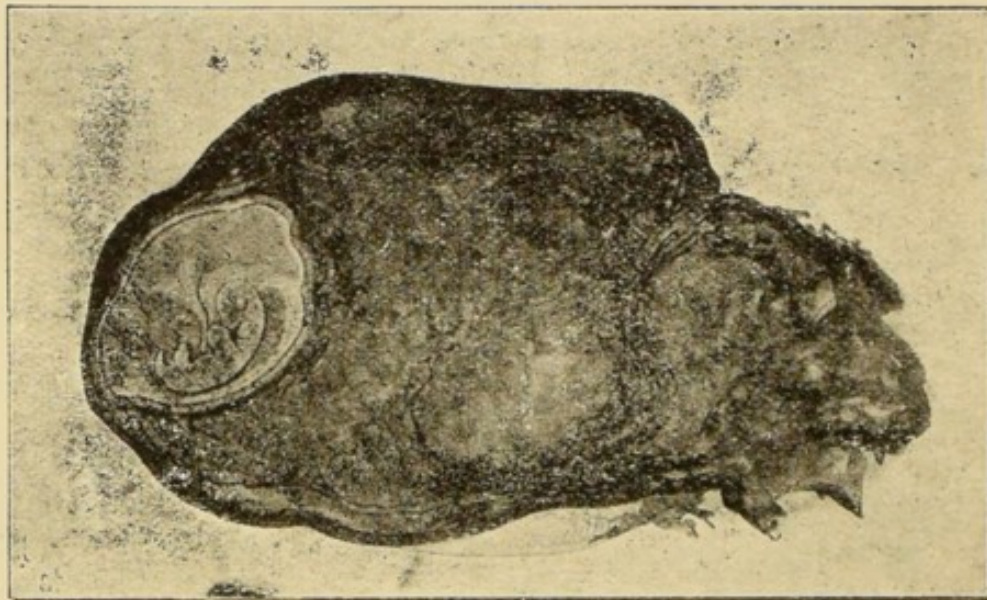
FIG. 53.—Clot and Ovum from a complete Tubal Abortion (Cullingworth).

open, blood is poured out into and around the membranes of the ovum, and as a consequence of this death of the embryo may take place. In fact, the abortion may be threatened or inevitable as in a case of uterine abortion. If the fimbriated end of the tube is not yet closed and, as we have said, it remains open until the sixth to eighth week of pregnancy, the blood generally finds its way out in a gentle stream through the mouth of the tube and gravitates into the cavity of the pelvis, where it coagulates and may fill up the whole pelvic cavity. This condition is known as pelvic hæmatocele. But, instead of this, and especially when the hæmorrhage occurs at a later

stage when the mouth of the tube is closed, the blood may collect in the tube and, by the sudden distension of the already thinned-out wall of the tube, cause it to give way, with the result that hæmorrhage takes place into the peritoneal cavity or into the broad ligament. In this case the hæmorrhage is sudden and profuse, and gives rise, as a rule, to urgent symptoms. These cases are the most alarming where the tube ruptures into the peritoneal cavity as the space is not limited as it is when the blood is poured out into the layers of the broad liga-
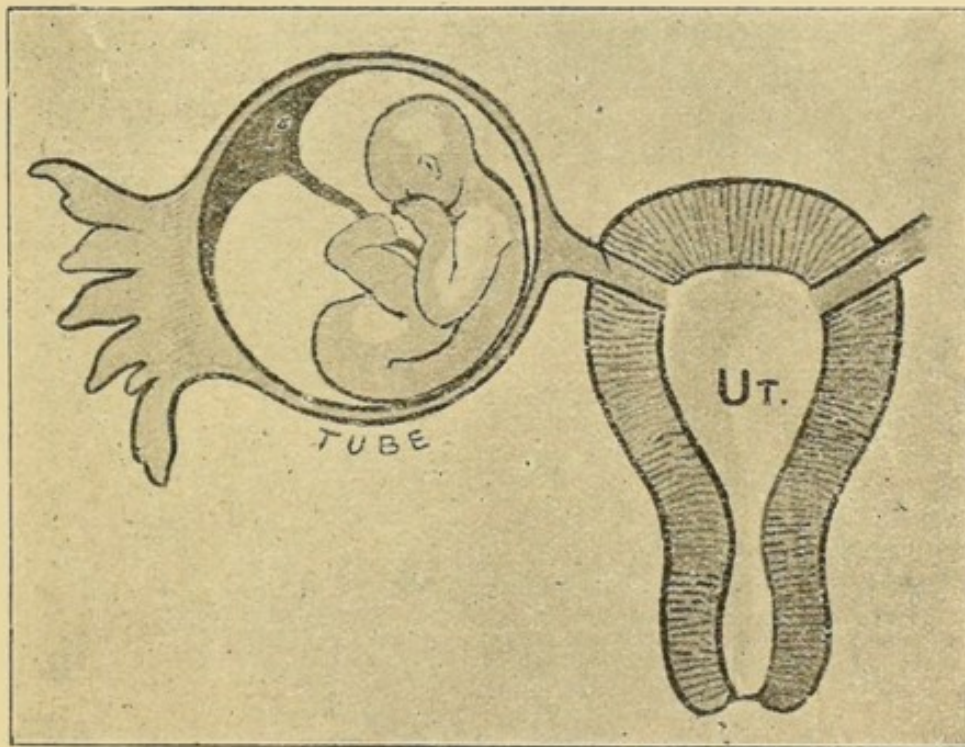
FIG. 54.—Gestation Sac in Tube (Auvard and Cullingworth).

ment. If the blood be poured out slowly the embryo may survive and, passing through the mouth of the tube or through the rent in its wall, when rupture occurs, continue to develop in its new situation. But its life is seldom a long one, as is shown by the few cases of advanced ectopic pregnancy which are met with when the abdomen is opened at the time of operation. When the ovum dies at an early period a tubal mole is formed.

Coincident with the development of the ovum in the Fallopian tubes are certain changes which take place in the uterus. The organ begins to enlarge as in a uterine

pregnancy as soon as the tubal pregnancy commences, and this continues for the first five months or thereabouts, but the increase in size is not so great as when the ovum is occupying the uterus. As soon as the embryo dies the uterus begins to decrease in size. Not only does the organ enlarge, but it develops a decidua vera as in normal pregnancy. This is expelled as a rule about the time that rupture occurs either in whole, as a cast of the
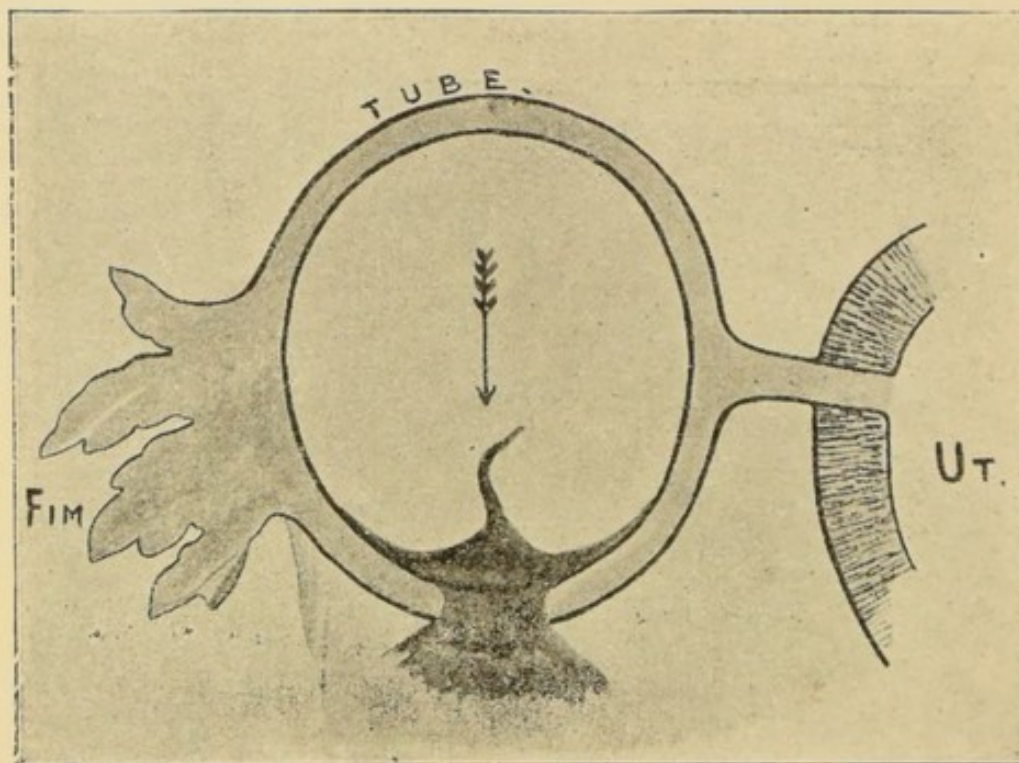
Fig. 55.—Rupture into Connective Tissue of the Meso-Salpinx.
Primary Extra-Peritoneal Rupture (Cullingworth).

uterus, or in part in the form of shreds or debris. As one would expect there is no decidua reflexa and serotina.

What are the symptoms we are accustomed to meet with in a tubal pregnancy? These depend to some extent on the duration of the pregnancy. We may have the suppression of menses for one or two months accompanied perhaps by morning sickness and other early symptoms of pregnancy, or there may be no symptoms at all prior to rupture of the tube. We depend, however, on three cardinal symptoms which are usually present; these are (1) irregular pains in one or other side of the pelvis, occurring generally in paroxysms; these are due to the

stretching of the muscular fibres in the walls of the tube.
The pains may be severe, but are often slight; (2) irregulad
hæmorrhages from the uterus. The blood is nearly alwayr
dark in colour and the flow is steady while it lasts ans
moderate in amount. This is quite different to the
character of the hæmorrhage in a case of threatened
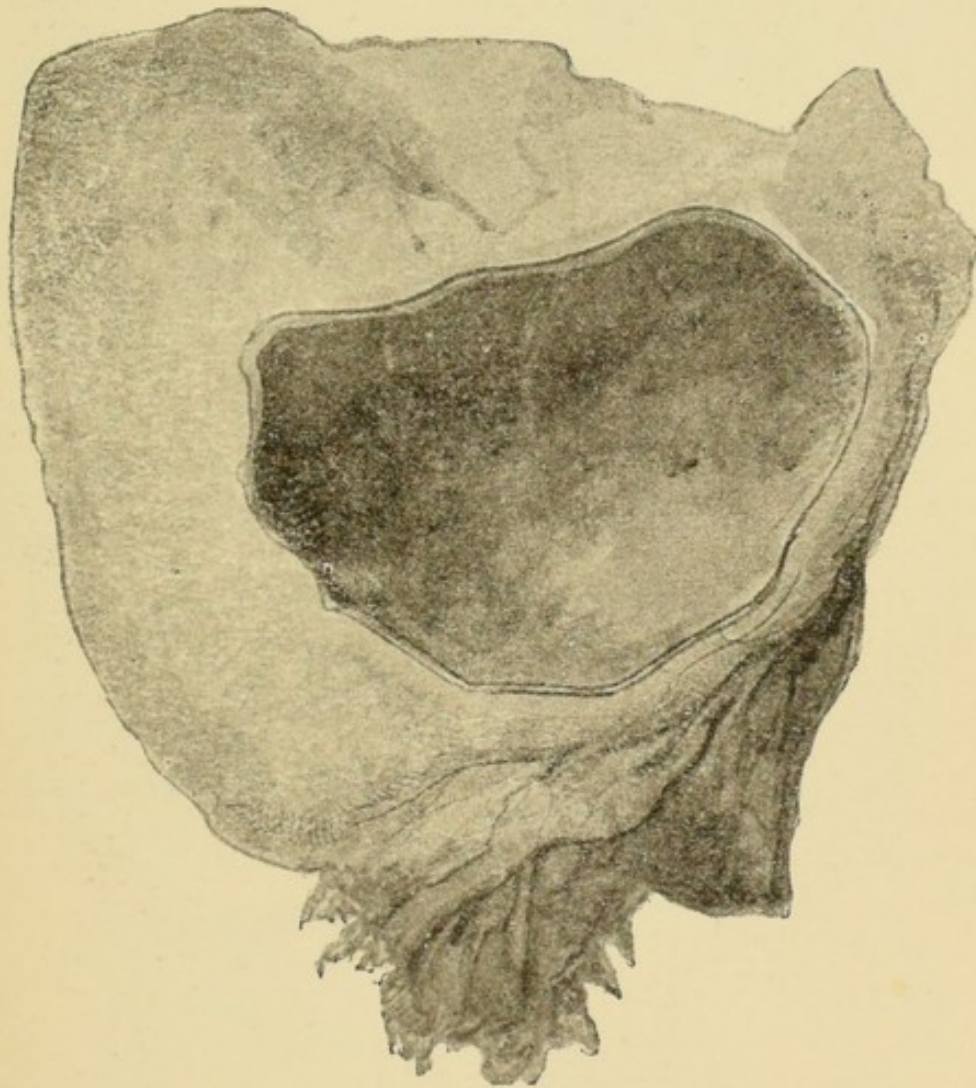
FIG. 56.—Decidual Cast from Uterus in a Case of Ruptured Tubal
Gestation, with Window cut to show Interior (Cullingworth).

abortion where the blood is often bright in colour, is apt
to come in gushes and may be profuse. The midwife
may be able to assist the doctor in the diagnosis of a
case of this kind by noting these points; (3) passage of
uterine decidua. This is a certain sign. When floated
out on water the membrane shows no chorionic villi or
fœtal membranes as would be the case in a uterine abor-
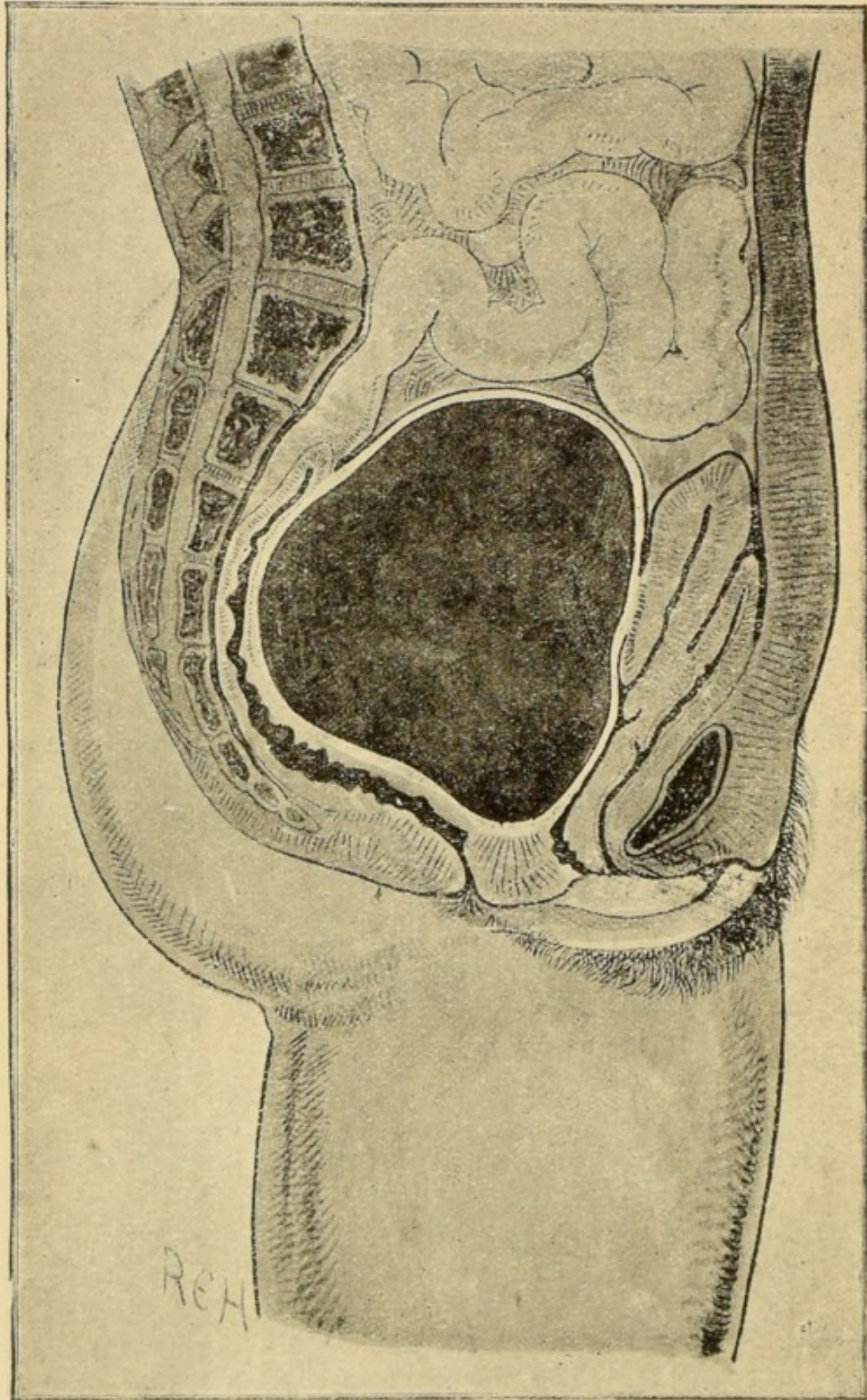
FIG. 57.—Pelvic Hæmatocele (Cullingworth).

tion. In a suspicious case, then, of ectopic gestation this must always be carefully watched for.

On examining bimanually a patient suffering from an early tubal pregnancy, the change in the size of the uterus is noted; and lying as a rule to one or other side of the organ, but separated from it, is discovered a swelling which is usually soft, elastic and tender. At this stage the patient will be kept under observation and the swelling will be found to enlarge and come to lie more behind the uterus. The symptoms produced when a tubal pregnancy ruptures are, sudden and severe abdominal pain, often accompanied by vomiting and a rise of temperature, intense collapse, great pallor and, when the rupture is intra-peritoneal, rapid loss of consciousness and death in a few hours unless the hæmorrhage be stopped. The abdomen is generally found to be distended, and is very tender to the touch. Generally, rupture and the consequent hæmorrhage occur between the fourth and the eighth weeks. The patient often recovers from the first hæmorrhage if it has not been very profuse and then other attacks usually follow at short intervals; especially is this the case when the blood comes from the mouth of the tube. Fig. 57 shows a pelvic hæmatocele which has filled the pelvic cavity, pushing forwards the uterus and rising up into the abdomen.

The treatment adopted in a case of tubal pregnancy as soon as it is diagnosed is, with rare exceptions, to open the abdomen as soon as possible. In those cases where the abdomen is opened before rupture has occurred, the tube and its contained embryo is removed. When the tube has ruptured, the bleeding points are secured and the ruptured tube is removed. In cases of severe hæmorrhage every minute may be of value and the doctor's assistants must keep their heads and be ready to act quickly. It is beyond our scope to enter further into the details of the treatment of ectopic pregnancy.

If the midwife is called to a woman who presents all the symptoms of abdominal hæmorrhage she will of course send for the doctor at once, and if his coming is delayed she should apply an ice-bag or cold water cloths to the abdomen; she may, too, without disturbing the patient's position, give an enema of saline solution, injecting from

one to two pints of warm water containing two tea-spoonfuls of salt to the pint.   Until an operation can be performed recourse is had to morphia ; one-quarter to one-third of a grain is injected under the skin.   It may be advisable, in urgent cases, for the midwife to do this before the doctor arrives (see Treatment of Uterine Hæmorrhage for other points in the management of cases of hæmor-rhage).

CHAPTER IX.

VARIOUS INTERCURRENT DISEASES AND DISORDERS AFFECTING THE SYSTEMS OF THE BODY DURING PREGNANCY.

IT must be borne in mind that certain of the intercurrent diseases and disorders which may be met with in the pregnant woman are nothing more than an exaggeration of the various symptoms encountered in a natural pregnancy, whereas others are of much more serious import and are quite abnormal. It would be out of place in such a work as this to discuss at all fully these affections; we shall in some instances do no more than mention them. These intercurrent diseases and disorders may be conveniently classified according to the part of the body affected. Thus they may be referable to :—

A. The digestive tract.
B. The blood.
C. The heart and blood-vessels.
D. The lungs.
E. The urinary organs.
F. The nervous system.
G. The constitution as a whole.

Lastly, we must include (H) the various acute infectious diseases.

A. *The Digestive Tract.*—The "longings" of pregnancy may cease to be natural symptoms and be exaggerated into a desire to eat all kinds of unnatural things, such as chalk, coal, etc. So long as an article of food is not absolutely hurtful little notice need be paid to such a symptom, but care must be taken that the woman does herself no injury. There may be an entire distaste for food (anorexia), and the various symptoms which we are accustomed to associate with "indigestion" may be present; especially would we mention heartburn, a very common symptom. When

the doctor is consulted he will prescribe the appropriate drug or drugs for each individual case and he will also regulate the diet. The midwife, however, may, in the milder cases, do much to give relief by advising a light and wholesome diet and by giving general advice as to the conduct of pregnancy. As to drugs, when a doctor is not available, she may order, in cases of heartburn, such a simple remedy as compound tincture of cardamoms in half-teaspoonful doses, taken in a little water. She should always dissuade her patient from taking alcohol in the form of spirits unless the doctor has specially ordered it. The pregnant woman is generally better without alcohol.

Turning to the vomiting of pregnancy we shall only refer here to those degrees of sickness which either injure the health or endanger life. In these cases the " morning sickness" may continue all day and the stomach may reject everything, even a little water. It is obvious that such a state of affairs will soon seriously affect the health, leading to great physical weakness, general depression and emaciation; and, if unchecked, the patient may pass into the typhoid state, so called because such a condition most commonly occurs in the course of typhoid fever. In an extreme case, she is apathetic and suffers from delirium and sleeplessness. She lies on her back and tends to slip down into the bed. There is great muscular weakness and the pulse is almost or quite imperceptible. The lips are parched and covered with crusts (sordes) and the tongue is dry and glazed. She tends to pick at the bedclothes and passes her urine and fæces under her. Such a picture as this is, of course, quite exceptional in cases of vomiting during pregnancy, but it is occasionally met with. Vomiting continuing after mid-day should always be regarded as requiring medical treatment. A great many drugs have been recommended for the relief of these severe forms of morning sickness, but no good purpose would be served in such a work as this in discussing the treatment by drugs. Sometimes no drug will check the vomiting, and even such a drastic measure as the procuring of abortion may be called for, but the doctor will very rarely have to resort to this. The patient must be kept as cheerful and bright as possible, it being

remembered that this condition has its origin in the nervous system. It may be necessary to partially digest the food before it is given or to rest the stomach entirely by feeding the patient by the bowel. This leads us to speak of artificial digestion and nutrient enemata. The pancreatic fluid gives more satisfactory results than the gastric juice in preparing artificially digested food, inasmuch as its action on the food substances is more widespread. Not only this, but food thus prepared is more palatable when the pancreatic juice is used. This fluid [1] is usually obtained from the pig, but other animals may be used to procure it. To peptonise milk add to one pint a tablespoonful of the pancreatic fluid and fifteen grains of bicarbonate of soda. Heat to 100° F. and allow it to remain for two hours. Then boil for a few minutes to prevent further digestion. The milk should be diluted with a little water before adding the pancreatic fluid to obviate the tendency to curdling. Gruel, beef-tea, soups and jellies may be peptonised on similar lines, as are also the various nutrient enemata. These should not be of a greater amount than six ounces. The rectum must be first washed out with a solution containing a teaspoonful of salt to a pint of hot water and the nutrient fluid is then injected slowly at the body temperature and as high up as possible, the patient lying on the left side with the knees well drawn up. This is repeated every six to eight hours. It cannot as a rule be continued for a longer period than ten days.

The teeth are very apt to give trouble during pregnancy, owing to the tendency of the saliva to be hyperacid, and a dentist should therefore be consulted, to arrest any dental caries.

Constipation is commonly met with; it is largely due to the pressure of the growing uterus on the rectum, thus interfering with the passage of the fæces. The bowels must be regulated by dieting and by the use of one of the numerous aperients and a daily evacuation should be obtained. Especially at the close of pregnancy is this

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[1] Fairchild's digestive preparations are also much used now, especially that known as "zymine," which is a peptonising powder prepared from the pancreas. It is put up in small tubes.

necessary so that labour may not be impeded. Cascara is a useful remedy in doses of twenty to sixty drops of the liquid extract. The fluid cascara aromatic of Parke Davis is a more agreeable preparation, but larger doses are required. It may be necessary to resort to aperient enemata. Half a pint of hot water taken at bedtime often does good.

Diarrhœa usually yields easily to ordinary treatment; sometimes it gives more trouble and it may very rarely cause abortion. Unless it stops within twenty-four hours it should be reported to the doctor.

B. *The Blood.*—In a natural pregnancy the amount of blood in the body is increased, but this increase affects the water of the blood, while the red corpuscles, the carriers of oxygen to the tissues, are diminished in number. These changes may be exaggerated, leading to anæmia. Most of us are familiar with the pallor and colourlessness of the face presented by a patient suffering from anæmia. As a rule, palpitation, shortness of breath on slight exertion, loss of strength, headache, dizziness and constipation are present in greater or less degree. There is a specially severe form of anæmia, known as pernicious anæmia, which may attack the pregnant woman. This is generally a fatal disease and, unlike ordinary anæmia, does not yield to treatment by iron. It is found chiefly in multiparæ, especially those who have had a rapid succession of pregnancies. The management of ordinary anæmia includes rest, generally in bed, a generous and easily digested diet, plenty of fresh air and sunlight, moderate exercise and the regulation of the bowels. Iron in one of its many forms is by far the most valuable remedy we possess.

C. *The Heart and Blood-vessels.*—Pregnancy is undoubtedly a test as to the state of the heart. The organ increases somewhat in size during pregnancy, especially the left ventricle; we say the heart hypertrophies. We can understand therefore that this increase in size may have a serious effect on a heart which is already diseased. But heart disease may develop for the first time in pregnancy. When symptoms such as extreme shortness of breath (dyspnœa), palpitation, pain over the heart and swelling of the legs occur in pregnancy a doctor must be consulted. If he finds serious heart disease he may have to consider

the propriety of terminating the pregnancy. Short of this, however, he will keep the patient under close observation, attending to diet, limiting or forbidding exercise. The clothing should be specially warm, flannel being worn next the skin. All excitement must be prevented. As to drugs heart tonics such as digitalis, strophanthus, strychnine are often used. Morphia is often ordered to relieve pain and procure sleep. So many cases of valvular disease of the heart are due to rheumatic fever that a woman who has had rheumatic fever should always have her heart examined when she becomes pregnant.

The veins in certain parts of the body may become enlarged and sometimes also inflamed. Veins which are irregularly enlarged are known as varicose. Those veins which are specially liable to become varicose from their position are those of the rectum (which gives rise to the affection called "piles" or hæmorrhoids) and of the lower limbs. Any condition which impedes the return of blood in the veins towards the heart, such as pressure on the veins above, will tend to produce this condition. In pregnancy the pressure is exercised on the veins at the brim of the pelvis, and it follows that the greater the pressure on the large veins in the pelvis as in twin pregnancy, for example, the greater is the liability to varicosity of the veins of the lower limbs. Long standing, too, predisposes to it. The left leg is more commonly affected than the right. The appearance presented by varicose veins in the leg is that of an irregular knotted cord or tangled bluish mass varying in size according to the degree of varicosity. The skin over such a mass may be the seat of eczema from the constant irritation or it may give way, when a varicose ulcer results. Occasionally the vein or veins may burst, producing venous hæmorrhage. Generally a dull aching pain is complained of after standing or it may be merely a feeling of fatigue. The management is directed to a relief of pressure. Long standing must be given up, rest in bed may be necessary. No garters should be worn and the clothing should be loose and easy. The general health is to be attended to and constipation avoided or, when present, removed. Some form of support is necessary, such as an elastic stocking or flannel bandage. In the case of bleeding

from a varicose vein tie something, such as a clean handkerchief, tightly round the limb below the ruptured vein and at once call in a doctor.

D. *The Lungs*.—Symptoms such as cough and shortness of breath are commonly met with in pregnancy; in fact the latter is seldom absent in the later months. It is nearly always due to pressure exercised by the growing uterus.

Pneumonia is always a grave disease, but especially is it serious when occurring in pregnancy, both for the mother and child.

Phthisis is not usually affected in its course by pregnancy, but a phthisical patient is not apt to conceive. Abortion or premature labour may take place and in many cases the children are still-born.

E. *The Urinary Organs*.—The most important symptom which we have here to consider is albuminuria, that is to say, the occurrence of albumin in the urine. We have referred to the importance of the urine being examined during pregnancy as a routine practice. This does not come within the scope of the midwife, but she will learn all that is necessary for her to know, as to the collecting and the examining of the urine, from the author's little book dealing with this subject. Albuminuria is, of course, an important symptom of inflammation of the kidneys (nephritis or Bright's disease), but it may and often does occur in pregnancy apart altogether from kidney disease. It is more apt to occur in first pregnancies and in cases of excessive enlargement of the uterus as in multiple pregnancy and hydramnios. It occurs in about 5 per cent. of all pregnancies and must always be regarded as an abnormality. Albuminuria is due to the retention in the blood of poisonous materials derived both from the mother and the fœtus, which the kidneys, owing to the increased strain put upon them, are unable to remove. It may cease after pregnancy or it may be the starting-point of kidney mischief. Again, it may recur in successive pregnancies, the urine being free from it in the intervals. It is found in by far the greater number of cases during the latter half of pregnancy. Its presence must be first detected by analysis before a diagnosis can be made and then

suitable treatment may be employed before further symptoms, such as headache, swelling (œdema) of the lower limbs and face, set in. The quantity of urine passed in the twenty-four hours should be collected and measured and reported on to the doctor.

In collecting samples of the urine for examination care must be taken to exclude any leucorrhœal discharge. Where such is present a vaginal douche should first be employed. The outlook in a case of albuminuria is worse when the albumin occurs early in pregnancy and when it is constantly present and in large amount. It is a not uncommon cause of fœtal death and premature labour. Suffice it to say that albuminuria in pregnancy must always be regarded with some degree of anxiety, especially if treatment has little or no effect in removing it.

The relation between albuminuria and certain convulsive seizures which may attack the pregnant or puerperal woman or complicate labour we shall refer to when we have to speak of eclampsia.

The management of a case of albuminuria manifestly depends on the amount of albumin present and the stage of the pregnancy. The diet will consist entirely or largely of milk. The kidneys, the skin and the bowels are stimulated to act freely in order to rid the system of the poison circulating in the blood.

Plenty of fluid drinks, and the use of drugs which have a special action on the kidneys (diuretics) promote the flow of urine. Warm and hot-air baths favour the action of the skin, and saline aperients, such as Epsom salts, cause a free action of the bowels. Especial care should be taken to avoid taking cold and the patient should be clothed in flannel. The midwife is referred to the account of eclampsia (see p. 269) for a fuller reference to this subject. The commonest cause of retention of urine in the early months is backward displacement of the pregnant uterus which we shall discuss in the next chapter (see p. 109).

Inability to retain the urine (incontinence) and irritability of the bladder, showing itself by an increased frequency of micturition, may occur at any time. The latter is especially liable to happen early in pregnancy, due to

the uterus pressing on the bladder before it has risen up out of the pelvis.

F. *The Nervous System.*—We cannot refer to the various nervous symptoms and disorders which may affect the pregnant woman. We may meet with head-ache, neuralgia, sleeplessness, convulsions (see Eclampsia), paralysis and mental disorders of various kinds. There is only one affection about which we shall say a few words, namely, St. Vitus's Dance or chorea. This disease is met with now and again and forms a serious complica-tion. It is especially liable to occur in first pregnancies, generally between the third and sixth months. In many cases the patient has had chorea in childhood or shortly before pregnancy, but not invariably so. Chorea, as a rule, affects only one side of the body, but when it occurs in pregnancy usually both sides are affected. Abortion generally takes place and if premature labour occurs the child is usually born dead. The mortality to the mother from statistics collected has been shown to be one death in every three cases. Chorea is characterised by involuntary, jerky, violent movements of the parts affected which increase in severity. They cease during sleep and return when the patient wakes.

The most valuable drugs we possess in the treatment of chorea are arsenic, bromide of potassium and iron. If the movements become very severe and exhaust the patient it may be necessary to induce abortion or prema-ture labour.

G. *The Constitution as a whole.*—As examples of the constitutional diseases which may affect the pregnant woman we may mention rheumatism and syphilis. It is only the latter to which we shall refer.

The pregnant woman may acquire syphilis or she may be affected with the disease prior to pregnancy. It is a fruitful cause of repeated abortion, and as a rule the abor-tion occurs later in each pregnancy until the patient may carry her child to term. As soon as syphilis is discovered the doctor will at once commence to treat it vigorously and prolong the treatment over the course of pregnancy, not only to check the progress of the disease, but to mini-mise the risk of abortion and to save the child from infec-tion. If the woman carry her child to term the latter

may remain free from infection and be born healthy if it is not inoculated with the disease in its transit through the genital canal.   The child may be infected subsequent to its birth or it may be apparently healthy at birth and subsequently develop the disease.   Mercury in one of its various form is the only drug which is of any value in the first and second stages of syphilis.   It must be remembered that syphilis in its second stage is contagious, inasmuch as it may be conveyed from one to another, for example, by kissing.   In front of patients syphilis is always spoken of as " specific disease ".

H. The various acute infectious diseases include all those affections with which we are familiar, such as scarlet fever, measles, small-pox, cholera.   The more serious of these diseases, such as small-pox and cholera, generally result in abortion taking place.   In the case of scarlet fever and measles it is only when a severe attack occurs that abortion is likely to occur.

CHAPTER X.

DISEASES OF THE GENERATIVE ORGANS, INCLUDING DISPLACEMENTS OF THE UTERUS DURING PREG-NANCY.

WE shall now very briefly allude to certain disorders and diseases which may affect the generative organs during pregnancy.

Pruritus or intense itching of the vulva and adjoining parts is sometimes complained of; it may, however, be part of a general itching affecting the whole of the body. The doctor will examine the urine for sugar and will also see to the condition of the vagina and cervix. The itching may be associated with or be caused by a white discharge (leucorrhœa). This discharge is quite a common occurrence in pregnancy, but it should not be at all copious. If it is then it must be controlled by clean-liness. Douching with hot water night and morning will often relieve both of these disorders. Borax or sub-acetate of lead solution may be ordered to be used in the douche. Leucorrhœa also requires tonic treatment in the form of such medicines as quinine, iron, nux vomica and general attention to the health.

When the itching is very intense sedative remedies, such as bromide of potassium, will be required to procure sleep. Opium and morphia should not be used.

The discharge of large quantities of clear or turbid fluid from the vagina generally points to decidual in-flammation; rarely is it due to escape of the liquor amnii.

Tumours may attack the generative organs and by their growth may seriously complicate pregnancy. In-cluded under these are fibroid tumours and cancer of the uterus and the ovarian tumours. Such new growths as these, especially fibroid and ovarian tumours, may be

mistaken for pregnancy and *vice versâ* and cause some difficulty in the diagnosis. When such tumours complicate pregnancy abortion may and frequently does take place, but the pregnancy may be completed, when labour is apt to be seriously interfered with, requiring various operative procedures to effect delivery.

We now turn to displacements of the uterus. These may be present before pregnancy occurs. Anteversion of the pregnant uterus in the early months is a normal
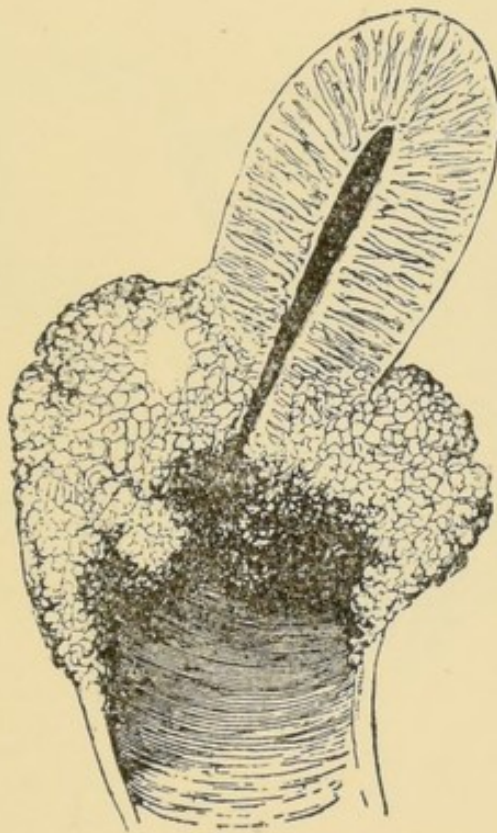
FIG. 58.—Cancer of the Uterus (after Simpson).

condition. This, as we have already said, is apt to cause increased frequency of micturition, with perhaps also some incontinence by pressure of the enlarged fundus on the bladder. In the later months anteversion is due to a laxity of the abdominal walls from a stretching or splitting of the muscle fibres, the result of previous pregnancies. This allows the uterus to fall forwards to a greater or less extent. Such a condition is known as pendulous belly. When this is present at the beginning of labour the force is directed in a wrong direction, the child's head being

pushed against the back wall of the pelvis and delivery is impossible. This is to be remedied by placing the woman on her back and applying a binder to keep the uterus in its proper position. During pregnancy an abdominal belt must be worn to relieve the pressure on and strengthen the muscles in the anterior abdominal wall.

In a primiparous woman, where the abdomen is not lax, but tense and firm, we may have pendulous belly during the last month of pregnancy. This is due to a
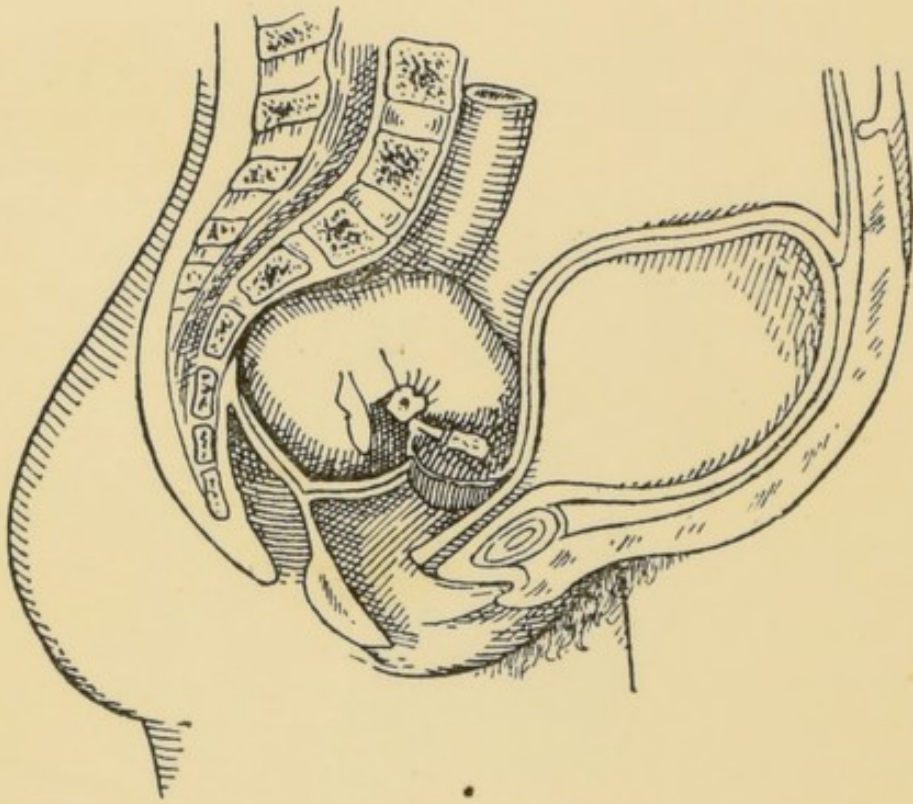
FIG. 59.—Retroversion of the Gravid Uterus (after Croom).

narrowing of the pelvic brim, which does not permit the head to enter the pelvis as it normally does during the last weeks of gestation. The pendulous belly, then, is due, in this case, to an obstruction to the passage of the fœtal head and this is its significance in a primiparous woman at the close of pregnancy.

In retroversion of the uterus, where the fundus is turned backwards to the hollow of the sacrum, pregnancy rarely takes place, but if it does, the uterus may straighten itself and resume its normal position, or it may remain

retroflexed and develop in this position. When retroflexion of the pregnant uterus occurs it may be due to an accident, for example a fall or a blow, or to an overdistended bladder pressing the fundus backwards into the hollow of the sacrum. It is obvious that such a condition as this can only occur while the uterus is a pelvic organ. When the fundus has risen up well out of the pelvis backward displacement becomes impossible. Therefore it does not occur after the first half of pregnancy.
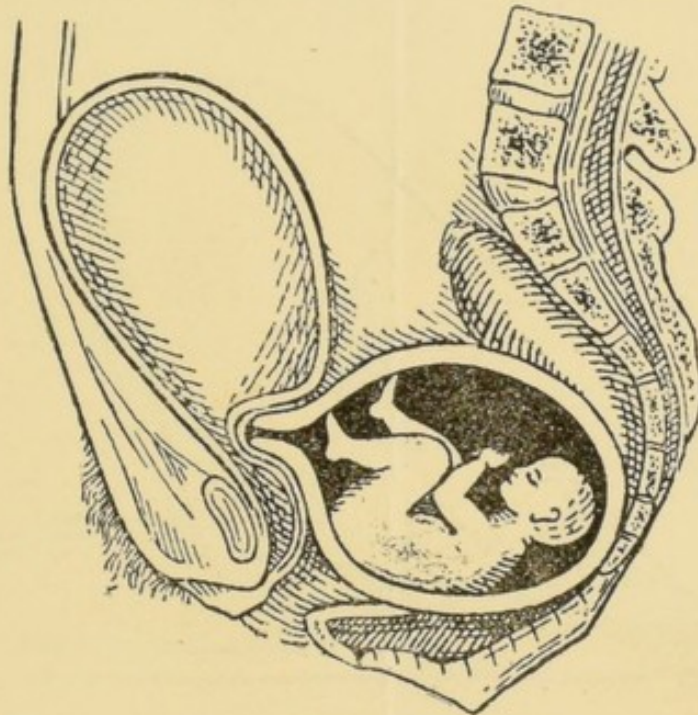
FIG. 60.—Retroversion of the Gravid Uterus showing the Cervix pressing on the Urethra and thus causing Retention of Urine (after Croom).

The symptom which is generally first complained of is disordered micturition; this is due to the cervix being tilted forwards and pressing on the urethra. The anterior vaginal wall is drawn upwards and with it the urethra, so there is a double cause at work in obstructing the flow of urine. What commonly happens, then, is that the bladder becomes exceedingly distended and the patient may complain of frequent micturition; but she does not usually empty her bladder, the urine which is passed being merely the overflow from an overdistended bladder. On the other hand there may be actual retention of urine

which requires immediate relief. Furthermore, a feeling of bearing down is complained of with pain in the abdomen and a constant desire to evacuate the bowels (tenesmus).

If the retroflexion be unrelieved the uterus may right itself, or the organ may become incarcerated in the pelvis, or part of the uterus may remain in the pelvis and part grow upwards into the abdominal cavity.

On examining a patient in this condition about the fourth month an abdominal swelling is found which turns
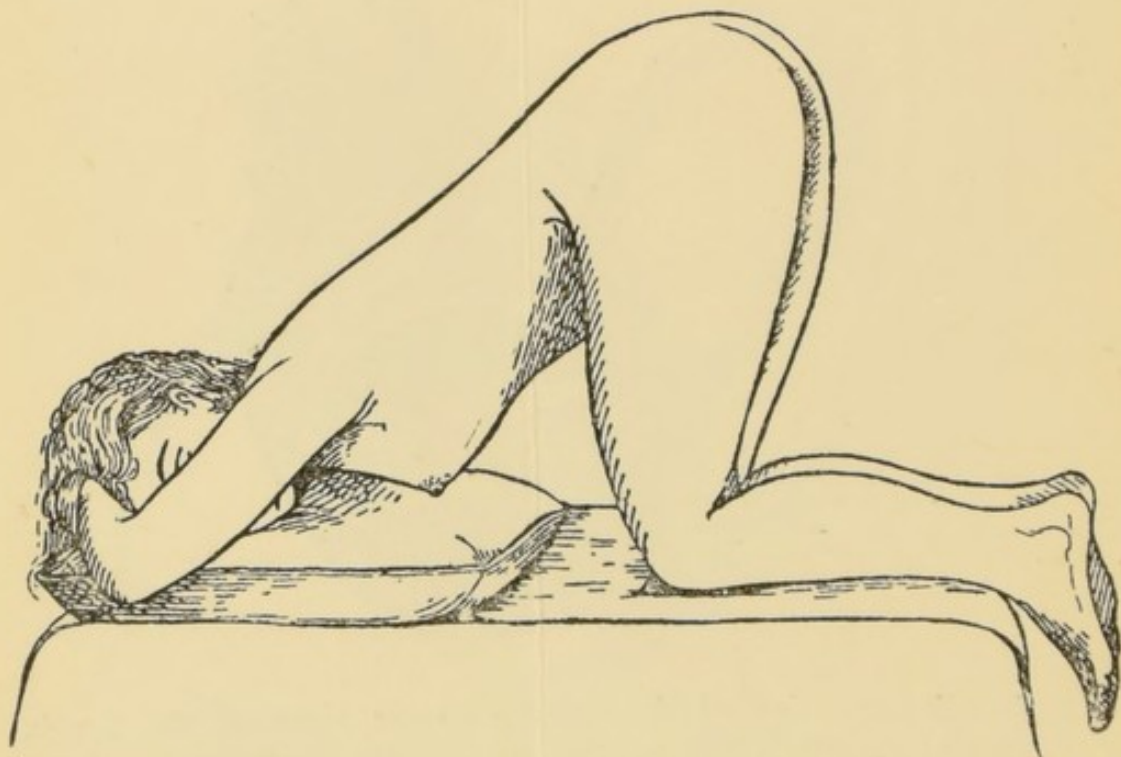
FIG. 61.—Genu-pectoral (Knee-chest) Position.

out to be the overdistended bladder. On vaginal examination the cervix cannot usually be felt and a large swelling is found posteriorly. When a catheter is passed and the urine is drawn off the abdominal swelling disappears. In the early months when retroflexion is found the uterus is replaced in its proper position and kept there by a suitable pessary. When retention of urine is complained of the bladder must of course be emptied. Difficulty in passing the catheter may occur owing to the urethra being drawn upwards. When the bladder and rectum have been emptied an effort is made with two fingers

in the vagina or rectum to push the fundus forwards. If this is unsuccessful when attempted in the left lateral or dorsal position the same manœuvre is tried with the patient in the genu-pectoral or knee-chest position, where the patient kneels with the thighs upright and the head and upper part of the chest resting on the bed or couch.

If, now, reposition cannot be effected the same is attempted under chloroform and, if still unavailing, other manœuvres are carried out. Finally, it may be necessary to procure abortion or to perform abdominal section and get at the uterus from above.

CHAPTER XI.

DISEASES AFFECTING THE CONTENTS OF THE PREG-
NANT UTERUS.

WE shall in the first place refer to a rare disease affecting the chorion. This is known as myxoma of the chorion or hydatid mole. There are two kinds of moles. There may be an effusion of blood round an ovum, the fœtus may be absorbed and the mass expelled; this is a carneous or fleshy mole. The other kind of mole is the hydatid mole, which we are now concerned with. This consists in an increased development of the chorionic villi. It will be remembered that at the beginning of pregnancy the chorion is covered with villi, which in course of time become absorbed at all parts save where the placenta is about to be formed. In this condition instead of the villi becoming absorbed as the placenta develops, they develop at the expense of the placenta and grow all over the ovum. But the disease may only be partial, the chorionic villi being partly absorbed and the placenta nourishing to some extent the fœtus, but this is exceptional. This development may go on to such an extent that the uterus early in pregnancy may be as big as a uterus at term.

The most important sign of this disease is that the enlargement of the abdomen is out of all proportion to the period of menstrual suppression. The ordinary symptoms of pregnancy, such as morning sickness, are more marked than usual. There is usually a blood-stained discharge, and if one of the swollen dropsical villi be passed and be recognised the diagnosis is certain. The uterus has a boggy, doughy feel about it and no fœtus or fœtal movements can be felt.

The treatment of this condition is to set up uterine action and to empty the uterus. This is started by ergot

given by the mouth or injected hypodermically.   The os
is dilated by tents and Barnes's bags; the hand is intro-
duced into the uterus when the os is sufficiently dilated
and the contents removed.   Hæmorrhage is likely to
follow and the uterus must be made to contract by the
use of ergot.   If the bleeding cannot be stopped hot water
at a temperature of not less than 120° F. is injected into
the uterus.   If it is below this temperature it is no use.
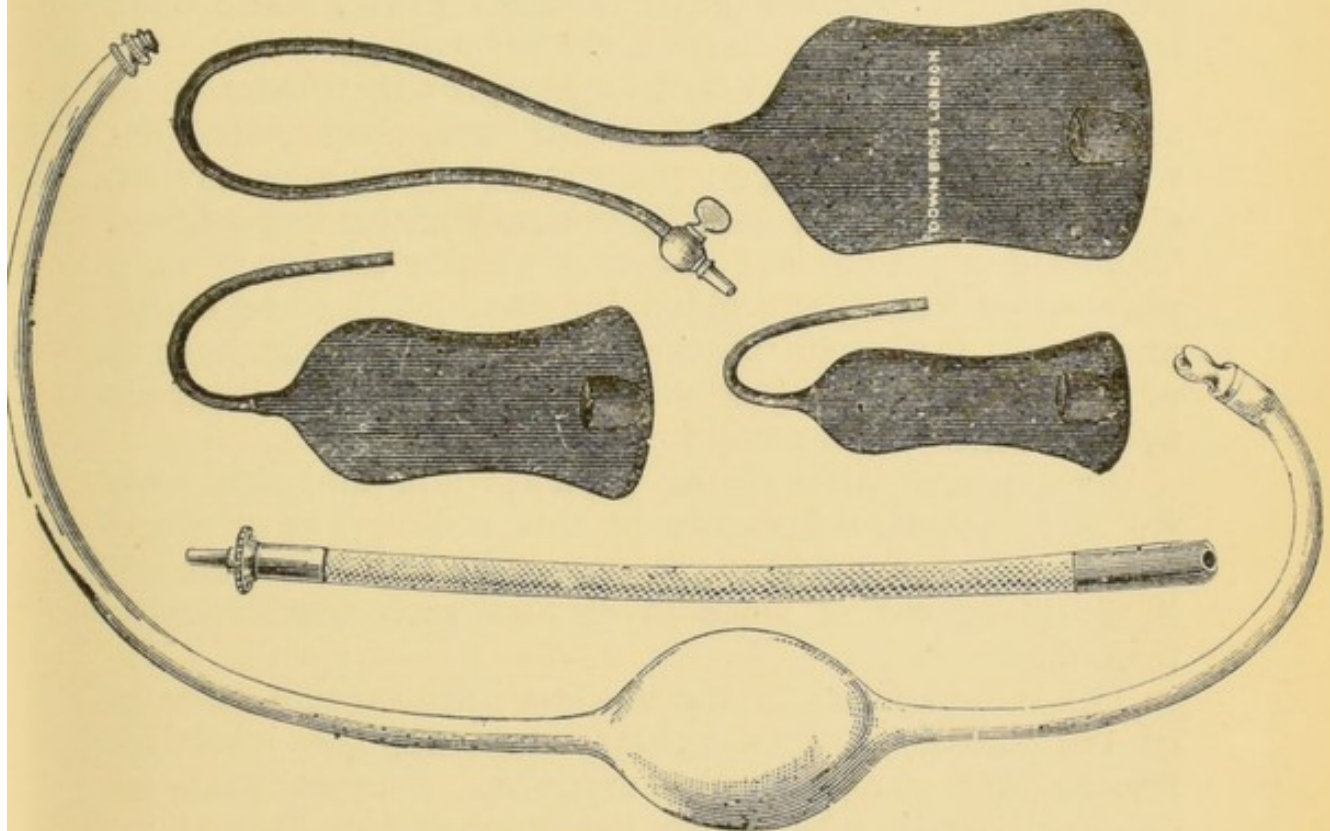
FIG. 62.—Barnes's Bags.

Hydatid mole is fortunately a rare disease.   Preg-
nancy is seldom advanced beyond the fifth or sixth
month before its presence is recognised.

The liquor amnii may be deficient or excessive in
amount.   When the liquor amnii is in excess—a condition
known as hydramnios—the uterus becomes globular
instead of ovoid and, as in hydatid mole, increases in
size out of proportion to the period of pregnancy.   It is
more commonly found in multiparæ and seldom develops
before the fifth month.   The increased uterine pressure
gives rise to feelings of discomfort and distress, the

vomiting often being severe and leading to weakness and emaciation. There is swelling of the lower limbs from the great abdominal pressure and for the same reason breathlessness and palpitation are complained of. There are various conditions from which hydramnios has to be differentiated, such as twins, hydatid mole, fluid lying free in the peritoneal cavity (ascites), ovarian tumour. The outlook for the mother is usually good, for the foetus it is bad, nearly one-fourth being born dead from suffocation, premature birth or other cause. The child is often malformed or imperfectly developed.

In treating a case of hydramnios, if only moderate in amount, a suitable binder or belt may give relief, but when the fluid is in large amount it will be necessary to evacuate it. This is done by puncturing the membranes. The fluid is not allowed to escape quickly or else fainting may occur from the sudden lowering of the abdominal pressure. Antiseptic precautions must be taken here as in all obstetric manipulations. If possible, no interference is undertaken till the child is viable.

Certain anomalies of the placenta and umbilical cord we have mentioned earlier in this book. The placenta may be affected by new growths or by inflammation, but it would be out of place to discuss such conditions as these here.

The same applies to the various intra-uterine diseases of the foetus, such as rickets, tumours, the infectious fevers, and various inflammations. Neither need we concern ourselves here with the numerous malformations of the foetus and monstrosities about which much has of late years been written.

Hæmorrhage during pregnancy may be due to (1) persistence of menstrual periods; (2) abortion; (3) disease of the genital canal, for example fibroid tumour of or cancer of the uterus; (4) placenta prævia; (5) accidental hæmorrhage. The last two named we shall describe in that part of the book dealing with complex labours.

PART IV.

NATURAL LABOUR (EUTOCIA).

CHAPTER XII.

THE STAGES AND THE PHENOMENA OF LABOUR.

BEFORE discussing the subject of labour we must understand what we mean by this term. Labour is the process by which the child is expelled from the womb and born. It is made up of three elements or factors and its successful accomplishment depends on the harmonious action of these factors. They are the powers which drive the child through the genital canal; the passages through which the child passes; and the products of labour, namely, the liquor amnii, the fœtus and the secundines or " afterbirth ". How these three factors are combined to act together harmoniously we shall see in the succeeding chapter, when we speak of the mechanism of labour.

A natural labour is usually defined as one in which the vertex of the head presents and which is completed by natural efforts within twenty-four hours. We are only concerned now with natural labour, the various forms of unnatural labour will be described in Part V. of this book.

It is customary to divide labour into various stages. At one time five and even six stages were described, but now a division into three stages is adopted. The first stage commences with the preliminary or premonitory symptoms, or, as they are sometimes termed, the prodromata, and ends with the complete dilatation of the cervix. This is the stage of dilatation. The second stage, the stage of expulsion, commences with the full dilatation

of the cervix and ends with the birth of the child. The third stage, that of delivery, is from the expulsion of the child to the complete birth of the placenta and membranes.

Each of these stages has its own individual phenomena which we shall consider in order. These phenomena may be tabulated as follows :—

First Stage
1. The Prodromata.
2. Uterine contractions.
3. Gradual opening of the os uteri.
4. Formation of bag of membranes.
5. Rupture of bag of membranes.
6. Full dilatation of the cervix.

Second Stage
7. Descent of the head into the pelvis.
8. Formation of the perineal tumour.
9. Full dilatation of the external parts.
10. Expulsion of the head and body of the child.

Third Stage
11. Detachment of the placenta from the uterus.
12. Expulsion of placenta and membranes.

1. *The Prodromata.*—These are generally but not always present. They cannot strictly be regarded as the commencement of labour, since they may be present a day or more before labour begins. They consist of preparatory changes in the passages. As the uterus sinks down into the pelvis towards the close of pregnancy there is more pressure on the rectum and bladder and the other contents of the pelvis, while at the same time there is a greater freedom of breathing, owing to a relaxing of the pressure on the diaphragm. With the sinking of the uterus walking becomes more difficult.

Lastly, there is an increased secretion in the vagina and vulva, manifesting itself as a discharge of mucus mixed with blood. This is called a " show " or " the shows," and is a sign, more or less reliable, that labour is about to commence.

2. *Uterine Contractions.*—True labour commences with the uterine contractions or " pains ". These terms are not, strictly speaking, interchangeable, since the contractions may occasionally be painless, but they are commonly used as synonymous. The early contractions are frequently painless. The pains which are complained of may be false and not true labour pains, and

so at this early stage it becomes necessary to distinguish the one from the other.

(1) *Date of Occurrence.*—True labour pains come on at or about the time when the confinement is expected, false pains may occur at any time. If the patient has not arrived at full term the pains are probably false.

(2) *Character.*—Labour pains occur with regularity, the intervals between the pains gradually lessen and, as labour progresses, they become stronger and more intense. False pains are irregular and they may begin intensely, recur rapidly and then gradually become weaker and return at longer intervals until they cease.

(3) *Seat.*—True pains begin in the lower part of the back and pass round the abdomen towards the pubes. False pains more often start in the abdomen over the bladder or higher up and are not always felt at the same spot.

(4) *Cause.*—True pains are due to the efforts of the uterus to expel its contents. False pains may be due to a variety of causes, indigestion, overloaded bowel, flatulence, colic, over-distended bladder, or simply over-exertion, as may occur after a hard day's work or long standing. Usually some explanation is forthcoming.

(5) *Effect.*—True pains affect the whole uterine muscle, the entire uterus contracts with each pain, as can be felt when the hand is applied to the uterus. On vaginal examination the cervical canal is found to be gradually opening up, and the membranes, if they can be felt, become tense and bulge with the advent of each pain. False pains do not produce any true uterine contractions, and if the membranes can be felt through the os they are flaccid and do not bulge.

Attention to these points will rarely fail to distinguish between false and true pains; and it can easily be understood how important it is to make this distinction. If we are dealing with false pains it is necessary to find out and remove the cause, if possible. It is advisable to keep the patient in bed, and often a sedative drug, such as bromide of potassium, chloral or opium is required, but the midwife will do well to avoid giving drugs except by doctor's order. One thing she may do with advantage, and that is to clear out the bowels when constipated,

as they usually are, by a simple enema or a glycerine suppository. Care must be taken, too, that a distended bladder does not pass unrelieved.

We have said that true pains recur with regularity. They are intermittent, and thus rest is afforded to the mother, pressure on the mother's viscera and on the fœtus is relieved and placental breathing and circulation are resumed. We may meet with cases where the pains are continuous or, as we say, tonic, there being no periods of intermission, and here the infant is often born dead, as the placental respiration and circulation have been interfered with.

Early in labour the pains are slight and are scarcely felt. When the os commences to dilate they become more severe and have a cutting and grinding character. During the second stage the pains produce a tearing sensation.

The pains are at first involuntary in character, being due simply to the uterine contractions, but as labour advances the auxiliary muscles of the chest and abdomen begin to act and now voluntary efforts are added to the involuntary.

3. *Gradual Opening of the Os Uteri.*—The os uteri is early in labour felt high up in the pelvis and pointing backwards to the hollow of the sacrum. It should be soft, moist, fairly thick, not specially tender, and cool to the touch. In primiparæ the margin is smooth and regular; in multiparæ it is generally irregular in outline and fissured, some parts being thicker and some thinner, the result of laceration in previous pregnancies. As labour commences the ring of muscular fibres which surrounds the internal os begins to relax and thus the os uteri begins to dilate. This part of the dilatation is the slowest; when the os has reached the size of a florin the expansion goes on more rapidly. Moisture and softness of the os promote rapid dilatation.

4. *Formation of Bag of Membranes.*—This takes place while the os dilates and the cervical canal expands, the uterus and cervix thus coming to form one cavity. The bag consists of the chorion and the amnion, and also of the remains of the decidua, which is peeled off from the lower end of the uterus. The liquor amnii which is in

front of the child's head becomes shut off from the rest of the amniotic fluid and forms the "forewaters". With each pain the bag of membranes presses against and protrudes through the expanding os uteri, and, acting as a fluid wedge, plays an important part in the dilatation of the os. When the bag is absent for any reason during labour the expansion of the cervix is much retarded and the labour is much slower; a "dry" labour is always a tedious labour. Instead of feeling the globular tense bag of membranes protruding through the os, the bag may hang through the os like the finger of a glove. This is generally found in breech presentations where the bag is not supported by the firm, rounded fœtal head.

5. *Rupture of Bag of Membranes.*—This is the next phenomenon. The burst takes place in a normal labour coincidently with or shortly before the full dilatation of the os and it occurs at the height of a pain. But there are one or two fallacies to guard against. Water may form between the amnion and the chorion, and this may come away, leaving the amnion intact. Again, it sometimes happens that a woman believes labour is in progress because she finds the "waters have burst" when a quantity of fluid has been discharged from the vagina as a result of decidual inflammation, there being no signs of uterine activity. This not at all uncommonly happens some weeks before labour. But the bag of membranes may rupture early in labour or just prior to labour, when, as we have said, we have to deal with a "dry" and therefore a tedious confinement.

Now and then the fœtus may be expelled, covered with the membranes, which have not ruptured. This is more commonly seen in premature labours. The amnion may be intact and pass through the weaker membrane, the chorion; in fact, this is what more often happens when the child is born in its membranes. When such an event takes place special virtue is by some attached to the membrane, which is commonly known as a caul. It is supposed to be lucky. When we come to speak of the management of labour we shall insist on the importance of preserving the bag of membranes as long as possible. This is necessary if the first stage is to be satisfactory; for the amniotic fluid exerts its pressure equally in all

directions, and adapts itself to the gradually increasing os in a way that the head or any hard substance cannot do, and thereby the dilatation of the os takes place more quickly and more evenly, and the duration of the first stage is much shorter than it would otherwise be. This will be referred to when tedious labour is considered.

What occasions the burst'ng of the bag of membranes? As the uterus contracts the pressure of the liquor amnii on the uterine walls is increased, but as the dilated os uteri is the weakest point against which this pressure is exerted, since the membranes are not supported here by the uterine wall, it follows that rupture occurs at this site.

6. *Full Dilatation of the Cervix.*—This event completes the first stage and the uterus and vagina now form practically one cavity. The child's head passes through the os uteri which is drawn up together with the front wall of the vagina and the bladder out of harm's way.

7. *Descent of the Head into the Pelvis.*—Now the voluntary muscles of the abdominal wall assist the involuntary power of the uterus in driving the head downwards. The uterus contracts more strongly and bearing-down efforts are made as the head descends. The pains now alter in character and produce a tearing or dislocating sensation.

8. *Formation of the Perineal Tumour.*—The head has now reached the pelvic floor and the perineum is stretched from before backwards and from side to side. The anus is drawn forwards and the anterior wall of the rectum is exposed. This stretching of the perineum and opening out of the vaginal orifice continue until the next event is reached, namely,

9. *Full Dilatation of the External Parts.*—With each pain the crown of the head is pushed into the vaginal orifice and kept there till the contraction ceases, when it is again drawn back by the elasticity of the structures. This relieves the soft parts from pressure and is a good sign. So long as the head advances and recedes with each contraction and relaxation there is no danger and nature may be left to do her work unaided.

10. *Expulsion of the Head and Body of the Child.*—Advance of the head takes place with each pain until it is actually born, it being generally fixed for the last few

seconds immediately preceding birth. The head passes forwards between the patient's thighs and a slight interval of rest follows before the shoulders and trunk follow. This concludes the second stage.

11. *Detachment of the Placenta from the Uterus.*—Usually this takes place after the child is born, but it may occur during birth. It is produced by the contractions of the uterus which squeeze the placenta from off its wall. Further uterine contractions drive it through the os into the vagina. It passes down folded upon itself, with its uterine surface usually outwards, when it is separated naturally.

12. *Expulsion of Placenta and Membranes.*—When the placenta reaches the vagina it becomes a foreign body and the abdominal muscles are brought into use to expel it. Labour is now completed and the patient enters on the puerperium.

Parturition is longer in primiparæ than in multiparæ, in the proportion of twenty to twelve hours. The first stage is by far the longest, being generally considered to be three to four times as long as the second stage. Suppose a first stage to be on an average seven and a half hours, the second would last about two and a half. The third stage is very variable, depending usually on the instructions we give to the patient as to bearing down to get rid of the secundines. It may last from ten minutes to an hour, an average being about half an hour. The times given for the average duration of the three stages vary considerably in the different books. One authority, for instance, gives the average duration of the first stage in a multipara as twelve hours and of the second stage as one hour.

CHAPTER XIII.

THE MECHANISM OF LABOUR.

WE are now in a position to study the mechanism of labour. We have said that labour is made up of three elements or factors which must act in harmony one with the other if we are to have a natural labour. We find at each stage these three factors are at work and we mus ;in the first place consider them in detail.

1. *The First Factor, the Powers.*—The chief power is the wall of the uterus, which is made up essentially of muscular fibres specially developed. By the contraction of these muscular fibres the uterus exerts its energy. We have already seen that these contractions take place for the most part in the upper part of the organ (see p. 57). Early in labour there is formed in the lower part of the uterus a ring of muscular tissue which separates the upper contracting or active part of the organ from the lower passive portion—the lower uterine segment—and this ring is known as Bandl's contraction (or retraction) ring. Various obstetricians have tried to measure the force which is exerted by the contracting uterus. Probably it is equivalent to a weight of from fifteen to twenty pounds, that is to say that such a weight as this would be requisite to drive the head through the genital canal apart from the action of the abdominal muscles.

The uterine power is an involuntary one. Under the influence of chloroform the contractions continue, and it has been proved that they may go on even after death has occurred. But it must be remembered that these contractions are also to some extent voluntary; for any fear or emotion may temporarily arrest them. We all know that the doctor's entrance into the lying-in chamber is often quite sufficient to stop the pains. The lesson to be drawn from this fact is obvious.

When the uterus contracts it is drawn together from side to side and becomes lengthened from before backwards; the organ also becomes more erect. The contractions can be easily felt by placing the hand over the uterus and the midwife can easily satisfy herself of this.

The uterus is assisted by the secondary or accessory powers, but not until the completion of the first stage. The accessory powers are the muscles of the abdominal walls and the diaphragm, which act simultaneously with the uterus. This force is a voluntary one, it is under the patient's own control, and the stimulus which puts it into action is found in the entrance of the uterine contents into the pelvis. The nerves in the pelvis are irritated by the presence of a "foreign body" just in the same way as the entrance of fæces into the rectum calls for expulsive efforts to empty the bowel. The patient takes a deep breath and fixes the chest and diaphragm. The abdominal contents are pressed downwards and the pressure is transmitted to the uterus itself.

Lastly, there is a third element, namely, the weight of the contents of the uterus. In the standing or sitting posture the mere weight of the fœtus has some influence in expanding the passages. But we do not depend on this third power.

What is the work which the powers have to do, in other words what resistance has to be overcome? The lower uterine segment and the cervix have first to be dilated, the bag of membranes has to be ruptured, the vagina has to be stretched, and, since this canal is curved, the resistance to be overcome is all the greater. Lastly, the perineum and the vaginal orifice have to be expanded.

At each stage some of this work has to be accomplished. In the first stage the uterus acts unaided; in the second stage the uterus is still the principal power, but it is supplemented by the simultaneous or almost simultaneous action of the abdominal muscles. In the third stage we have both these powers at work, but they are not now acting simultaneously. The placenta is separated and expelled from the uterine cavity by the efforts of the uterus unaided, but when it has been extruded into the cervical canal or into the vagina the uterus ceases to act and the accessory powers are called

upon to complete the work of delivery.   This is the strictly natural state of affairs, but occasionally the uterus may expel the placenta to the vaginal orifice, or, again,
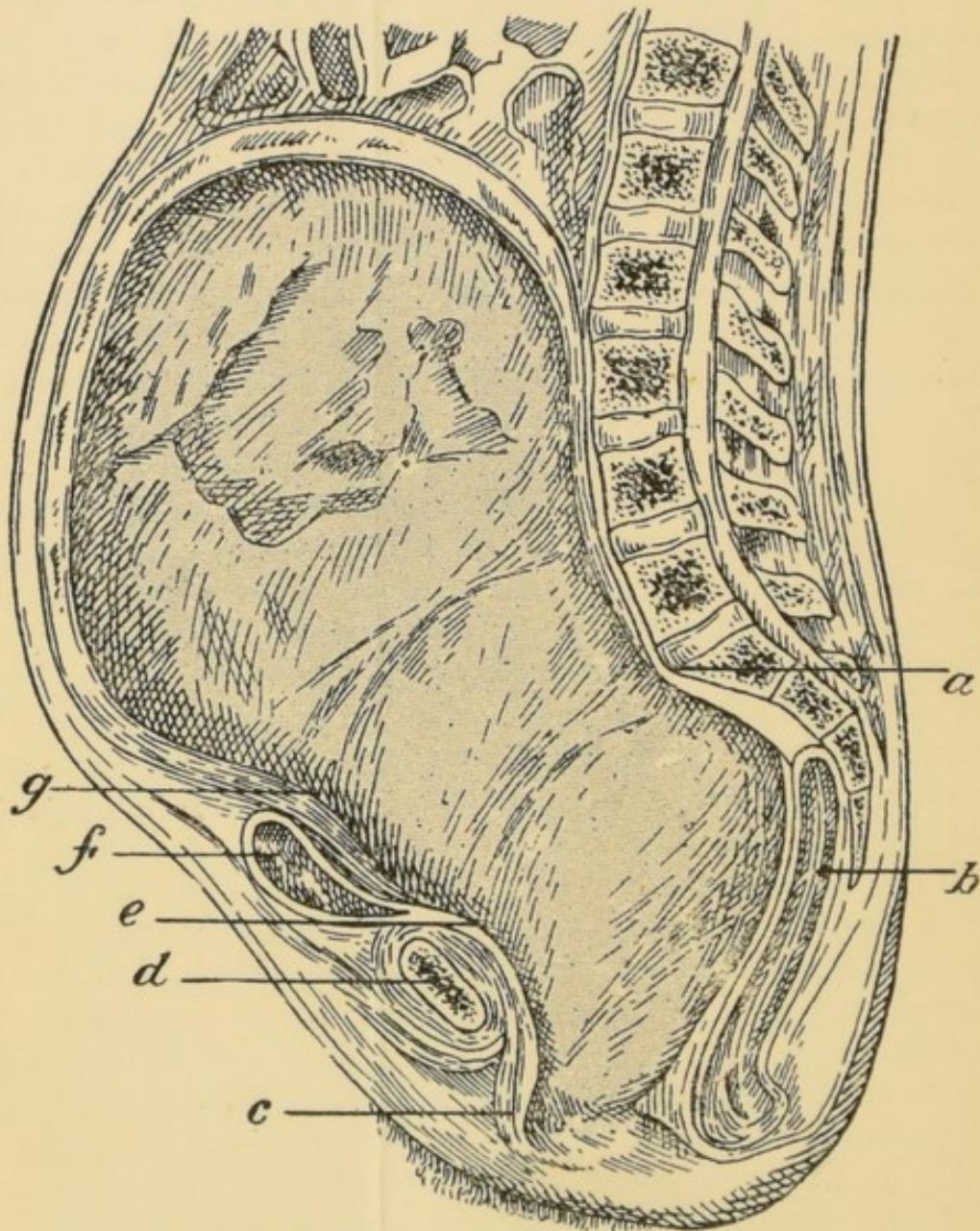
FIG. 63.—The Genital Tract during the Second Stage of Labour. From Chiara's Section (after Simpson).

a, Promontory of sacrum; b, Rectum; c, Vulva; d, Symphysis pubis; e, (?) External os; f, Bladder; g, Retraction ring (Bandl).

the sensibility of the pelvic nerves may be so impaired that the sensations produced by a foreign body lying in the vagina may be in abeyance and the abdominal muscles may not complete the delivery, when we shall require to

tell our patient to make an expulsive effort to expel the after-birth.

2. *The Second Factor of Labour, the Passages or Birth Canal.*—The passages are (*a*) soft and (*b*) hard. The former include the lower uterine segment, the cervix, the vagina and the perineum. The latter consists of the true pelvis. These we have already considered and it will not be necessary to describe them again. In the first stage we are concerned with the lower segment of the uterus and the cervix; in the second stage with the cervix, vagina and vulva, surrounded by the hard passage, the pelvis; and in the third stage with the uterus, cervix and vagina. It must be remembered that the bladder and part of the anterior wall of the vagina are drawn up in the second stage above the symphysis pubis, while the posterior wall of the vagina with the rectum is driven downwards and backwards by the child's head.

The fully developed parturient canal represents a tube, the posterior wall of which is ten inches in length as measured from the promontory of the sacrum to the fourchette; the anterior wall is three inches, the sides of the tube vary from three to ten inches.

3. *The Third Factor of Labour.*—This may be defined as the whole uterine contents together with a layer of the uterine mucous membrane. In the first stage the liquor amnii and the membranes represent the third factor; in the second stage we are concerned with the fœtus, especially the head, and in the third stage we have to do with the placenta, cord and membranes. These have all been described. We have seen that the edges of the bones of the head are able to telescope or override each other to some extent when the head is exposed to pressure and that the upper angle of the occipital bone dips under the adjacent angles of the parietal bones. The frontal bone, too, dips under the parietal bones and the posterior parietal (that is to say the left in the first cranial position) is overridden by the anterior (the right) parietal bone, according to the law that the bone which is least pressed upon is the uppermost one, the posterior wall of the canal being hard and bony.

There is one other phenomenon which results from the pressure to which the fœtal head is subjected during

birth. When the head passes through the pelvis the circulation in the scalp is checked in that part of the head which lies in front of the point where the head is gripped in its downward passage (this point is known as the girdle of contact). Hence the watery part of the blood (serum) is poured out into the loose tissue between the skin and the bone where there is no pressure ; this is known as the caput succedaneum. It forms a soft, boggy swelling and is generally found over the upper and back part of the anterior (right) parietal bone. The longer the labour and the greater the pressure to which the child's head is subjected the more marked is the caput succedaneum. On the other hand, there may be an effusion of blood (not simply serum) not into the loose tissue of the scalp, but between the bone and the unyielding membrane (pericranium) which immediately covers it. This is an abnormal condition. It is known as a cephalhæmatoma (see p. 319). It is confined to one bone, has a distinct ridge or margin round it, is not so diffuse a swelling as is the caput succedaneum, and, unlike the latter, instead of disappearing within a day or two after confinement, increases in size. It disappears in a few weeks and generally requires no treatment. These changes in the bones and in the scalp constitute what we are accustomed to speak of as the moulding of the head, and it can be readily understood that the shape produced by this moulding varies according to the position in which the head passes through the pelvis (see Figs. 27-32).

It now remains to discuss the relation of the three factors of labour one to another.

The reader who is conversant with the earlier chapters of this book will understand, with the aid of the illustrations, the positions which the child's head assumes in its relations to the brim of the pelvis. We shall confine our attention at present to those cases in which the head enters the pelvis in the right oblique diameter with the occiput pointing forwards and to the left, the child's back pointing in the same direction ; this is the left occipito-anterior or first cranial position.

There are four movements imparted to the fœtal head during labour ; these are (1) flexion ; (2) internal rotation ; (3) extension ; and (4) external rotation or restitution. In

addition to these movements, which pass imperceptibly the one into the other, there is a steady descent of the head going on all the time.
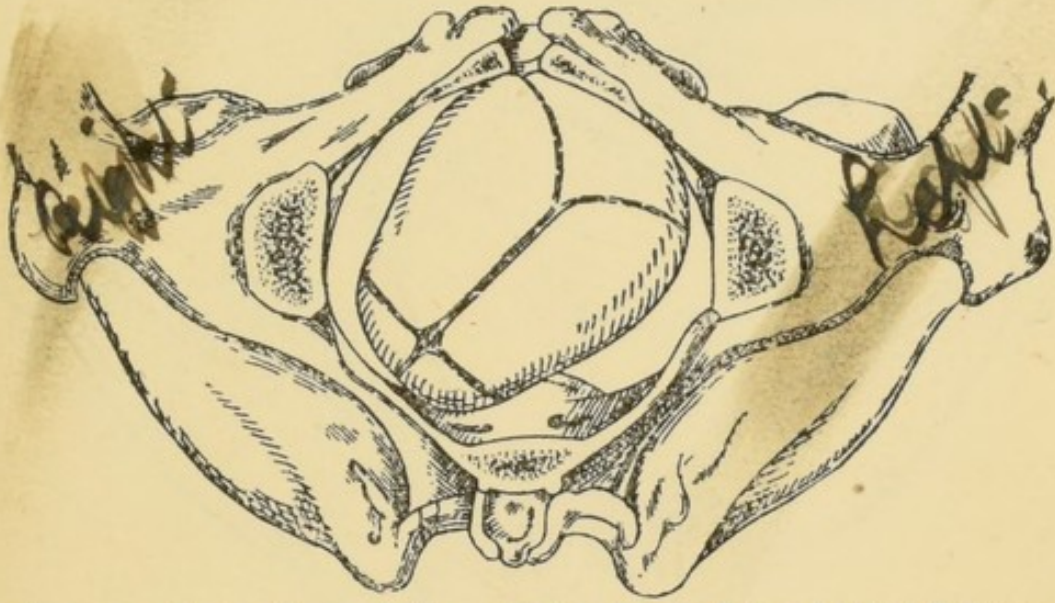
FIG. 64.—Vertex Presentations, I. (seen from below) (after Croom).
Left occipito-anterior (L.O.A.). First of Naegelé—first in frequency.
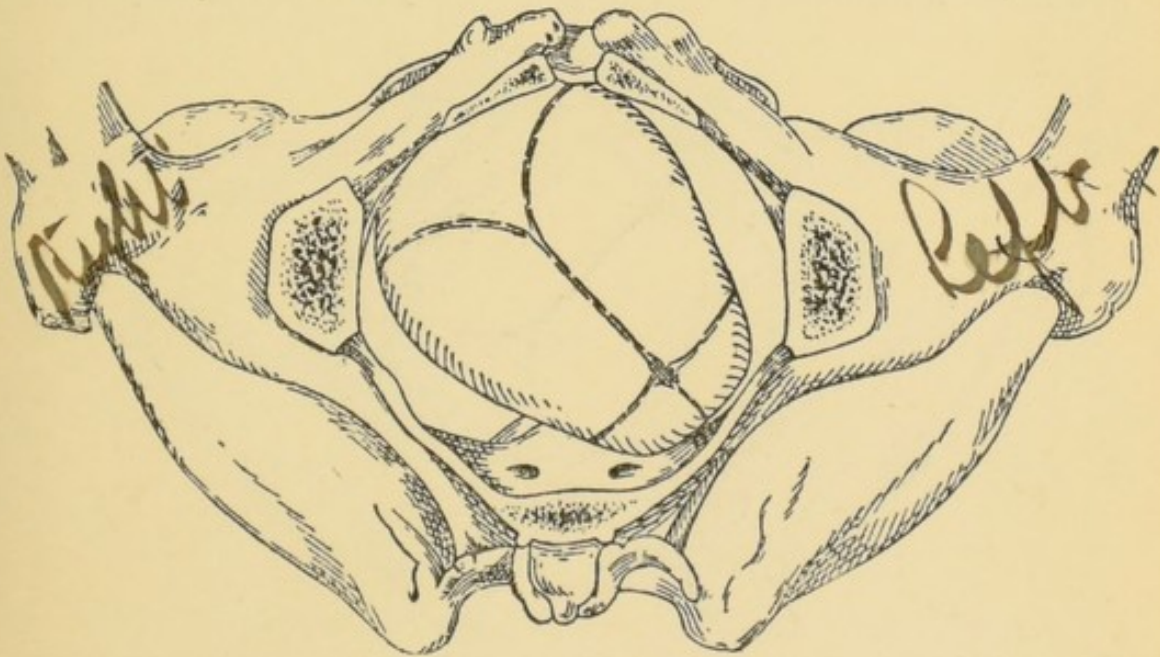
FIG. 65.—Vertex Presentations, II. (seen from below) (after Croom).
Right occipito-anterior (R.O.A.). Second of Naegelé—third in frequency.

At the commencement of labour, then, the head lies with its occipito-frontal diameter in the right oblique diameter of the pelvis; we say the head is "engaged"

in the brim. As a result of uterine contraction the head commences to descend and as soon as resistance is encountered flexion occurs. What is this movement? We
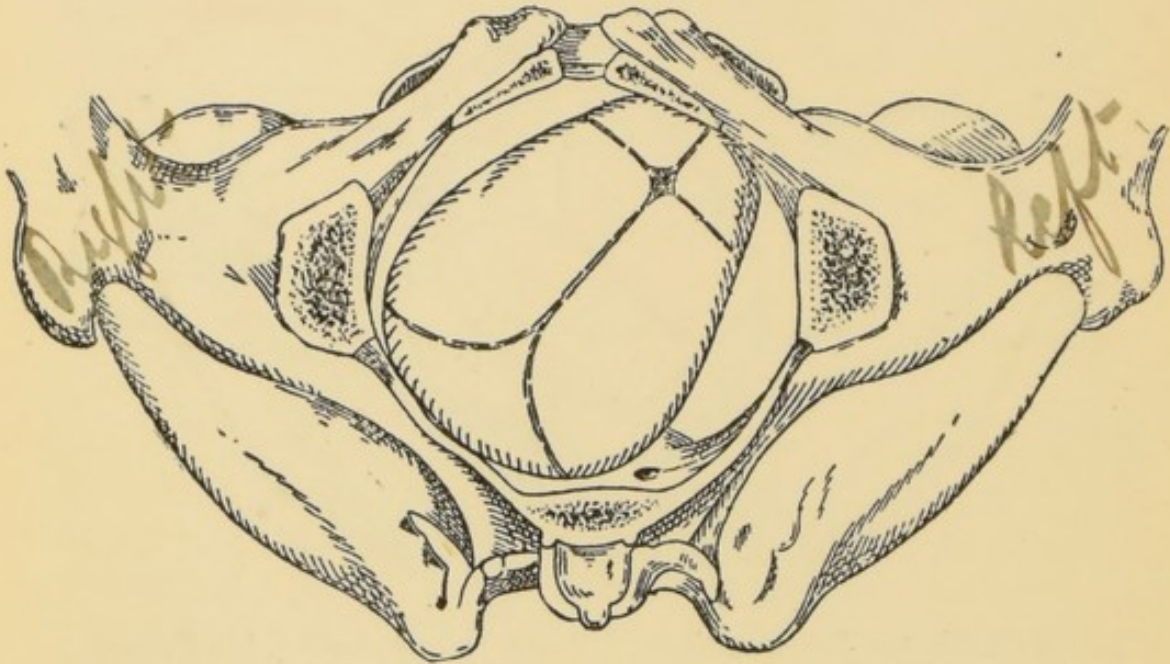
FIG. 66.—Vertex Presentations, III. (seen from below) (after Croom).
Right occipito-posterior (R.O.P.). Third of Naegelé—second in frequency.
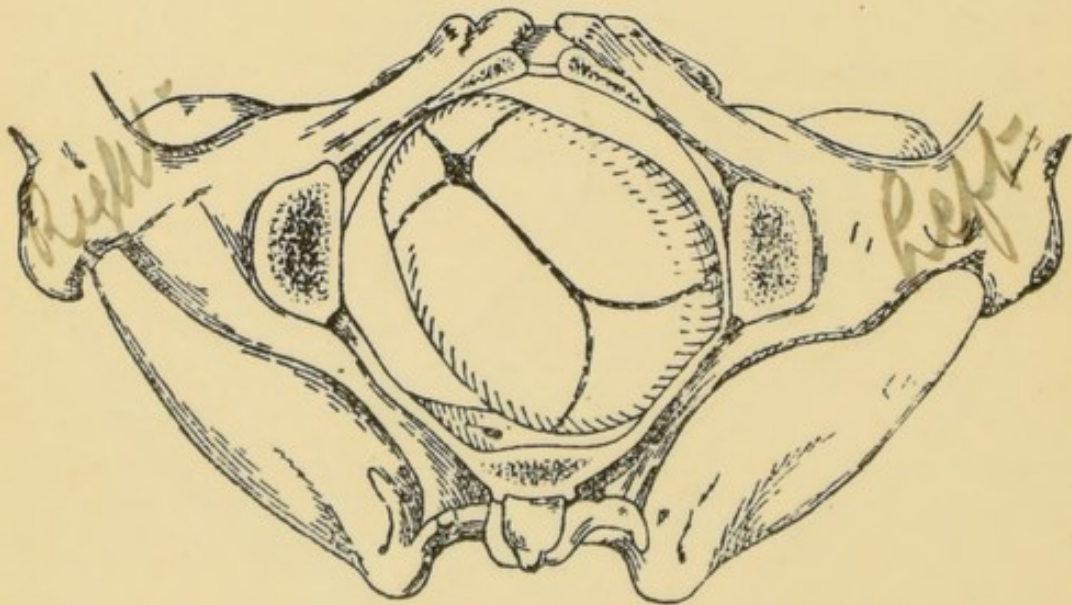
FIG. 67.—Vertex Presentations, IV. (seen from below) (after Croom).
Left occipito-posterior (L.O.P.). Fourth of Naegelé—fourth in frequency.

have already described how the child lies in its mother's uterus in a state of complete flexion (see p. 45). This movement, then, is an increase in the bending forwards
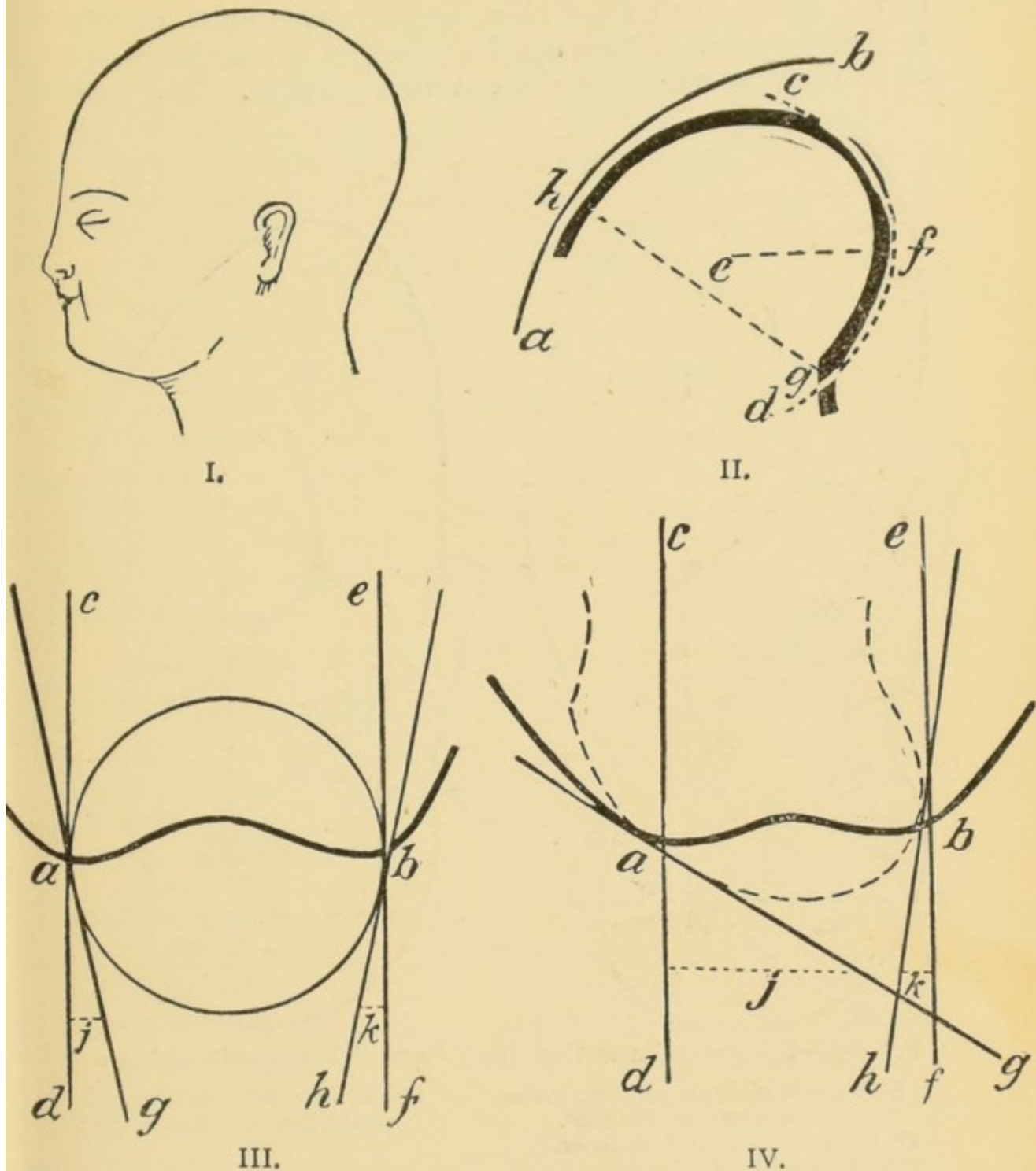
FIG. 68.—Diagrams illustrating Lah's Theory of Flexion (Croom).

I. Outline of a fœtal head unaffected by labour—delivered by Cæsarian section.

II. The thick line represents outline of cranial vault. *a b*, Segment of anterior or larger circle ; *c d*, Segment of posterior or smaller circle ; *g h*, Radius of anterior circle ; *e f*, Radius of posterior circle.

III. Shows mode of descent of a sphere through a " girdle of contact " *a b*; *c d* and *e f*, Perpendiculars drawn through " girdle of contact "; *a g* and *b h*, Tangents to the circle at the points of contact *a b*; *j* and *k* are *equal* angles formed by tangents and perpendiculars.

IV. Shows mode of descent of fœtal head, not being a sphere, but made up of segments of circles of different diameters (*vide* I. and II.) ; *a b*, " Girdle of contact "; *c d* and *e f*, Perpendiculars ; *a g* and *b h*, Tangents ; *j* and *k* are angles differing in size, *j* greater than *k*.

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of the head, so that the chin approximates more closely to the sternum. Therefore the posterior fontanelle comes to be more accessible to the examining finger. The occi-
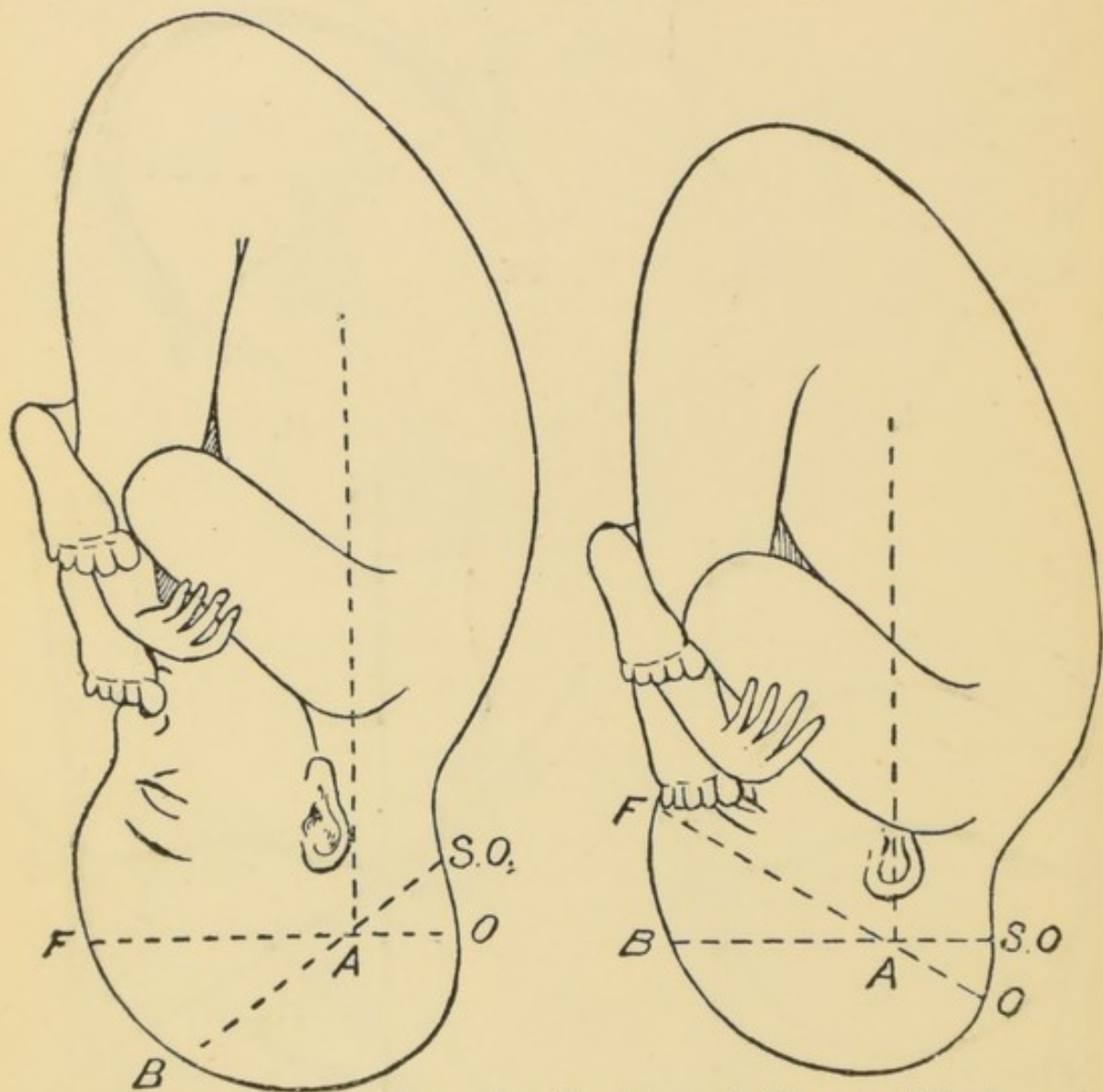
FIG. 69.—Diagrams illustrating the " Lever " Theory of Flexion.

I. Attitude of fœtus previous to the commencement of labour.

II. Attitude of foetus after the production of "flexion".

O, F, Occipito-frontal diameter.
SO, B, Sub-occipito-bregmatic.
A, Point at which the resultant of the forces expelling fœtus crosses the occipital diameter.

put descends in advance of the forehead (sinciput) which passes out of the sphere of touch. This movement allows the head to pass through the pelvis in the sub-occipito-bregmatic instead of the occipito-frontal diameter, and the

advantage of this is that a diameter of four inches or perhaps less is substituted for one of four and a half, which makes labour much easier than it would otherwise be. The explanation of flexion involves some knowledge of physics. Briefly, flexion occurs because (1) the fœtal head is more or less wedge-shaped, and when it meets with resistance the steeper or more sloping side of the wedge passes down more easily; and (2) the spine is articulated to the head nearer to the occiput than to the sinciput and this promotes flexion. The two sets of drawings by my old teacher Sir Halliday Croom will explain more fully these theories of flexion than can a mere written description. Where does flexion occur? The point at which it occurs varies according to the relation of the head to the genital canal, that is to say according to the degree of resistance encountered. As soon as the head meets with resistance, then flexion comes about.

The head continues to descend till it reaches the floor of the pelvis when internal rotation occurs. The occiput moves forwards under the pubic arch, so that the vertex comes to lie in the conjugate or antero-posterior diameter of the pelvic outlet. The forehead, which has been lying in relation to the right sacro-iliac joint, descends and passes backwards into the hollow of the sacrum. Many theories have been put forward to account for this movement. We may, however, content ourselves by saying that the head, when it reaches the pelvic floor, seeks the roomiest diameter, which is the conjugate, and that it is directed into the antero-posterior diameter by the disposition of the muscular and other structures which form the pelvic floor. Internal rotation may occur before the head reaches the floor of the pelvis or it may be delayed till just before the head is born. What is the effect of internal rotation? By this movement the long diameter of the head is adapted to the longest diameter of the pelvic outlet.

The next movement is extension. This is the converse of flexion. The back of the neck is caught under the pubic arch. The occiput, vertex, forehead, face, nose and chin pass out, in order, over the stretched perineum and the whole head is born. This occurs when the occiput

has moved forwards under the pubic arch. There are two forces acting on the child's head at this stage, the powers are forcing the head downwards and backwards, and the resistance of the pelvic floor is acting forwards and upwards. This produces a movement forwards under the pubic arch. When the head has escaped external rotation or restitution occurs. The trunk rotates and the head is carried with it, so that the occiput turns towards the side it occupied (left) in the pelvis ; instead of looking
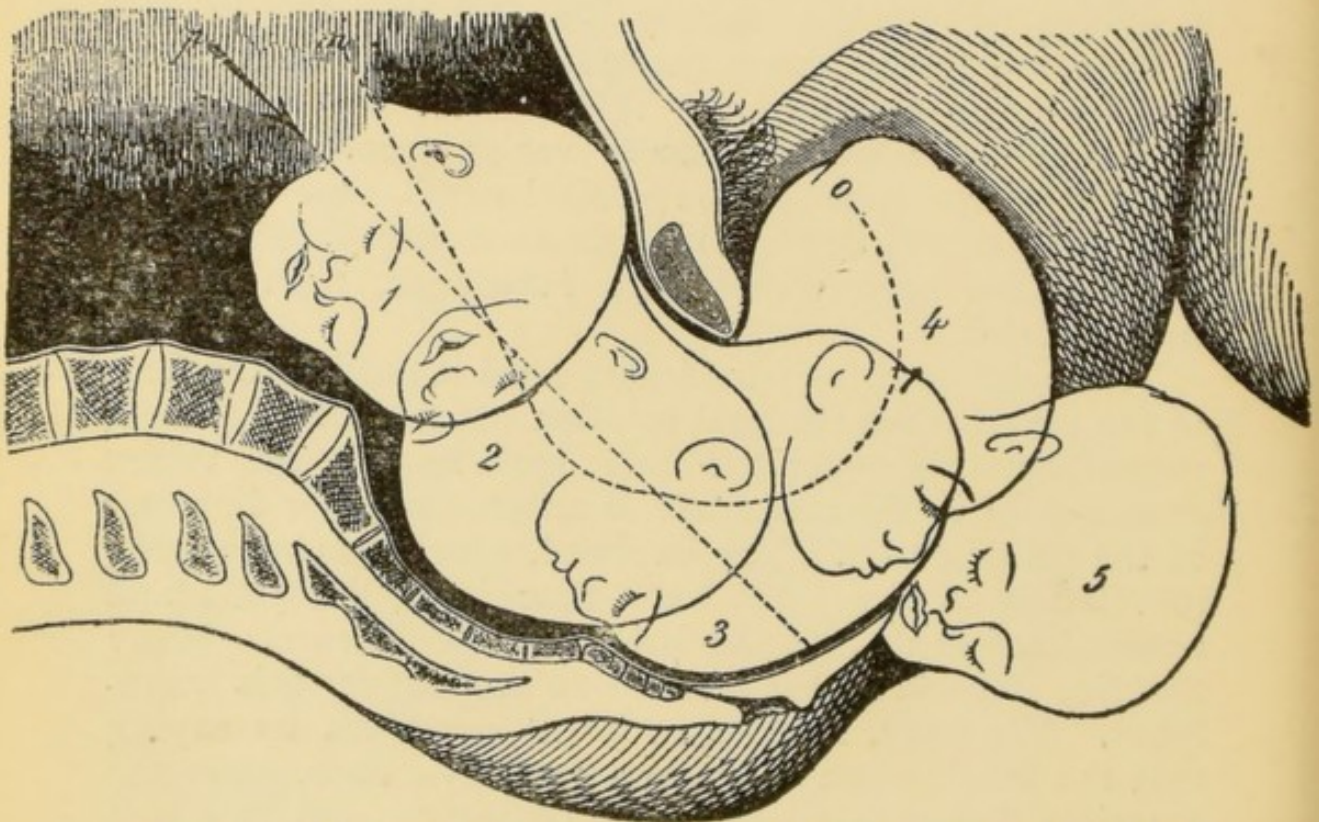
FIG. 70.—Mechanism of the Head in an Occipito-Anterior Position (after Simpson).

forwards it looks towards the mother's left thigh. This occurring outside the pelvis is called external, in contra-distinction to the internal rotation already described. The child's shoulders now come down in the left oblique diameter, and as they advance they turn from the left oblique into the conjugate of the outlet, the right shoulder being under the pubic arch and the left in the hollow of the sacrum. The former becomes fixed under the pubic arch and movement in a circle follows, the left shoulder being pressed upon and sweeping over the perineum,

followed by the buttocks and the rest of the child. Sometimes the anterior shoulder appears at the vaginal orifice and is born first; this depends on the length of the perineum. If the occiput be to the front but to the right, that is to say if the head lie in the left oblique diameter (second cranial position; third in frequency), the mechanism is the same, but the occiput is to the right instead of to the left, and when internal rotation occurs the head must turn to the left instead of to the right for the occiput
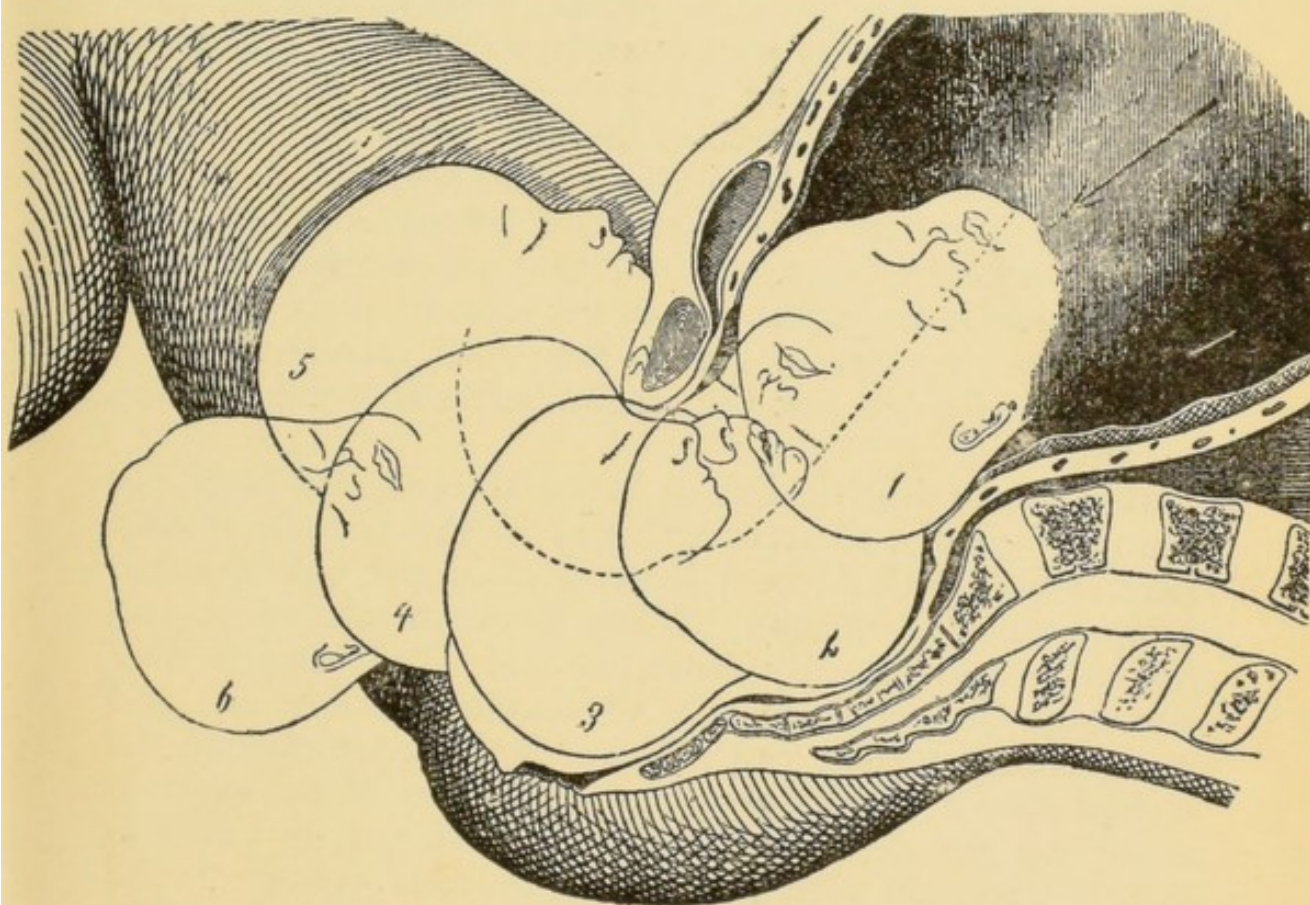
FIG. 71.—Mechanism of the Head in an Occipito-Posterior Position (after Simpson).

to lie under the pubic arch. Similarly, after birth the occiput is turned to the mother's right thigh, and the shoulders come down in the right oblique diameter. When the occiput lies posteriorly labour progresses more slowly all through.

By far the commoner position for the head to occupy in occipito-posterior positions is, as we have seen, the right oblique diameter; this is the third cranial position (second in frequency). In only a very small number of

cases does the head lie in the left oblique. The reason why labour is more tedious in these cases is that the head is generally badly flexed, and this, in its turn, is due to the fact that the fœtal head does not adapt itself to the pelvis so easily when the occiput is behind. Let the midwife take a pelvis and a fœtal head and satisfy herself on this point. Not only is flexion less complete, but for the same reason the head descends more slowly. Take the third cranial position as our type to explain the mechanism. We have, as before, descent and flexion. When flexion is fairly well marked, as the head descends, the occiput on reaching the pelvic floor is directed forwards along the right wall of the pelvis, and, behaving as it would were it originally in the second position (R. O. A.), it passes under the pubic arch and labour goes on as in occipito-anterior cases. In the first place, then, we note that flexion is imperfect and in the second place that the occiput has further to travel, the third cranial position being transformed into the second before internal rotation is completed.

But, supposing flexion is badly marked, the head fits the pelvis badly, as it is engaged in the occipito-frontal (four and a half inches) instead of in the sub-occipito-bregmatic (four inches). There is much less room and labour is consequently more tedious. The occiput does not reach the pelvic floor in advance of the forehead and thus it is not turned forwards, but is either jammed on the ischial spines or rolls back into the hollow of the sacrum, when we get a persistent occipito-posterior or a face to pubes case. In such a case spontaneous delivery is the exception and forceps are nearly always required. Why does a persistent occipito-posterior interfere with natural delivery? This is due to the fact that the face cannot pass out under the pubes, since the occipito-mental diameter is rather larger than the conjugate of the outlet. What happens, then, is that, as the child is pressed upon, this pressure is transferred, through the spine, to the occiput and this moves in a circle round the symphysis, having the child's forehead as the centre of its movement, and in this way the birth of the head is completed, the neck lying against the perineum while the face slips out from behind the symphysis pubis. The perineum is

stretched to a greater extent than in an occipito-anterior case and is frequently torn, for the same reason, namely, that the longer occipito-frontal diameter of the head is substituted for the sub-occipito-bregmatic which is half an inch less. The fourth cranial position bears the same relation to the third that the second does to the first.

Occipito-posterior cases are not strictly included under natural labour, but it is convenient to describe them along with the other cranial positions. Face presentations will be treated of in a later chapter.

CHAPTER XIV.

PREPARATIONS FOR LABOUR ON THE PART OF THE MOTHER AND MIDWIFE (OR NURSE).

A. *The Midwife or Nurse's Requisites.*—The midwife should keep a suitable bag for confinement cases only, and this should not only be capable of being disinfected, but should have a removable canvas lining which can be washed. The bag should be kept scrupulously clean. It should contain :—
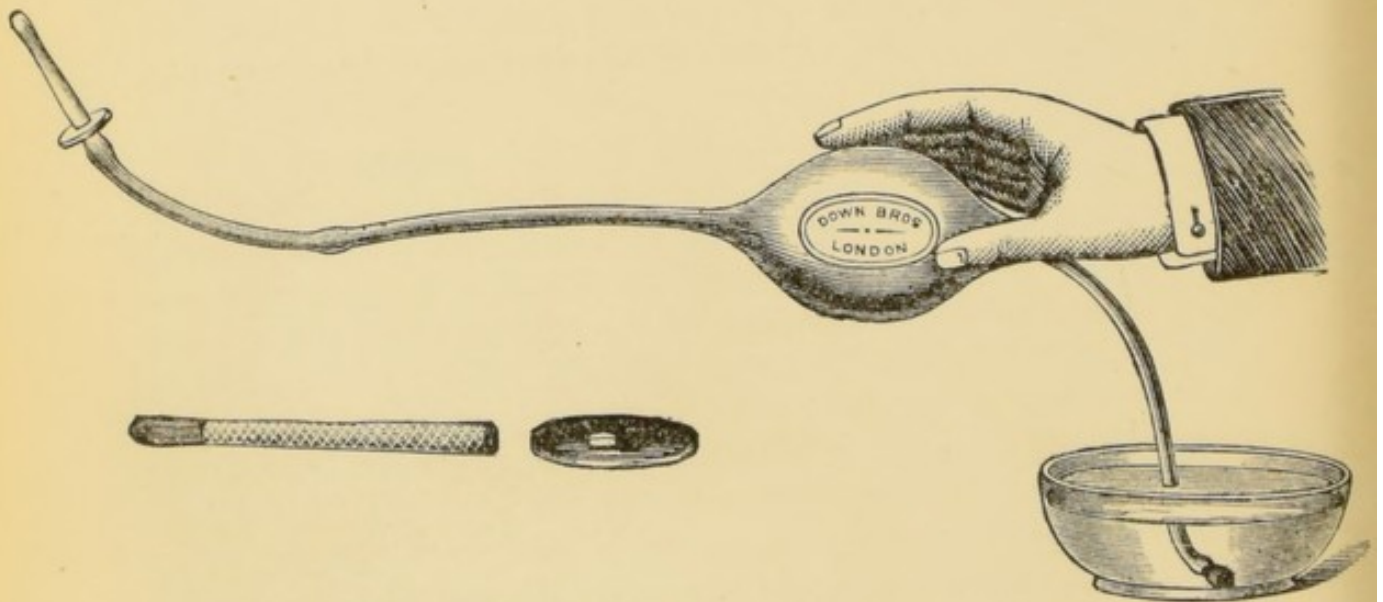
FIG. 72.—Higginson's (Enema) Syringe with Vaginal Tube.

1. Higginson's (enema) syringe with a glass vaginal tube made to fit on to the nozzle of the syringe.
2. Male gum-elastic or celluloid No. 12 catheter with a stilette, in a metal case.
3. Bath thermometer.
4. Clinical thermometer in metal case.
5. Tin containing izal soap or other disinfectant soap.
6. Nail-brush in a tin.

7. A bottle of tablets of biniodide of mercury, of such a strength that one dissolved in a pint of water makes a solution of 1 in 1,000; the bottle to be labelled poison.

8. An antiseptic lubricant, such as Allen & Hanbury's chrismoids (see Chapter XV.), antiseptic liquid soap, carbolised vaseline or a solution of perchloride of mercury in glycerine, 1 in 2,000.

9. A box of nickel-plated safety-pins of various sizes.

10. A pair of blunt-pointed plated dressing scissors.

Fig. 138 from page 279 to come here.

FIG. 73.

11. A tape-measure.

12. A reel of coarse thread or tape for tying the cord.

13. A box containing a dozen one grain opium pills.

14. An ounce of the liquid extract of ergot in stoppered bottle, a drachm to be given as a dose when required after delivery.

15. Syrup of chloral (B. P.), one ounce in stoppered bottle. Each drachm contains ten grains of chloral. The dose is a drachm and a half when it is required to be given in cases of rigid os.
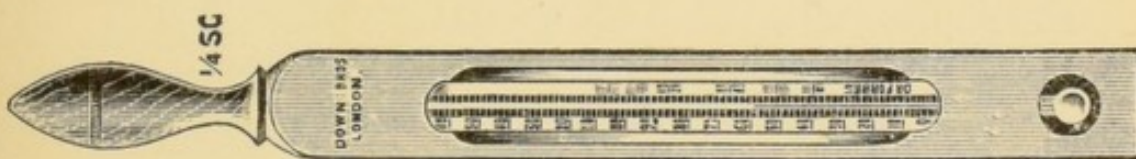
FIG. 74.—Bath Thermometer.

16. An ounce of sal volatile (Spiritus Ammoniæ Aromaticus, B. P.). (Half to one teaspoonful dose as a stimulant.)

17. Solution of boracic acid (four grains to the ounce of water), six-ounce bottle.

18. A measure glass to hold two drachms, graduated in five minim divisions.

19. Hypodermic syringe with two needles which should always have wire stilettes in them when not in use.

20. Burroughs & Wellcome's tabloids of citrate of ergotine for use in hypodermic syringe. Each tabloid contains one-hundredth of a grain. In cases of severe uterine hæmorrhage two of these, dissolved in twenty minims of water, are injected deeply into the buttock. This is only to be done in cases of serious emergency when prompt action is necessary to save life.

21. Small packet of absorbent cotton-wool.

22. Boracic lint for umbilical cord.

23. Crystals of permanganate of potash to make Condy's fluid.

24. A short curved needle in a metal handle and several strands of silk-worm gut.

25. A couple of clean aprons.
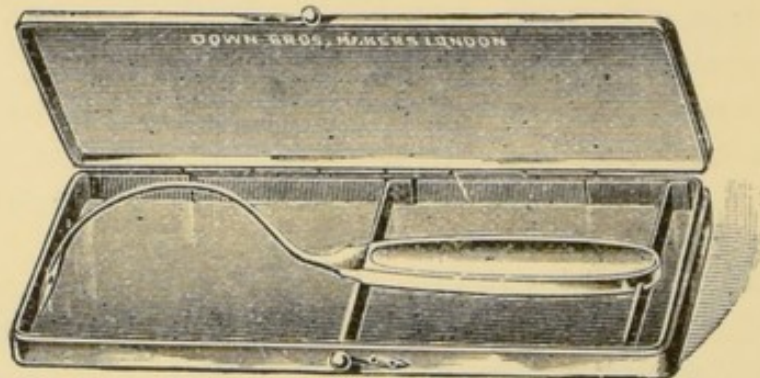
FIG. 75.—Short Curved Needle in Metal Handle.

26. A piece of mackintosh sheeting.

27. A mackintosh apron for bathing the baby.

28. Note-book and copying-ink pencil.

29. Four-hourly charts.

We have given a fairly full list of what the midwife is to take in her bag. There are two things she is not to take, namely, any instrument for accelerating the birth of the child and chloroform.

She may carry with her, if she so wishes, a flexible stethoscope, and we would also suggest the advisability of her adding to her outfit a hammock and scales for daily weighing of the infant. These can be folded up into a very small bulk.

As to her personal attire all that we need say is that she should wear a washing dress of light-coloured cotton material, and have it so made that she can turn up her

sleeves easily and keep them from slipping down.[1] A couple of clean white aprons is the least number that should be taken.

B. The mother is to be instructed to provide herself with the following articles, and the best plan to ensure that nothing is forgotten is to tell her to make out a list in good time. Some of these articles cannot be considered absolutely necessary; it stands to reason that the completeness of the mother and infant's outfit must be in direct ratio to the means at her disposal for its purchase.

1. Mackintosh sheet (thirty-six by sixty inches) (two if possible).
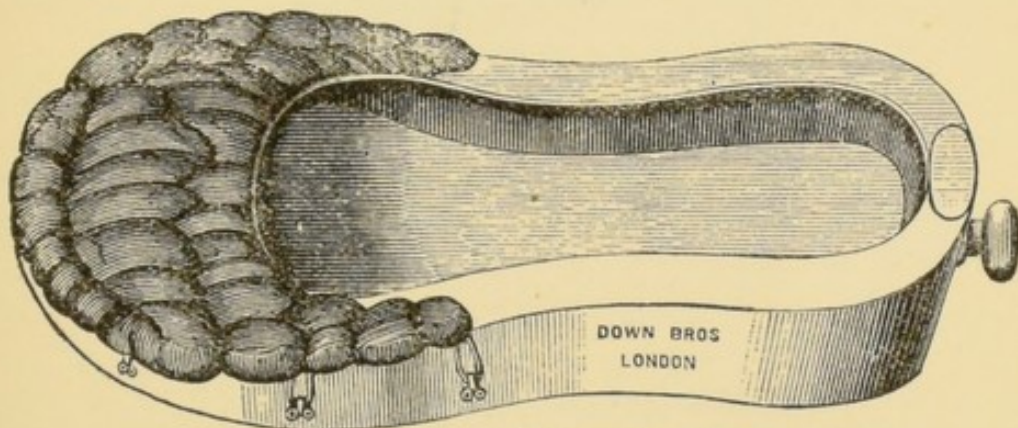
FIG. 76.—Padded Bed Bath.

2. A good supply of diapers.

3. A good supply of clean towels, some soft, some huck.

4. Absorbent wood-wool sheet about thirty-two inches square, or, if this cannot be got, a couple of clean, soft, old sheets doubled up.

5. A bed-pan or bed-slipper.

6. Plenty of stout safety-pins.

7. Absorbent cotton-wool (one-pound packet).

8. A bottle of carbolised vaseline.

9. A douche can with rubber tubing and stop-cork.

10. A new nail-brush (for the nurse).

11. Two or more abdominal binders, eighteen inches wide and about a yard and a half long, of soft but stiff material.

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[1] The dresses may so be made as to allow of the sleeves being unbuttoned or unhooked just above the elbow. These can be removed with ease whenever necessary.

12. Several night-dresses, bed-jacket, etc.

13. Rubber hot-water bottle covered with flannel.

14. Where it can be afforded a very useful article is a Kelly's douching cushion with inflated pad.

15. Some kind of bed-bath if possible.

For the child are required the following :—

1. Cradle and bedding.
2. Basket to hold the various toilet articles.
3. An old blanket.
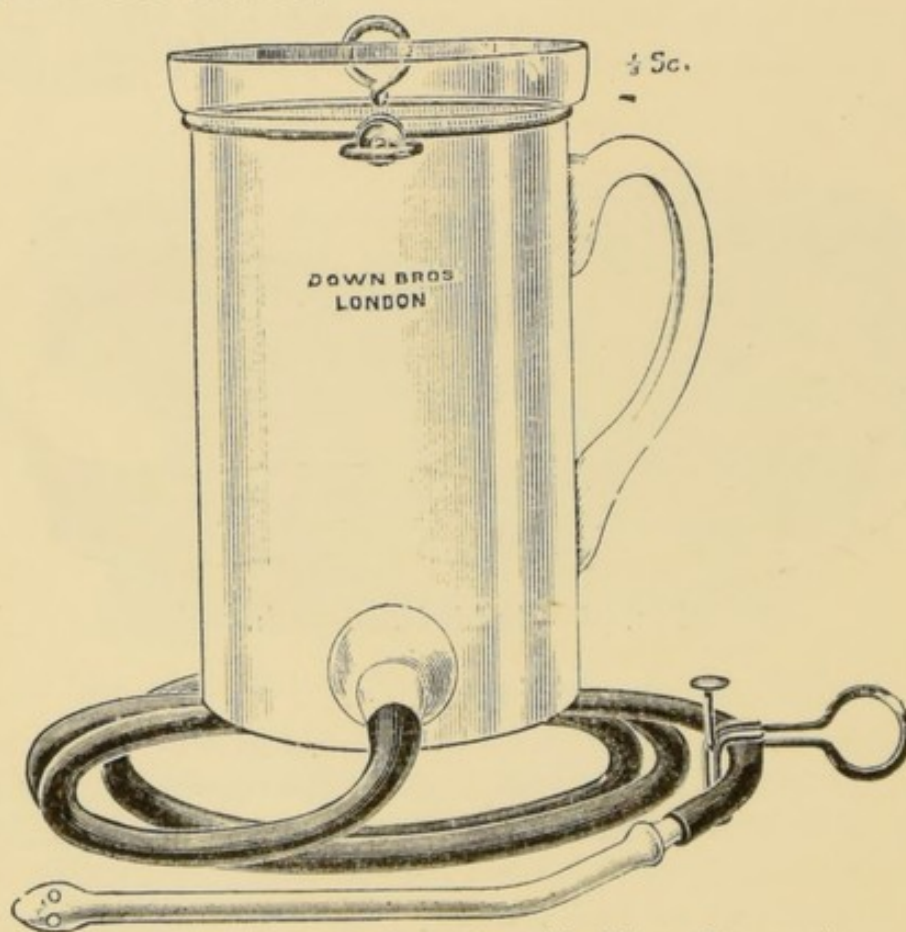
FIG. 77.—Aseptic Douche with Glass Reservoir.

4. Several pieces of soft old linen.
5. Thread or tape for the cord.
6. Boracic lint for cord.
7. Talc powder in box—Fuller's earth.
8. One bottle of solution of boracic acid for the eyes.
9. Two sponges, a smaller for the face and a larger for the body.
10. Cake of castile or superfatted soap.
11. Zinc and starch powder in tin.
12. Absorbent cotton-wool.
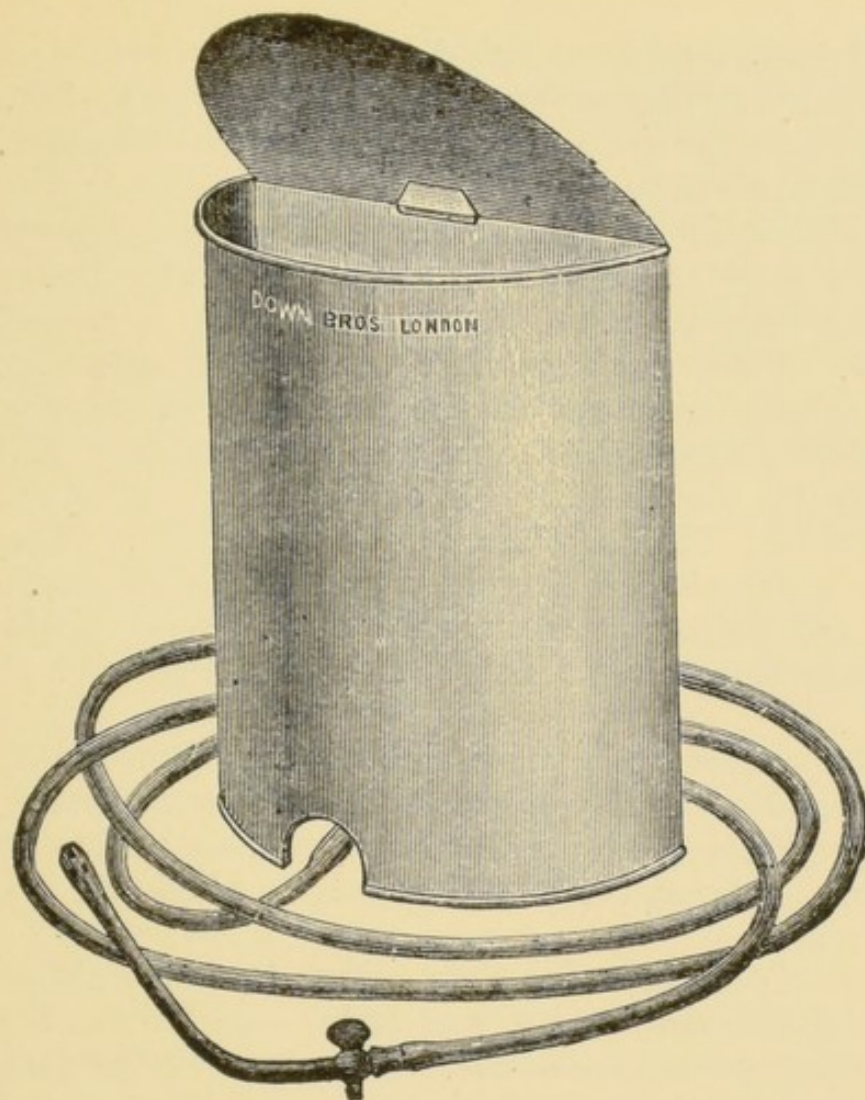
FIG. 78.—Japanned Tin Reservoir.

FIG. 79.—Kelly's Douching Cushion with Inflated Pad.

13. A large supply of soft diapers.
14. Flannel binders from eight to ten inches wide.
15. Flannel shirts and petticoats and head flannel.
16. Box of safety-pins.

The above list of the mother and baby's requirements does not aim at being absolutely complete, and many additions may be made to it to promote the mother's comfort. Reference may here be made to the obstetric outfits which are now on the market. These are very convenient; especially would we draw attention to those supplied by the Sanitary Wood-Wool Company of 26 Thavie's Inn, Holborn Circus, London, E.C. They are put up in parcels of one guinea and half a guinea. The sheets and diapers are composed of wood-wool, which is soft, absorbent and cleanly; after use they are simply burnt.

At the commencement of labour there should always be an abundant supply of hot water, two clean, empty slop-pails (preferably toilet-pails), at least two basins, plenty of clean towels, and two large jugs, one filled with recently boiled water.

The lying-in room is more often than not simply the patient's bedroom, and it has to be used for the confinement whether suitable or not. But when we have a choice of rooms we should select the best and most convenient one, since it is not only to be the patient's living room for at least several days, but in it may require to be carried out various operative procedures. The room should be commodious, bright, well heated or well cooled as the outside temperature demands and well ventilated. Above all, it should be thoroughly clean and, whenever possible, the room should be cleaned out a day or two before the confinement is expected. The room should contain a fireplace and there should be in it a minimum of furniture. It should not be in close proximity to a water-closet or open sink. Again, whenever possible, a room should be avoided in which there has been any infectious disease during the preceding half year. It may be advisable to take up the carpet and to remove many articles into another room.

The ideal room should contain the mother's bed, the child's cradle, the nurse's bed, wash-stand and toilet-set,

a few bedroom chairs, an easy-chair, a dressing-table, a light table at the foot of the bed, slop-pails, an extra jug and as few other articles as possible. The fire should be lit as soon as labour commences. There should be free access to the bed, which may be arranged on some such plan as the following: A mattress guarded by waterproof sheeting, a sheet, then another sheet of waterproof, next a folded-up sheet or sanitary wood-wool sheet under the buttocks and covering the patient, a sheet, one pair of blankets and a counterpane, with, if necessary, a quilt in addition.

A feather bed should not be used if we can possibly get a spring mattress.

Although it is unusual in our own country we recommend the use of a single bed for the patient. She can be got at more easily and, if care is taken, the bedding need not be soiled. The soiling of one side of a double bed involves a risk, because the patient is moved over to the unsoiled side and the soiled side may be left for some time *in statu quo*. If the bed or body clothes are soiled they should be treated like the diapers and be removed from the lying-in room without delay. One further point about the bed. It should be seen that there is no sagging of the mattress in the centre of the bed where the discharges may collect, but the mattress is to be kept level; this may be done by placing flat boards across the bed under the mattress.

The child's cradle varies from the most luxurious bassinette to the humble clothes-basket, or there may be and often is no separate bed available. Avoid feather beds for infants as they become hot and uncomfortable. See that there is plenty of room for the air to get access to the inside of the cradle and also that the infant's bed is not more than four inches below the top of the framework. If it is, the bed must be raised up to this level.

At the commencement of labour the patient should put on a clean night-dress which is to be rolled up to the armpits and pinned there. She should wear a warm flannel wrap or dressing-gown and a clean petticoat which can be easily removed after labour, clean stockings and slippers. The hair should be well brushed and plaited. The midwife may at the commencement of labour give her patient a good general wash if this can conveniently be done.

The bladder and bowels are next attended to, an enema of soap and water is generally advisable. The external genitals are now to be well washed with soap and hot water and then bathed with an antiseptic solution, such as perchloride of mercury (corrosive sublimate), 1 in 2,000. After labour has commenced and these preliminaries have been seen to the use of the water-closet is to be forbidden.

Some of the antiseptic lubricant is now put into an egg-cup for use throughout the labour, when a bottle or pot of lubricant is to be used instead of collapsible tubes. This prevents the rest of the lubricant from becoming contaminated.

Syringes must be cleansed after use both inside and outside and then kept in and filled with perchloride of mercury solution, 1 in 1,000, for an hour.

Having concluded these preparations the patient and the midwife are now ready for the expected confinement.

CHAPTER XV.

ANTISEPTICS AND THEIR SYSTEMATIC USE IN MIDWIFERY PRACTICE.

THIS subject is very closely connected with puerperal fever, which we shall have to consider in detail in a later chapter. It is our desire now to insist on the systematic use of antiseptics in midwifery practice. And, first, what do we mean by antisepsis? The word is derived from two Greek words, *anti*, meaning against, and *sepsis*, putrefaction. The discovery of antisepsis and the rationale of the use of antiseptic substances we owe to Lord Lister, who has conferred an enormous boon on suffering humanity. He recognised that the chief danger in treating both accidental and operation wounds lay in the putrefactive changes which are so liable to take place in them. Such processes being set up by germs which are present everywhere in greater or less numbers, he sought to exclude them from wounds by employing substances hostile to them, and also to kill those which had gained access to such wounds.

All germs are brought to the patient, they all come from without. They are not produced in the patient's system in the first place.

When anything is free from germs we say it is aseptic. Asepsis (Grk. *a*, negative; *sepsis*, putrefaction) is what we should all aim at; and, were we sure that we could exclude germs by thorough cleanliness, then we could dispense, at any rate very largely, with antiseptics both in midwifery and surgery; but, unfortunately, we can seldom or never be certain that we have excluded germs, and that is why, as a precautionary measure, we make use of antiseptics.

Cleanliness in the popular sense of the word is of great importance, clean hands, clean clothes and so on, but cleanliness cannot take the place of asepsis, for we may

be perfectly clean as far as we can tell, but we may be septic. In hospitals and lying-in institutions where people are congregated together there are apt to be more germs than, say, in a country house, but a lying-in woman is safer, wherever she may be, when antiseptics are used.

The antiseptics that are commonly employed in midwifery practice are perchloride of mercury (corrosive sublimate), biniodide of mercury, carbolic acid and Condy's fluid.

The mercurial antiseptics are by far the most powerful, but it must be remembered that they are strong poisons and, unless they are used with care and are sufficiently diluted, they may poison the patient. The biniodide is the more valuable of the mercurial antiseptics, because it does not form an insoluble compound with the albumin in the tissues as does the perchloride. These antiseptics are conveniently used as tabloids or tablets, which when added to a certain quantity of water make a solution having a definite strength; for example, we may use a tabloid of perchloride of mercury, which when added to a pint of water makes a solution of 1 in 1,000. The biniodide does not decompose soap and so it can be used, unlike the perchloride, for washing the hands. Plated instruments must not be put into mercurial antiseptics as they are tarnished thereby. The perchloride is useful for dipping the hands in after washing them. The question of douching after a natural confinement we shall consider later on.

For vaginal douching the mercurial antiseptics should not be used in a stronger solution than 1 in 2,000, and in cases where an intra-uterine douche is given (and this should not be done unless the case is being supervised by a medical man) the strength should not exceed 1 in 4,000.

The douching of the patient with an antiseptic solution is not by any means the most important of the antiseptic measures we employ in midwifery practice. It is of far greater importance to use every means to prevent our infecting the parturient woman during the conduct of labour by attending to cleanliness of the person. and by washing the hands and anointing the examining fingers with an antiseptic lubricant previous to each examination. Of such there are many substances on the market. These

are put up in capsules or collapsible tubes. Allen & Hanbury supply, for example, gelatine capsules containing various antiseptic ointments made up with a basis known as chrisma (something like vaseline). These are called chrismoids. They may be prepared with perchloride of mercury, carbolic acid, izal or boric acid, and are sold in boxes containing a dozen at six shillings a dozen boxes. Another useful preparation is antiseptic liquid soap which contains biniodide of mercury of a strength of 1 in 2,000. This is used for cleansing and disinfecting the hands and may also be used for washing the pudenda.

Carbolic acid is of no use if used in a weaker solution than 1 in 40, and it should not be used stronger, as it then becomes an irritant. It is best used for douching after labour. It is neither so useful nor is it nearly so convenient as the mercurial antiseptics for cleansing the hands.

Condy's fluid, which is a solution of permanganate of potash, is a very safe antiseptic, though not a very powerful one, and is eminently suitable for use by the midwife for douching purposes. When added to water it produces a deep purple colour, but it becomes changed to a dirty brown colour when it is decomposed. It is to be used in the strength of one ounce of the fluid to a quart of water, and syringing should be continued until the solution returns from the vagina the same colour as it went in, otherwise it does no good.

We are fond of iodine as a basis for an antiseptic douche in the strength of a drachm (one teaspoonful) of the tincture of iodine to a pint of water. It should be used as soon as prepared, as the iodine soon evaporates. It is more expensive than the mercurial antiseptics or permanganate of potash (Condy's fluid). Examples of other antiseptics which are used to a less extent than those we have mentioned are lysol ($\frac{1}{4}$ to 2 per cent. solution) and creolin. The latter, which is used in the same strength as tincture of iodine, mixes with everything, and is a useful and pleasant antiseptic. Jeyes's fluid is a preparation of creolin and is often used.

Before leaving the consideration of antiseptics brief reference must be made to the symptoms which arise from mercurial and carbolic acid poisoning.

The first symptoms of mercurial poisoning are tenderness and soreness of the gums, fœtor of the breath, a feeling of loosening of the teeth and, perhaps, also an increased flow of saliva (salivation). This is followed later by diarrhœa, sickness and vomiting and griping pains. When the early symptoms appear douching with the mercurial antiseptic is at once stopped. If the later symptoms have appeared give raw white of egg (to form the insoluble albuminate of mercury) or flour and water, and then empty the stomach with any emetic that is at hand, such as plenty of warm water or mustard and water. This is to be followed by stimulants and hot bottles applied to the body.

A doctor is called in as soon as possible, but there is no use, in a serious case of poisoning, waiting till he comes. Prompt action is necessary.

Carbolic acid poisoning causes vomiting and colours the urine an olive green. If severe, the patient soon loses consciousness and dies. Such poisoning usually results from the acid being accidentally swallowed. Then the inside of the mouth is whitened and there is severe pain in the throat and stomach. Get the patient to swallow melted butter, oil, flour and water or white of egg, and then promote vomiting. The severe collapse which follows must also be treated.

We shall discuss more fully the means we are to employ to prevent our patient getting septic mischief after her confinement, when we come to speak of the preventive treatment of puerperal fever (see p. 304).

CHAPTER XVI.

THE EXAMINATION OF THE PATIENT AT THE COMMENCEMENT OF LABOUR.

BEFORE the actual management of labour is undertaken we have to ascertain not only that labour is actually in progress, but also the presentation and position of the child. We are presuming that the midwife has satisfied herself as to the presence of pregnancy and also as to the probable date of confinement. When called to her patient early in labour—and she should give instructions that she is to be sent for as soon as labour pains commence – she will attend to the call at once. The first thing to do is to put herself into easy relations with her patient. There is no need for her to burst into the room with her bag in her hand, unless, of course, the urgency of the case demands great hurry, as in, say, a case of hæmorrhage from placenta prævia. She should do all in her power to calm and reassure her patient; nor need she be in a great hurry to make an examination. She can quietly ascertain when the pains began, how frequently they are recurring, and, after having put her patient at her ease, she may then proceed to ascertain from examination the state of affairs. Let her keep three points before her when she attends a confinement, namely, a good head, a kind heart and, last but not least, clean hands. It will not generally be necessary at this time to examine the breasts, but if an opportunity during pregnancy has not occurred for doing this, it will be as well to take advantage of it now. The midwife must never lose an opportunity of learning all she can from abdominal examination. As she becomes more skilled and experienced she will be able to surmount, in great measure, the difficulties she meets with at first in ascertaining the presentation and position of the fœtus

by external examination alone. One thing must be borne in mind and that is that until a thorough external examination has been made the vaginal examination should not be undertaken. To commence an examination by the vagina before the external examination, is bad and unsafe practice for the midwife and is to be condemned. In laying this down as an axiom we do not say that there may not sometimes be an exception to this as there is to every other rule. It is surprising how much can be learnt from abdominal examination if we
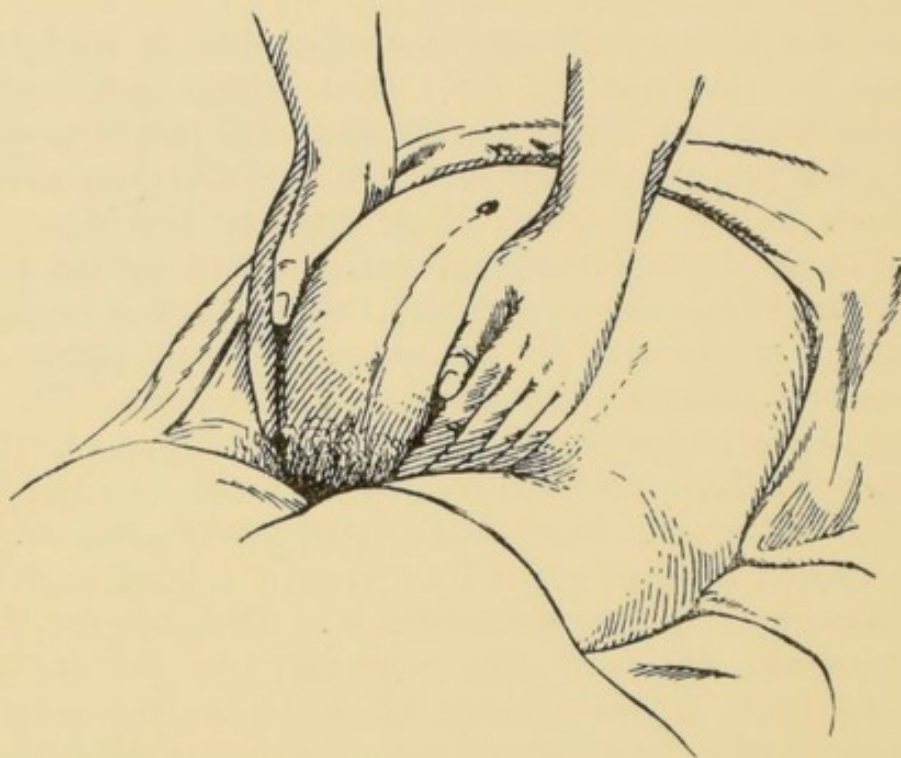
Fig. 80.—Position of the Hands for Palpation of the Fœtal Head and for performing External Ballottement.

exercise sufficient skill and patience in order to appreciate what we feel.

In the chapter dealing with pregnancy we explained how the examination of the abdomen was to be carried out (see p. 64). It will be necessary now to consider this in more detail. The preparation of the patient and the order of examination need not be described again. As to the midwife's position, she should stand on the patient's right side facing her feet and place her hands one on each side of the uterus, low down, the finger tips pointing downwards towards the symphysis pubis and

the outstretched thumbs towards the umbilicus.[1] If the uterus is contracted then she must wait until the contraction has passed away and the examination can then be proceeded with. The fingers are now pressed well downwards, and towards the middle line on either side to try and palpate the child's head, which is felt as a hard rounded mass. If the head is not presenting it may be possible, in a pelvic presentation, to feel the breech between the two hands. It is larger and softer than the head. We wish to ascertain if the head is lying above the pelvic brim or if it has entered the pelvis. If the fingers can be pressed well down into the pelvis and the head is felt between the two hands we may infer that the head has entered the pelvis, and therefore that the pelvis is not contracted nor is the child's head unduly large. If the greater part of the head is felt to be above the pelvic brim then it may be taken that the head has not yet entered the brim.

The next point to settle is whether or not the head can enter. By making the patient sit up we may get the head to sink down, or if it remains still in the same position we may try and press it down. If after these manipulations the head does not engage and the pains are strong the midwife is entitled to suspect that the labour is not a natural one and she will send for medical assistance. But this is only part of the abdominal examination. The upper pole of the uterus is next examined, and, if the head has been felt below, it may be possible to feel the breech and, perhaps too, the lower limbs at the fundus. The position the child is occupying is next to be made out. Is the back to the right or to the left and is it towards the mother's front or back? This is not always easy to find out, but unless there is much liquor amnii present it is generally possible to make out a uniform resisting surface between the head and the breech. Having gone thus far apply the ear in the manner already described (see p. 61) and listen for the fœtal heart sounds. By so doing the position the child has been found to occupy by palpation may be

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[1] In the figure the thumbs are represented as approximated to the fingers.

confirmed. There can be no harm in the midwife using a stethoscope for auscultating the foetal heart if she likes, but we do not consider it necessary. We shall not now describe the signs presented by an unnatural presentation, as this is not part of our present purpose. There is one further point which requires mention. If the abdomen is very large, and this is not to be accounted for by the patient's build and physique, it is a good practice to measure its size both transversely and vertically. The transverse measurement over the most prominent part of the abdomen should not as a rule exceed thirty-six inches. The vertical measurement from the symphysis pubis to the top of the fundus is seldom more than fourteen inches. If these figures be exceeded we may suspect excess of liquor amnii or twins. After as complete an external examination as is possible has been made, then, and not till then, the internal examination is proceeded with.

Although this examination is often more satisfactorily made with the patient lying on her back, still in this country it is not usual, and it will be best as a routine practice to make the examination with the patient lying on her left side across the bed with the legs well drawn up to the abdomen. The vulva should first be well washed with soap and warm water, and then bathed with an antiseptic solution. The first two fingers of the right hand are introduced into the vagina. It may be only possible, early in labour, to introduce one finger, but with one finger alone it may not be possible to reach sufficiently high. Before making the internal examination the hands are to be well washed and the nails scrubbed with a nail-brush; the fingers are then anointed with an antiseptic lubricant (see p. 147). It is presumed that the rectum is empty. If it is not an enema should be given early in labour. The state of the vagina is first investigated. It should be moist and soft, but not tender, and fairly capacious. The condition of the os will depend on how far labour has progressed. Its edges will be tense during a pain, but between the pains the os should be soft and elastic.

If the os be hard and stiff this is a bad sign and means a delay in the labour. As the os dilates its edges should

be found smooth and uniform.   If it feels uneven or
harder at one part than another trouble may be anticipated.
The presenting part next engages the attention.

It is customary to begin the examination just as a pain
is coming on, because during a pain the force of the
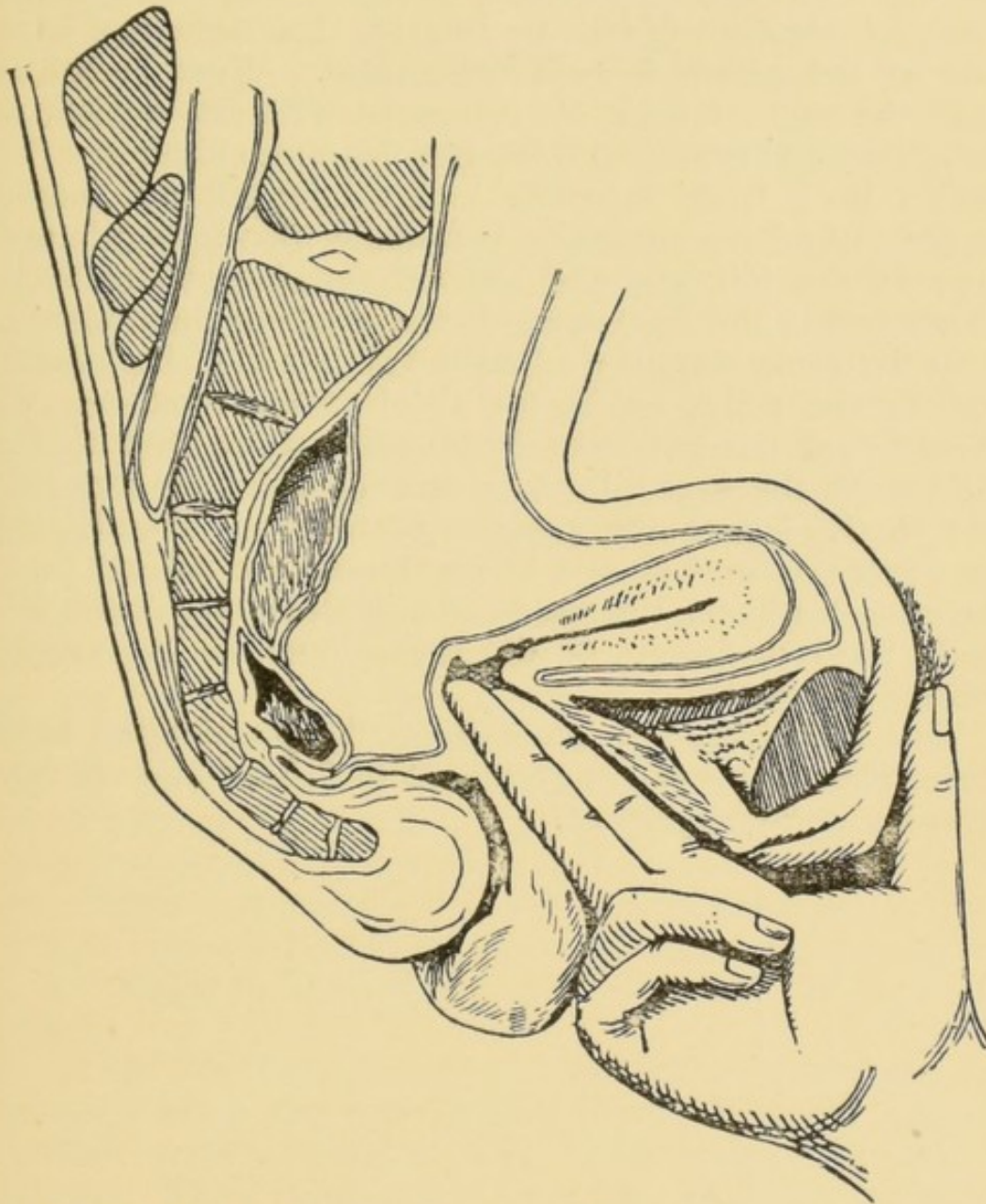
Fig. 81.—To illustrate the Bimanual Examination; the External
Hand is not shown.   (Hart.)

uterine contraction and the degree of distension of the os
can best be judged of.   But excessive pressure on the
presenting part must be avoided as by so doing the mem-
branes may be prematurely ruptured.   The examination

is continued during the interval and now the details of the head can be made out; the posterior fontanelle should first be felt for as a triangular depression from which three sutures run. In the first cranial position this will be felt rather in front of the centre of the os and towards the left. The sagittal suture running obliquely backwards from the posterior fontanelle towards the right and back part of the pelvis is next recognised. What is learnt from the vaginal must be compared with the results of the abdominal examination. For example, if we find the child's back lying forwards and to the left we should expect to find the posterior fontanelle also forwards and towards the left, and the sagittal suture running backwards and to the right towards the anterior fontanelle.

In the same way, if we find the child's back backwards and to the right, as in the third cranial position, we should find the posterior fontanelle behind and to the right, with the sagittal suture running obliquely forwards and to the left to the anterior fontanelle. Finally, the two examinations should be combined (the patient turning on to her back), the one hand outside feeling the child's back, the two fingers of the other hand in the vagina feeling the vertex.

This completes our account of the examination to be undertaken at the commencement of labour and we next consider its management.

CHAPTER XVII.

THE MANAGEMENT OF LABOUR.

THE consideration of the management of a case of labour is simplified by what has been already said in the preceding five chapters. The midwife has certain points to attend to in conducting a labour: (1) She must use every endeavour to avoid septic infection; (2) she must satisfy herself as early as possible as to whether there is any abnormality or not. If there is, then the delay and danger are increased the longer it remains unrecognised; (3) she must be prepared to cheer and assist her patient by all means in her power from the onset of labour to its termination; (4) later on she will have to avoid, as far as she can, hæmorrhage; and (5) she will have the care of the child. During our account of the management of labour we shall keep before us these points. We shall presume that the labour is a perfectly natural one for the purposes of our present description, but it must be remembered that, although labour is a natural process, yet it is very easily turned into an unnatural one, so finely is it balanced between what is normal and what is abnormal.

As to the first point, the midwife must put into practice what she has already learnt from the chapter dealing with antiseptics and their systematic use in labour. She should at once prepare some hot antiseptic solution by placing two tablets (or, as they are sometimes called, soloids) of biniodide of mercury of such a strength that when one is added to a pint of water a solution is obtained of 1 in 1,000, in a quart of warm water. After washing her hands in another basin and scrubbing the nails well with a nail-brush till they are spotlessly clean, she next immerses her hands in the antiseptic solution

after rinsing off the soap, and keeps them there for half a minute; the hands are then dried with a clean towel. She now proceeds with the examination in the way we have already described. On each occasion that she makes an internal examination, and these occasions should be as few as possible during the first stage, the same routine disinfection of the hands must be employed. When this is completed the midwife is able to say what stage of labour her patient is in, and how far advanced such stage is. She then attempts to make a forecast as to the duration of the labour, being guided in so doing by the strength, the character and the effects of the pains; by the dilatability of the canals, as evidenced by their softness, moisture and capacity; and lastly, by the adaptability of the third to the second factor of labour. But it is seldom wise to try and predict the exact hour of delivery, as disappointment may follow. It is better, when asked, " How long will it be ? " to reply that " This depends on the pains keeping strong ". If everything is found to be normal the patient should be assured of this. If it is not, a little tact is necessary; she must be kept cheerful, and any abnormality must be explained to a relative or other responsible person who can be trusted not to upset her. In first pregnancies the early labour pains must not be made too much of, they are rather to be regarded as premonitory symptoms and are not usually to be reckoned as the actual commencement of labour.

We cannot do better than quote with slight modifications the rules for the conduct of the stages of labour which have been drawn up by Professor Simpson.

Rules for the first stage of labour :—

1. Examine to detect the existence of pregnancy and of labour; its progress, the presentation and the state of the passages.

2. Repeat the vaginal examination as seldom as possible during the first stage.

3. In making the examination introduce your finger or fingers during a pain, but do not complete it till after a pain has ceased.

4. Allow the patient to lie or walk about at pleasure till the os uteri is dilated to from one and a half inches to two inches.

5. After this period place her in bed and on the left side.

6. Keep the urinary bladder and lower bowel empty.

7. Restrict the diet to nourishment of the lightest form, avoid all stimuli, bodily and mental, but endeavour to cheer and support her.

8. Keep her cool and the room properly ventilated.

9. Prevent her fatiguing herself or making expulsive muscular efforts.

10. Prevent or palliate any abnormal symptom that may supervene, as rigor, nausea, vomiting, irritability and despondency; also delirium during the last part of the first stage.

These rules hardly require any amplification. Rule 6 should be carefully attended to. Castor oil is useful as an aperient early in labour, if one is required, but if there is not time for it to act, an enema of soap and water answers better. If the bladder cannot be emptied voluntarily it will be necessary to pass the catheter. It is best to expose the patient to do this, and care must be taken to see that the catheter (a No. 10 gum-elastic male catheter is to be used) is perfectly clean. Warm the instrument and lubricate it with carbolised vaseline or other antiseptic lubricant. The patient is most conveniently placed on the left side with the knees drawn up. The labia are separated and the catheter is passed from behind forwards into the urethral orifice so as not to let its point impinge on the clitoris. If it be allowed to slip into the vagina by mistake, it must be again washed before it is passed, otherwise inflammation of the bladder may be set up. Before removing the instrument place the right forefinger over the opening so as to prevent dripping of the urine during its removal. Three feet of rubber tubing may be fixed on to the open end of the catheter so that the urine can discharge into a utensil under the bed.

It is best to restrict the diet to beef-tea, milk, weak tea and such like. Alcohol is to be prohibited as it exhausts the nervous system subsequently. Rigors and nausea are best combated by a warm drink, such as milk, and by placing the patient in bed and putting a hot bottle to the feet. Delirium is rare, and, as a rule,

demands the administration of chloroform, but such a symptom as this requires that a doctor be called in.

One point we have not touched upon and this is a personal matter. The midwife must not take any stimulant herself during her presence at a labour, and, as a rule, she should take her meals in a separate room, when she will be relieved by one of the patient's relations or friends in the lying-in room. It is needless to say that she will absent herself for as short a time as possible and then only when her patient can be left with safety.

When the os is fully dilated, and on this point there should be no doubt, if the membranes are long in rupturing they may be scratched through with the finger-nail, which, of course, must be thoroughly clean ; but, as a general rule, it is better to let them rupture of their own accord.

Rules for the second stage of labour :—

1. Continue to enforce all the rules stated in the management of the first stage with regard to diet, ventilation and position.

2. Examine as soon as possible after rupture of the membranes to see if any part is prolapsed, cord or hard.

3. Repeat the examination occasionally, but more frequently than in the first stage, to ascertain the progress of the head. To see if the head has progressed note its relations to the back of the pelvis as well as to the front, for the supposed progress of the head in its most accessible part may be really due to moulding of the head and the formation and the development of the caput succedaneum.

4. Palliate distressing symptoms :—

(a) *Pain in the Back, Sacrum, etc.*—Pain is now complained of as the utero-sacral ligaments are stretched above and below, and to relieve the pain the patient will probably ask to have her back held, or she may press her back against the bed.

(b) *Cramp in the Lower Limbs.*—This is best relieved by rubbing the affected part, bathing it with very hot water, or tying something round the limb.

5. Have the limbs separated when the head descends to the outlet; it is useful to place a doubled-up pillow between the thighs.

6. Tell the patient to strain only during the pains and not to cry out.

7. Prevent the perineum from being torn as far as is possible. In first labours the perineum is usually torn very slightly, but care must be taken to prevent anything like an extensive tear. When the head reaches the vulva it is to be pressed forwards and slightly upwards, and it should not be allowed to progress too rapidly, but must be held back until the external parts are sufficiently dilated. Many tears are brought about by delivering too quickly both the head and the shoulders. A clean, dry and smooth diaper previously warmed, is better to press on the perineum with than the naked hand. When the perineum tends to give way keep the head back till a subsequent pain.

8. When the head is born receive it in the right hand and place the left hand over the fundus uteri.

9. After the head is expelled see if the cord is round the neck, and if so, free it. This happens once in about every six labours. Pull down a loop of the cord until it becomes slack and slip it over the occiput. We may have to tie and divide the cord without delay if it is very short, and cannot be slipped over the head.

10. Wait until another pain comes on before delivering the shoulders and trunk, leaving the expulsion as much as possible to uterine action. By trying to manipulate the shoulder the bone of the upper arm may be broken. Direct the trunk forwards as it passes out, following down the fundus uteri with the left hand externally.

11. Continue to guard and protect the perineum during the passage of the shoulders and trunk.

In connection with the management of the second stage there are a few points that must be referred to, apart from the rules that we have enunciated.

To assist the patient in her expulsive efforts in this stage it is a good plan to give her something to pull with, such as a jack-towel fixed to the lower end of her bed, and also something to press her feet against to give her a purchase when bearing down. A good plan is to place a flat board, such as an ironing-board, against the foot of the bed.

What advice are we to give about the use of chloroform by the midwife during the second stage?

We consider that there are so many risks attached to the use of chloroform by the midwife that she is not justified in using it. Its use is to be reserved for cases attended by a doctor, but as she may be called upon to give it under medical supervision it will be advisable to refer briefly to its administration. It is usually given to the full surgical degree when an obstetric operation is called for, but far more commonly, it is used simply to numb the pain caused by the distension of the external parts by the fœtal head and its passage through the vulva.

Rules for giving chloroform in labour (under medical supervision only) :— [1]

1. Begin its administration when pains begin to be severe as the second stage progresses.

2. Keep surroundings of the patient perfectly quiet.

3. Give chloroform only during a pain and withdraw it during the intervals.

4. Do not restrain patient to one position.

5. Be sure to remove the chloroform as soon as the child is born, and if any chloroform has been spilt on the pillow turn it over.

6. Do not awaken the patient artificially.

7. Take care to have nothing tight round the waist or neck and see there are no false teeth in the mouth.

Sometimes, as the second stage draws to a close, the patient is put deeply under chloroform so as to destroy all feeling, but this is a matter for the doctor's discretion.

Chloroform may be administered on a handkerchief, serviette, a piece of lint, a towel, or by means of a mask, that is, a wire frame covered with some absorbent material such as flannel.

Before giving it, the cheeks and lips and nostrils should be anointed with vaseline so as to prevent these surfaces from becoming irritated by the chloroform.

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[1] We wish it to be distinctly understood that it is the doctor who is responsible for the giving of the chloroform, and all that the midwife is required to do is to assist him in its administration, when called upon by him to do so.

The third point we wish to refer to has to do with the actual delivery. It is important that the midwife should not be in a hurry to deliver her patient. Better let the delivery be too long than too rapid, and as the trunk is born make downward pressure on the uterus from above; in fact, follow the uterus down as the child is expelled. By so doing two objects are attained, the liability to hæmorrhage is greatly lessened, if not prevented, and multiple pregnancy, if present, is thus discovered.

After birth the child is laid down near its mother. The contact of its body with the external air will cause it to inspire and cry. Wipe out the mouth thoroughly. If inspiration do not occur and the mouth is quite clear, dip the end of a towel in cold water and slap the chest and back. It is better not to tie the cord at once, but to wait a few minutes; but of course if the child is still-born, the cord must be quickly tied and cut, and efforts must be made to stimulate the respiratory function by dipping the child alternately in cold and hot water. This we shall return to in a later chapter.

Before tying the cord we place the hand over the uterus, and by so doing we satisfy ourselves that it is contracting and also that there is not a second child present. After the cord has ceased to pulsate it is tied in two places; by waiting a little while most of the blood that was in the placenta after birth has passed into the child's body. The first ligature is applied to the cord an inch and a half from the umbilicus, the second about an inch farther away. The ligatures must be applied tightly so that they will not slip, and at the same time do not let the ligature be too thin or else it may cut through the cord. Several strands of thread tied at each end answer well. Elastic tape is also satisfactory. The cord is now cut cleanly in two, the child is separated and is handed to an attendant, who wraps it in a blanket or other wrap and lays it in the cradle if there is one, or at the other end of the bed. Take care that in cutting the cord it is not dragged upon and that the cut ends do not ooze. If the mother is all right and time permits the child's eyes may be bathed with warm boracic lotion by means of a piece of absorbent cotton-wool before the cord is tied. If this cannot be done now the bathing of the eyes must be

attended to at the first possible opportunity. This should never be omitted.

Now we come to the management of the third stage, and this is of great importance, since the great danger we have to contend with is hæmorrhage. The midwife must let the mother be her almost sole care till the confinement is quite over and she has been made clean and comfortable; the child will be all right and need not now be fussed over; all that is necessary is that it be occasionally looked at to see that it is breathing properly and that the cord is not oozing.

The hand is again applied to the uterus immediately the cord is cut. The uterus should be quite easily felt alternately contracting and relaxing. If the organ gets large and flabby and seems to lose its shape there is probably hæmorrhage. We wish to feel the contractions following one another when the placenta will be gradually becoming detached from the uterine wall. As it passes into the vagina the uterus will gradually get smaller until it becomes about the size of a good-sized cricket-ball. The important point now is not to hurry this process. It will take from twenty minutes to half an hour as a rule. This separation is promoted by gentle kneading of and downward pressure on the uterus. There is one thing the midwife must not do and that is to pull on the cord; for by so doing she may easily tear away the cord from the placenta and thus produce a serious complication. A good plan is to tie the cord after the child is separated close to the vulva and this assists in telling, by the increased length of the cord, when the placenta has entered the vagina. If, after half an hour has elapsed, and the uterus, after kneading and pressing it, still is felt to get no smaller, probably the placenta is not yet separated. In such a case get an assistant to hold the uterus, wash and thoroughly disinfect the hand as before; make a vaginal examination, tracing the cord upwards. If the placenta is still felt by the fingers to be in the uterus wait another half-hour, if the bleeding be very slight. If, however, the bleeding be at all free, or if after an hour the placenta has not left the uterus send for medical aid without further delay. If the hand has been kept carefully applied to the uterus after the cord has been tied there

will be no difficulty in telling, by the change in size of the organ, when the placenta has been expelled into the vagina. When the placenta remains in the uterus for an hour after the child is born it is probably adherent and the doctor may have to insert his hand into the uterus and peel the placenta off its wall. This procedure involves a serious risk of sepsis and demands a very careful preliminary disinfection of the hand and arm up to the elbow. The midwife should never introduce her hand, even into the vagina, much less into the uterus, for the purpose of separating an adherent placenta except in cases of hæmorrhage of the gravest emergency, when it would be criminal to await the doctor's arrival before trying to stop the bleeding.

When the placenta is lying in the vagina the hand is made to press firmly on the uterus downwards and backwards, and by this means it is pressed out of the vagina. This is assisted by the voluntary efforts of the patient whom we ask to " bear down " or cough. The placenta passes out, its fœtal surface first, followed by the membranes. As it is being delivered it is supported and twisted round and round to facilitate the passage of the membranes. It should not be pulled deliberately out, but merely guided; the force must come from the hand applied to the uterus and from the patient's own expulsive efforts. Only as a last resource are the fingers, carefully washed and antisepticised, to be introduced into the vagina to assist its delivery.

The after-birth is received into a clean chamber or other receptacle and put aside temporarily for examination. The hand, in the meantime, is still kept applied to the abdomen. The uterus should now be quite firm and contracting well, and it should be so kept by constant kneading and pressure. So long as the uterus is in this state all is well. The hand should not be removed for twenty minutes and then only if the organ is quite firm and hard and if the pulse is not over eighty. If it is more frequent than this there is a liability to hæmorrhage, and the uterus should then be gently kneaded for another quarter of an hour. There is no need to give ergot as a . routine practice. There should always be a reason for using it, and that reason is practically always delayed, and

insufficient retraction of the uterus, from whatever cause, arising, with consequent hæmorrhage or increased liability to it.

If, therefore, the uterus be long in retracting and if it keeps on relaxing at short intervals and this state of affairs continues for more than twenty minutes after the third stage is over it is good practice to give a drachm of the liquid extract of ergot by the mouth. In cases of emergency where there is serious hæmorrhage the midwife should inject ergotine hypodermically, but only after the more active treatment has been carried out (see Post-partum Hæmorrhage).

Just as we have cautioned the midwife not to hurry the separation of the placenta so we recommend her not to try and squeeze it out of the vagina too quickly, for, by so doing, the abdomen has to be pressed far more than would otherwise be necessary, and there is a risk, too, of leaving behind a portion of the membranes. As soon as the mother can safely be left the placenta and membranes are carefully examined, floating them out in water, and if they are not complete this is soon found out. If anything be left behind there is the likelihood of hæmorrhage occurring, or septic mischief from the consequent putrefaction of the retained tissue.

Subsequent Duties of the Midwife.—The perineum is now to be examined and any tear of more than half an inch must be sutured. This is of course a doctor's work, and when it is at all possible a doctor must be called in to do the suturing. But we can quite well imagine that this is not always practicable, and rather than leave a torn perineum unstitched for perhaps several hours we should recommend the midwife to repair it herself with the above-mentioned reservation. She must, of course, use every antiseptic precaution as to washing and disinfecting her hands, boiling her needle, scissors and sutures in a dish, and thoroughly washing and bathing the lacerated perineum. She passes her needle fixed on the metal handle deeply through the torn tissues, supporting the parts as the needle passes, and, after threading the needle with a strand of silk-worm gut, she withdraws it. As many sutures as are necessary to bring the parts well together are inserted, care being taken to approximate the edges of

the wound evenly and exactly, and not to tie the sutures very tightly. The ends of the sutures are left long and tied together, the bunch, thus formed, being fixed to the buttock by a piece of strapping so as to avoid the sharp points of the gut pricking the perineum. Boracic acid powder is dusted on and the parts are kept as dry as possible. Before the patient is moved on to her back the legs are tied together with a piece of bandage and the patient is enjoined to keep as quiet as possible.

Medical opinion is divided upon the question of giving a vaginal douche immediately after a perfectly natural labour. Probably, however, the midwife will be acting most wisely if she gives a vaginal douche (she should not give an intra-uterine douche: this is the doctor's business) of a quart of a 1 in 2,000 perchloride of mercury after labour is completed, at a temperature of about 102° F. But this should not be given until she is sure her patient is in a satisfactory state as to pulse and as to uterine retraction (the uterus should be as hard as and about the size of a cricket-ball). She should always remember, too, that unless she is extremely careful to take every antiseptic precaution, especially as regards the disinfection of her hands and of her syringe or douche and tubing, she may do serious harm instead of doing good. She should, too, prepare her antiseptic solution accurately, remembering how poisonous perchloride of mercury is, if it is used in too strong a solution.

If a Kelly's douching cushion with inflated pad be used (the apron attached to it draining into a slop-pail at the side of the bed) or a bed-bath then the patient had better be placed on her back to receive the douche. Otherwise it will be better to have her lying on her left side across the bed with her hips projecting over the edge and the knees well drawn up. The antiseptic solution is prepared in a jug and kept there ready for use or poured into the douche-can if such be employed. The nozzle with glass vaginal tube attached is passed gently into the vagina after being first disinfected and filled with the fluid, and the douche is given slowly, the returning fluid being caught in a basin pushed under the buttocks. As soon as this is over the hand is applied

to the abdomen, and pressure is made in order to expel any of the solution which may have been left in the genital canal.

All blood clots and fluid are now cleared away from under the patient, and all soiled diapers and other articles, such as sheets and pads, are also removed and taken out of the room.[1] The buttocks and thighs are next washed with a clean diaper, or piece of wool, wrung out of the warm antiseptic solution and dried. A clean warm pad or diaper is applied to the vulva and this is changed in
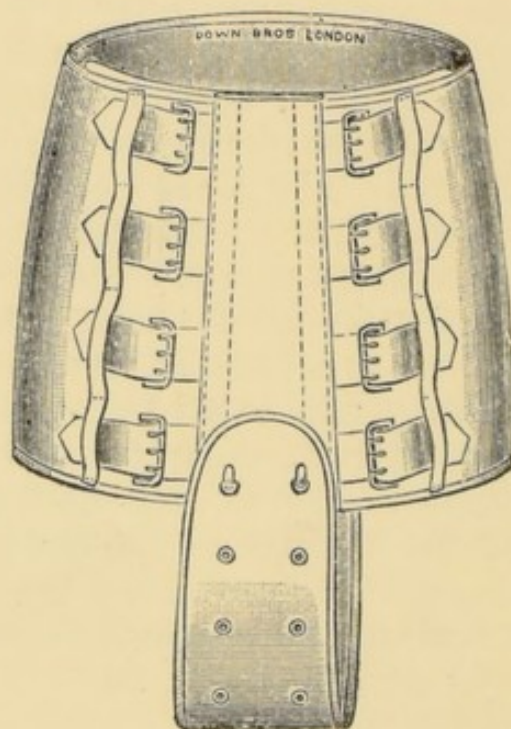
Fig. 82.—A form of Accouchement Binder.

about a quarter of an hour, when the amount of blood discharged is noted. If the bed have been properly protected and reasonable care taken, the patient should be lying dry and comfortable after the garments soiled by the confinement have been taken away. A folded-up clean sheet, which has been previously aired and warmed, with a mackintosh underneath it, is now placed in position under the buttocks; but if the bedclothes have got wet, then she must be moved over to the other side, the sheet and mackintosh being placed in position as before.

[1] The patient's petticoat, stockings, etc., will have been removed before the douche is given.

The patient is next to be gently turned on to her back, but before so doing the binder, partially rolled up, is placed in position underneath the left side, so that when she moves over the rolled-up portion can easily be got at from that side. The binder is now fixed in position. It should reach well below the hips and should be applied tightly over this point and also over the fundus, but more loosely above, so as to avoid undue compression of the abdominal viscera which predisposes to congestion and may lead to hæmorrhage. The lowest pin should be inserted at the lower edge of the binder, the next at the level of the symphysis pubis, the third at the level of the iliac crests and the fourth near the upper margin. If necessary, additional pins will be used. Care must be taken to apply the binder evenly and avoid all creases, especially underneath.

Some obstetricians recommend that a folded-up diaper be placed over the fundus uteri to fix it underneath the binder. This is the author's practice and he believes it to be useful.

The patient is now given some slight nourishment which is to be luke-warm, not hot, and then left to rest. The midwife should not leave her patient for at least an hour after the completion of the third stage. Before leaving she inspects and changes the diaper, she satisfies herself that the discharge is moderate and not too profuse, she feels the pulse and notes the general condition of her patient, and, lastly, she gives her instructions to the relative, friend or attendant who is to wait on the lying-in woman, enjoining perfect quiet, bodily and mental. She leaves word that she is to be sent for if a rigor or faintness occurs. The patient has now entered on the puerperium and this we shall describe in a later chapter. Suffice it to say here that on the return of the midwife within twelve hours of the completion of the labour she should see that her patient has passed water (it must be drawn off with the catheter only as a last resource), she should take and record the temperature and pulse, and she should inquire if there have been any " after-pains ". If these are at all troublesome a pill of one grain of opium may be given. This should not be repeated oftener than once every six hours, and opium must be given only if the pains are severe and prevent the patient from sleeping.

The attendance on the baby, which will be part of the midwife's work, will be referred to in a later chapter. All that we need say here is that the baby will be washed and dressed, the umbilical cord receiving special attention as well as the eyes, if they have not already been bathed.

Finally we would wish to emphasise the importance of the midwife making a free use of her pencil and notebook, which we included in her outfit, to record her observations on the cases she attends as fully as possible. She will find out how much this teaches her and she will be able to profit by her mistakes if her observations are conscientiously recorded.

PART V.

UNNATURAL LABOUR (DYSTOCIA).

CHAPTER XVIII.

TEDIOUS OR LINGERING LABOUR.

THE subject of unnatural labour or, as it is called, dystocia, in contradistinction to eutocia (natural labour), is a large one. It is important that the midwife should have some acquaintance with unnatural labour in order that she may be able to tell when a labour is normal or not, and also that she may know how to deal with obstetric emergencies until the arrival of the doctor.

Unnatural labours are classified as follows :—

I. Laborious labour, subdivided into
    1. Tedious or lingering labour; and
    2. Instrumental labour.
II. Præternatural labour, subdivided into
    1. Presentation of breech or lower extremity; and
    2. Presentation of trunk or upper extremity.
III. Complex labours, due to various causes.

These we shall discuss in their order. The present chapter is concerned with tedious or lingering labour, by which we understand a labour in which the head presents, but which is unduly delayed or prolonged from various causes. A tedious labour may and frequently does become an instrumental labour; or, where version is resorted to, as in a face presentation, it is turned into a præternatural labour; or, again, from some complication, the labour may become complex. Thus all the forms of unnatural labour may be more or less closely connected the one with the other.

When we were discussing normal labour we said that its successful accomplishment depended upon the harmonious action of the three factors of labour. Now, a tedious labour is due to a want of such harmony. The powers, the passages and the passengers may be at fault, either individually or collectively, and such fault may manifest itself during the progress of any of the three stages. We, therefore, consider tedious labour from the standpoint of delay or protraction of these stages arising from a fault in one of the individual factors. The following table will make this clear :—

    I. From protraction of first stage.
        Causes 1. Faults in powers.
               2. Faults in passages.
               3. Faults in passenger.
   II. From protraction of second stage.
        Causes 1. Faults in powers.
               2. Faults in passages.
               3. Faults in passenger.
  III. From protraction of third stage.
        Causes 1. Faults in powers.
               2. Faults in passages.
               3. Faults in passenger (placenta).

I. From Protraction of the First Stage.

1. *Faults in the Powers.*—The power which is at work in the first stage is, as we have seen, the uterus. This power is seldom at fault in the first stage, it is during the second stage that uterine inefficiency, or inertia, as it is usually called, is so apt to arise, so we shall refer to uterine inertia later on.

2. *Faults in the Passages.* (1) *Rigidity of the Lips and Neck of the Uterus.*—This is a very common cause of delay. Four varieties are usually described. It may be due to (*a*) constitutional conditions, for example, when a labour occurs in an elderly primipara (thirty-five and onwards) where the structures in the parturient canal are firmer and less elastic than in a younger woman. The same is apt to occur, too, in premature confinements, as now the cavity of the cervix has not had time to become

gradually opened up as it does normally at the close of pregnancy and it is thus unprepared for labour. The cervix is felt to be firm and hard and often thin in primiparæ, generally thick in multiparæ. (*b*) The second variety is inflammatory rigidity. This is due to cervical inflammation and is more common in multiparæ. The outline of the os is felt to be irregular, the whole or only part of the circle of the os being thus affected. (*c*) Spasmodic rigidity. This may be part of a general uterine spasm which may be met with in uterine inertia. A common cause of this form of rigidity is too frequent examinations. This the midwife has already been cautioned about. (*d*) Organic rigidity is that form which is produced by organic disease, especially cancer. In such a case the cervix does not expand with the progress of labour, but tears, and such a tear may be very extensive and the patient may die from hæmorrhage or rupture of the uterus. The cancer may have appeared before or after conception.

The diagnosis of rigidity of the cervix is made sometimes at the onset of labour, the lips of the cervix being felt to be firm, dry and hard, but more commonly it is only discovered towards the close of the first stage. When once the healthy cervix early in labour has been felt and the sensation produced remembered, it is generally easy to appreciate the sensation produced by a rigid unyielding os. When rigidity of the os is unrelieved the effect is to gradually wear out the uterus in its efforts to overcome the difficulty.

The most reliable drug we possess for overcoming rigidity of the os, especially spasmodic rigidity, is chloral; and, although chloral is a drug which has to be used with great care as it has a depressing effect on the heart, yet the midwife need have no fear in giving a drachm and a half of the syrup, which is equivalent to fifteen grains of the drug. If, after a lapse of three hours, the rigidity is not overcome medical assistance is to be procured.

After giving the chloral the patient is induced to try and sleep; if she is unable to sleep, however, the chloral will still probably produce the desired effect. Periodical hot vaginal douching will often assist the overcoming of the rigidity. If a doctor be called in he will probably put

the woman under chloroform and he may find it necessary to resort to artificial dilatation with the fingers or a dilator. Occasionally when the os is partly dilated and refuses to stretch further forceps are required, but in such a case there is a serious risk in their use. The midwife must not try and dilate the os with her fingers. This will only land her in difficulties and delay the labour, nor must she use chloroform by herself. Where the rigidity is due to widespread cancer of the cervix it will probably be decided to effect delivery by Cæsarian section (see p. 216).

(2) *Occlusion (Closing Up) of the Os Uteri.*—True occlusion is very rare. On vaginal examination the cervix may present a rounded smooth surface everywhere and there may be an absence of any depression representing the os itself. Such a state of affairs is sometimes due to the lips of the os having become glued together or adherent after inflammation of the cervix. Before pregnancy the menses kept the orifice open, now that they are in abeyance, the os seems to have become closed up. If the os is actually sealed up it must, of course, be opened up to allow labour to proceed, and that soon, so as to prevent the uterus from becoming exhausted or from actually becoming ruptured in its efforts to expel its contents. On passing a speculum in such a case, the cicatricial tissue, which is then generally seen, is scratched through very carefully, so as to avoid injuring the bag of membranes beyond, and the rest is completed with the finger, and dilatation then proceeds in the usual way. More often than not, however, an apparently occluded os opens up under chloroform. If the midwife, after careful examination, cannot find the os, she must send for a doctor.

(3) *Obliquity of the Uterus.*—The uterus at the commencement of labour may be anteverted or more rarely retroverted. In the former case, which gives rise to pendulous belly, the abdominal walls are relaxed and the uterus hangs more or less over the symphysis pubis. The presenting part is then driven backwards on to the posterior wall of the cervix and the uterine force thus comes to act in a wrong direction. To remedy anteversion place the patient on her back and apply a binder to the abdomen. Later on the doctor may have to be called in and he may

require to terminate labour by delivering with forceps or by turning the child.

(4) The anterior lip of the cervix occasionally becomes wedged or impacted between the child's head and the pelvis. It may be felt as a thick fold below the head or it may even protrude from the vagina and be mistaken for the child's head or the bag of membranes. If it protrudes, it is seen to be discoloured and the head and bag of waters may be felt above it. To make sure it is not a prolapsed distended bladder pass the catheter and empty the bladder. As soon as the midwife is satisfied that this has occurred or even if she suspects it, she will send for assistance. An attempt is made to push up the swollen cervical lip between the pains, a hot douche being given at the same time. When once we have succeeded in pushing it up behind the head labour progresses naturally.

3. *Faults in the Passenger.* (1) Over-distension of the uterus with liquor amnii (hydramnios) interferes with the contractions and hampers the uterine action. It is generally recognised by the undue size of the abdomen and by the feeble character of the pains and the long intervals between them. When the uterus is very greatly distended with fluid, as it sometimes is in hydramnios, the patient is usually very short of breath and may even be unable to lie down. The proper management of this condition is to rupture the membranes as soon as possible, in the way we have already mentioned. The uterus may be over-distended, too, from another cause, namely, twins. Such a labour, however, is classified as complex and does not concern us here.

(2) Absence of the liquor amnii is only a relative term. When the liquor amnii is very scanty the result is the same as when the bag of membranes has ruptured prematurely. This is a very common cause of delay and causes a "dry labour," which is always tedious. We must again remind the midwife that she must not be misled by her patient telling her "the waters have broken," as the discharge of fluid may not be due to the rupture of the membranes at all (see p. 119).

Delay is due to the absence of the fluid wedge as the chief agent in the dilatation of the cervix. The cervix is dilated much more slowly by the hard head. The pre-

mature rupture of the membranes may be due to their being unusually thin, to want of support from behind as in malpresentations, or to unskilful examination.

(3) *Unusual Toughness or Adhesion of the Membranes.* —Toughness of the membranes will probably necessitate their being artificially ruptured. If the finger-nail cannot accomplish this, a fine quill, previously boiled in antiseptic solution, is to be used, with strict antiseptic precautions. The membranes are to be kept intact as long as possible, and it is only when the pains are becoming more feeble and no progress is being made that they are to be ruptured. When the membranes are adherent to the lower end of the uterus, as a result of endometritis, on examination the lips of the os are found to be normal, pains are regular and strong, but the os does not dilate. The finger, previously thoroughly disinfected, is to be passed round the os and the membranes are to be stripped off as far as the finger can reach. This is done and, if necessary, is repeated between the pains. In a delayed first stage when the membranes have ruptured, if there are no pains there is nothing to be done. If they are slight it is best to give chloral (grains x̄v̄) or an opium pill (1 grain) to give the patient rest, after which the uterus will often rouse itself to renewed effort. If the pains continue strong and no progress is made, get medical assistance.

II. From Protraction of the Second Stage.

1. *Faults in the Powers.*—(1) The first cause of delay on the part of the powers is uterine inertia. We have seen that it may be present in the first stage, but that it is far more commonly met with in the second.

Uterine inertia is spoken of as primary when it is due to some cause acting apart from the labour itself and when the pains are feeble from the commencement of labour; as secondary, when it is induced during the labour from some cause actually connected with the labour and when the pains were originally strong. Primary uterine inertia may be regarded to a large extent as constitutional, and it is this form which is met with in the first stage,

It is apt to occur in elderly primiparæ, where the uterine walls are often unyielding, as we saw the os uteri was apt to be in similar conditions. Another cause is repeated abortions and pregnancies with only a short interval between. Organic disease of the uterus produces it, as for example when the uterus is the seat of a fibroid tumour. General debility, phthisis, heart-disease or other serious general affection tends to produce inertia, and, finally, it may occur as the result of mental shock or emotion.

Secondary uterine inertia is usually induced during the progress of the labour and is most often due to undue protraction of the first stage. Another common cause is from escape of much of the liquor amnii, following on, it may be, premature rupture of the membranes. Too strong uterine contractions may cause it, the uterus tiring itself out before its work is completed. Over-distension of the uterus from hydramnios or twins tends to produce it, such a condition often causing inertia from the commencement of the labour.

All these conditions act by tiring out the uterus or by, so to speak, putting it out of gear.

The pains gradually become shorter and more feeble and the intervals between them become longer. On vaginal examination the mouth of the os is not made tense and tight during a pain, nor is the bag of membranes so powerfully forced into the os as when the pains are strong. Again, the head makes no progress after the membranes have ruptured. The uterus, when it contracts, does not feel so hard as it normally does in labour. This is realised when the hand is placed on the uterus during a pain.

What effect has uterine inertia on the mother? In the first stage the mother is seldom affected by the inertia to any extent. Between the pains she is quiet and comfortable, and her pulse and breathing are not altered. During the second stage uterine inertia occurs when the mother is tired and is probably suffering from loss of sleep. So long as the membranes are unruptured uterine inertia seldom gives rise to anxiety. When they are ruptured the case is more serious, but there is no danger. When it occurs in the third stage it is a very dangerous condition

as we shall see when we come to speak of post-partum hæmorrhage.

As to the management of uterine inertia; in the first stage when the inertia is primary we must exercise patience. If there is no other abnormality the os will dilate in time. Keep the patient as cheerful as possible, encourage her to sleep, give light food and drink as far as she can take them, and keep the room ventilated. Let her know that all is well, but that the labour is simply a slow one. Above all, do not let her bear down. See that the bladder and bowels are empty and kept so. If she has been suffering from loss of sleep and is tired, give a pill of one grain of opium, or if the os be rigid as well, substitute a drachm and a half of syrup of chloral.

When inertia comes on in the second stage we must do all we can to get the patient to sleep. This she may do naturally, but often a sedative drug is required, and the best plan is to give a pill of one grain of opium and to repeat it, if necessary, in from half to one hour. The pains will return when the patient wakes up and labour will probably go on satisfactorily if there be no further abnormality. If labour does not now progress the midwife will suspect that there is some other complication. She must not give ergot. No midwife should give ergot before the child is born, as by so doing she will increase the uterine contractions and the uterus will go on contracting, with shorter and shorter intervals between the pains, until one pain merges into another and a state of continuous contraction (tonic contraction) results, a very grave state of affairs, which is a source of great danger, especially when any obstruction is present, and increasingly so the longer it is allowed to continue. There are three things she may do, however, to try and get the uterus to contract before she sends for medical assistance. The first is to apply a binder to the abdomen, or she may make firm pressure downwards (if the uterus is not tender) in the axis of the pelvic inlet with the hand placed over the fundus with the advent of each pain, or, when the pains are in abeyance, at intervals. Thirdly, the stimulus to contract may be applied by means of hot vaginal injections or by plugging the vagina with an india-rubber ball or a bag (Barnes's bags) distended with

air or warm water. Unless the midwife is sure that she has stimulated the uterus to contract and labour is now progressing, she will get assistance. When the doctor arrives and he finds all that we have mentioned has been done and that it is of no avail, he will suspect that there is some obstruction in addition to, or producing, the uterine inertia.

Such obstruction may be due to a variety of causes, large size of the child, contracted pelvis, malpresentation or position (which the midwife would probably have detected ere this). If there is no obstruction and the head is low down and the passages clear he may decide to give ergot, but that is not the midwife's affair. How long is a woman with uterine inertia in the second stage of labour to be allowed to go on where all previous treatment is of no avail? It is our aim to keep the second stage within reasonable limits. It is generally, therefore, recommended that forceps be applied if the second stage has gone beyond two and a half to three hours in a multipara, an hour over this time being allowed in the case of a primipara. But it is by no means a safe thing to do to apply forceps in a case of inertia, as there is a grave risk of post-partum hæmorrhage. Therefore the doctor delivers as slowly as he possibly can, taking off the blades when the head is almost born ; and he either holds the uterus firmly while he delivers, or else he directs the midwife to do so, following down the fundus with the hand as delivery is being effected, and keeping a firm hold of the uterus after the child is born. If relief such as this be not given in a case of obstructed labour with uterine inertia there is a grave risk of rupture of the uterus taking place at Bandl's retraction ring (see p. 36).

Before leaving the subject of uterine inertia a word must be said about tonic contraction of the uterus, a condition which we have already explained. We have said that it may be caused by the abuse of ergot, but it may occur in any case of obstructed labour if relief is not given. It must be distinguished from uterine inertia, and in order to do so the following points should be noted. In uterine inertia the uterus is flabby and lax ; it is not tender, and the fœtus can be felt and perhaps moved about. In tonic contraction the uterus is hard, firm and

tender, and the fœtus is firmly moulded to its cavity and therefore cannot be moved. In the same way in uterine inertia the presenting part can be moved upwards, while in tonic contraction it is fixed. In the former the patient does not suffer unless other complication be present, her temperature and pulse are normal, in the latter she is seriously ill, her temperature may be raised, her pulse is quick and weak, and she looks anxious and ill.

(2) We have next to consider the second cause of delay as regards the powers, namely, irregular or spasmodic uterine contraction. This is more commonly seen in the third stage as what is known as "hour-glass contraction," but it may occur in the first and second stages. Instead of the whole uterine muscle contracting only part is active, sometimes the muscular fibres in the fundus and those in the lower part of the uterus alone contracting. Such a condition may be due to a full bladder or a loaded rectum, to exhaustion, to disease in the uterine walls, to escape of most of the liquor amnii and, perhaps, also to too frequent examinations. It is a troublesome cause of delay. The contractions are more painful than when they are regular and may become almost continuous. Examination may show that part of the uterus is hard and separated by a band from the other part, which is flaccid. Labour is more or less at a stand-still. When it occurs in the first stage it may be situated at the internal os. If the membranes have not ruptured the patient should be put to sleep or rest by opium (one grain pill), after first taking care that the bladder and rectum are empty. If it occur in the second stage and the midwife cannot get the uterus to contract regularly by the means we have mentioned she should send for the doctor.

(3) The accessory powers, the diaphragm and the abdominal muscles, may be at fault from a variety of causes, among which we may mention paralysis of the lower part of the trunk and limbs, disease of the thoracic viscera, as bronchitis, heart-disease, which prevents the patient from fixing the diaphragm in her bearing-down efforts, fluid lying free in the peritoneal cavity (ascites), large ovarian tumour, and, finally, over-distended bladder or rectum. It may be possible to overcome this cause of

delay by applying a binder or by supra-pubic pressure, but generally forceps are required.

2. *Faults in the Passages.*—The faults in the passages in the second stage of labour may affect the soft parts or the bony canal. We shall deal with the former first :—
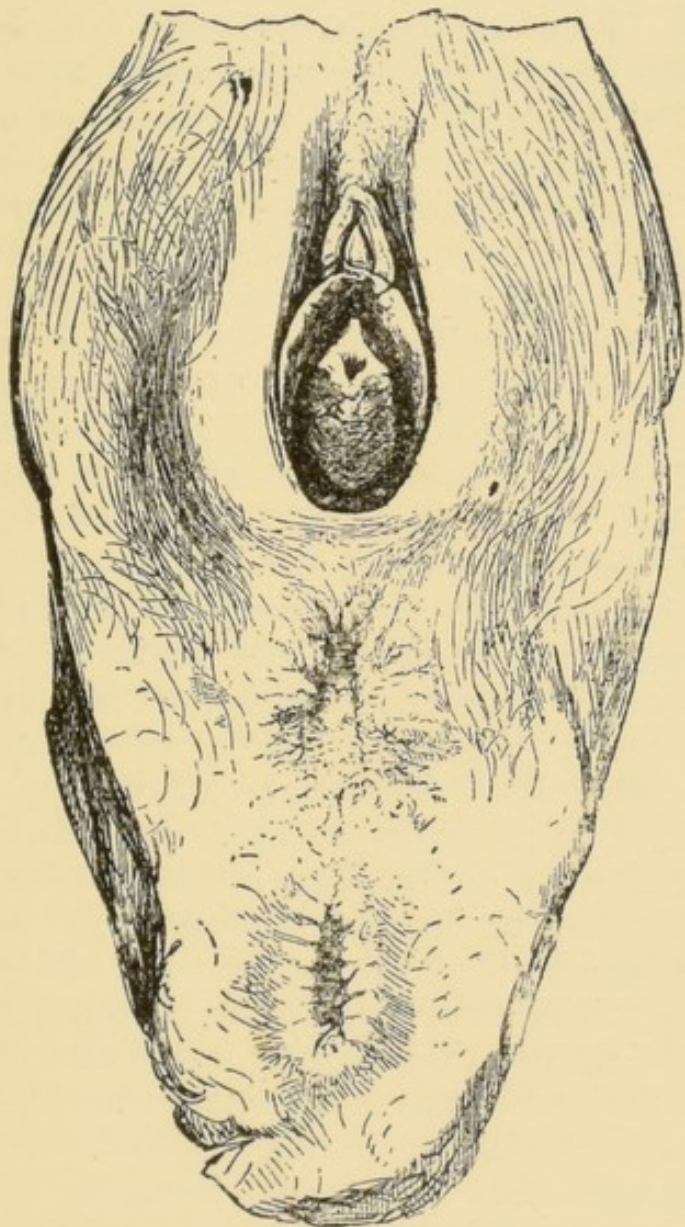
Fig. 83.—Central Rupture of the Perineum (Simpson).

(1) *Rigidity and Contraction of the Vagina or Vulva.*— The same constitutional rigidity that we referred to in the first stage as affecting the os uteri may also affect the vagina and vulva and thereby cause delay in the second stage. After labour has been unduly prolonged as in occipito-posterior cases, where the head is jammed higher

up in the genital tract, the vaginal walls are liable to become more congested and rigid. The vagina may be unusually narrow, especially as to its orifice, or there may be a firm unyielding hymen. Again, the vagina may be contracted from cicatrices, the result of ulceration, following upon trouble in previous labours, or due to other causes. Such cicatricial contraction may take the form of bands passing across the vagina and impeding the passage of the child's head. This cause of delay is discovered on vaginal examination, generally at the commencement of labour, occasionally not till later on. The effects of the labour have to be carefully watched.

Hot injections and emollients, such as carbolic oil, are of value in treating rigidity of the vagina and vulva. Examine as seldom as possible and aid the uterine efforts by supra-pubic pressure. In the case of cicatrices and unyielding hymen incisions will often be necessary, if the finger will not overcome them, and therefore a doctor must be summoned. Do not let the head pass until the perineum and vulva are fully dilated.

The management of a torn perineum has been considered. Such a tear may be partial or complete or central. A partial tear does not involve the sphincter, a complete one does. A central tear is very rare. In suturing, put in the stitches deeply. Superficial sutures only cut themselves out and are useless. Some recommend the suturing to be done immediately the child is born. We prefer to wait till the uterus is well contracted after delivery; it is more important to secure good contraction of the uterus than to risk it by attending to the perineum at the end of the second stage (see p. 164).

(2) *Distended Colon or Rectum.*—We have already said that the accessory powers are hindered by a loaded rectum. It is not enough to empty the rectum, the large bowel above may be full of fæcal masses and this must be obviated by a good aperient dose of cascara or castor oil, at the commencement of labour, followed by a copious soap and water enema if there has been trouble with the bowels. There may be a doughy mass due to fæces, which pits on pressure, to be felt pushing forwards the posterior vaginal wall.

(3) Coils of the small bowel may have fallen down into

the pouch of Douglas (enterocele). This is rare. A swelling is felt through the posterior vaginal wall, which gives rise to a gurgling sensation. The pouch may be unusually long, coming down to the perineum, and the prolapsed coils of bowel have been known to form a " perineal tumour ". Send for the doctor who will try to replace the bowel (taxis) with the woman in the knee-chest (genu-pectoral) position. If he cannot replace the bowel he will have to deliver the child as quickly as possible to remove the pressure. Intense and rapid pressure is not nearly so dangerous as when it is less severe but long continued.

(4) *Distended Bladder*.—As labour progresses the upper part of the bladder is drawn upwards above the pelvic brim and the urine is expressed more or less with each pain, but when the head is tightly fixed in the canal, the urine may accumulate and form a swelling between the uterus and the abdominal wall which will hinder the powers from acting. The bladder may go on filling and swelling till it reaches the umbilicus. This state of affairs should never be allowed to occur by taking care that the bladder is emptied from time to time. The condition is usually easily discovered on examining the abdomen, the swelling being exquisitely tender. A No. 10 male gum-elastic catheter must be passed far in (previously warmed and rendered aseptic) upwards and forwards close to the symphysis pubis till it has passed the child's head and has entered the bladder. If it cannot be passed without using undue force get assistance. But the bladder with the anterior vaginal wall may fall down before the child's head, forming a fluctuating tumour, which, unlike the bag of membranes, for which it may be mistaken, never feels lax or loose. Such a condition is called cystocele. It then distends the vagina and fills the pelvis, and may also be mistaken for the swollen anterior lip of the cervix, or other tumour, or even the head itself. Again, the catheter is to be used and its point will now be turned back into this pouch, and, with its evacuation, the swelling disappears. But unless this happens at once when the catheter is used and unless the catheter can be passed easily, assistance must be sought. It will often be necessary to chloroform

the patient, pass the hand into the vagina between the pains, and try to push the bladder up. As a last resource, the bladder has to be punctured and the urine drawn off in this way.

(5) *Stone in the Bladder or Urethra* (more commonly in the former).—If found during pregnancy it is removed before labour, if possible through the urethra. If it is found only during labour it presents itself as a firm, hard body felt through the anterior vaginal wall which can be moved about between the pains. Unless it is quite small and can be easily pushed up out of the way, or if it is discovered below the head, then send for assistance. It will have to be removed, then, under chloroform, by dilating the urethra, if possible.

(6) *Ovarian Tumours.*—These may be fluid (more often) or solid and, when small, are confined to the pelvis; when larger they cause an abdominal swelling, and hamper the powers of labour, changing the axis of the uterus by pushing it to one side. The abdomen is increased in size and it may be possible to make out a large fluctuating swelling with the uterus (contracting) lying to one side of it. When the tumour is confined to the pelvis it may be so large as to render the passage of a mature fœtus impossible. It is felt as a soft or sometimes dense resistant mass in front of the child's head. Examine by the rectum after making a vaginal examination, and do so both during and after a pain. As soon as such a condition is suspected, for the midwife can hardly be expected to diagnose it, send for assistance at once. They are dangerous, even if the child's head manages to pass spontaneously, as the tumour is crushed and bruised thereby, or it may even burst with serious consequences, such as peritonitis. Sometimes they cause rupture of the uterus. If a woman conceives with an ovarian tumour either the tumour will press on the uterus and empty it, or else the tumour will be pressed upon ; therefore ovariotomy should be performed during pregnancy, and the tumour removed. If the patient escapes aborting, premature labour often results. Sometimes premature labour is induced in such cases, but most authorities recommend ovariotomy.

When obstructing labour, the doctor tries to push the

tumour up out of the way of the child's head; if he cannot do so and it is fluid he punctures it and thereby empties it, and if it is solid or, if after emptying it, the child cannot be born, forceps are tried if there is room; if this cannot be done the child's head has to be broken up or, more often nowadays, Cæsarian section is performed.

(7) *Other Tumours of the Soft Parts.*—These include tumours of the Fallopian tubes, fibroid tumours of the uterus, polypi, inflammatory swellings of the vagina, various blood extravasations, such as pelvic hæmatocele, cancer of the cervix, rectum or bladder and tumours, abscess, dropsy (œdema) of the labia or varicosity of the veins of the labia. Inspection will discover affections of the labia, most of the other conditions will not be recognisable by the midwife. After emptying the bladder and rectum, medical assistance will be obtained to overcome the delay if things are at a stand-still. The midwife may or may not be able to satisfy herself as to the cause of delay. Various measures may be required, such as tapping or opening the swelling, removing it, applying forceps, turning, breaking up the child's head or Cæsarian section according to the existing circumstances.

CHAPTER XIX.

TEDIOUS OR LINGERING LABOUR (*continued*).

(8) *Abnormal Pelves.*—The various forms of abnormal pelves have a modifying influence on labour, in nearly every case causing a delay. We have in the first chapter considered the anatomy of the pelvis, its diameters and the methods by which we ascertain them (pelvimetry). There is, therefore, no need to go into these matters again, but we would refer the midwife to what has already been said. We have now to consider very briefly some of the types of abnormal pelves which we may meet with in midwifery practice. A pelvis may be well-formed, but abnormal in size. It may be unusually large ("justo major") or unusually small ("justo minor"). In the former case labour may be precipitate, in the latter it is usually delayed. On the other hand, the pelvis may be actually deformed, and the classification of deformed pelves which we shall adopt is that used by Professor Simpson.

Classification of Deformed Pelves.

(*a*) Individual peculiarities: (1) funnel - shaped; (2) deep; (3) shallow.
(*b*) Obliquely contracted (Naegelé's pelvis).
(*c*) Transversely contracted (Roberts' pelvis).
(*d*) Antero-posteriorly contracted (flat pelvis).
(*e*) Compressed pelvis (osteomalacic or malacosteon).
(*f*) Spondyl-Olisthetic pelvis.
(*g*) Pelvis distorted by morbid growths or injury.
(*h*) Sacro-coccygeal anchylosis.
We shall say very little about these deformities as they are beyond the scope of this work. Of some of them we give illustrations. And, in the first place, a word about the mechanism in a justo-minor pelvis, which is simply

an undersized but otherwise normal pelvis. Flexion of the head is unusually well marked just as it would be in a normal pelvis with a large head. All the diameters are shortened, but they bear their proper relation one to another; for example, if the interspinous be eight and a half inches instead of nine and a half, the intercristal will be nine and a half instead of ten and a half. Forceps will usually be required, more rarely some other operative procedure to effect delivery.

(*a*) 1. In the funnel-shaped and deep pelvis there is usually delay at the outlet from the undue approximation
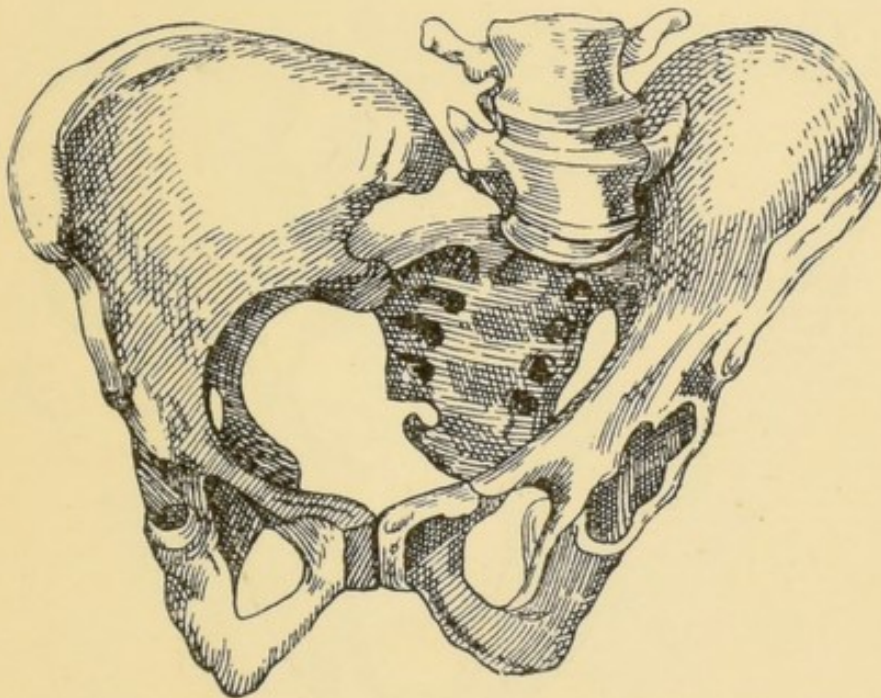
FIG. 84.—Naegelé's Obliquely Contracted Pelvis (after Simpson).

of the ischial tuberosities. It approximates in configuration to the male pelvis. (For characteristics of female pelvis as compared with the male see p. 9.)

(*b*) The obliquely contracted pelvis, called after Naegelé, is due to a want of development in one of the iliac bones and is usually associated with lateral curvature of the spine (scoliosis) and often with other deformities. In cases where it is the left ilium that is not developed, it is the right oblique diameter which is shortened.

(*c*) *Transversely Contracted Pelvis of Roberts.*—This is a double Naegelé pelvis, being due to a non-expansion of both iliac bones, the result of the fixing (anchylosis) of

the sacro-iliac joints. Here the trouble is at the pelvic brim. There is, however, another deformed pelvis which has also a transverse contraction of the brim; this is a kyphotic pelvis, that is to say a pelvis affected by kyphosis or arching backwards of the lumbar vertebræ, from disease of the lumbar part of the spinal column. Such a condition would be suspected in a hump-backed woman. Here the conjugata vera is increased (the opposite condition to that obtaining in a flat pelvis). The lower end of the sacrum is displaced forwards, and in the kyphotic pelvis the trouble is not at the brim, but in the cavity
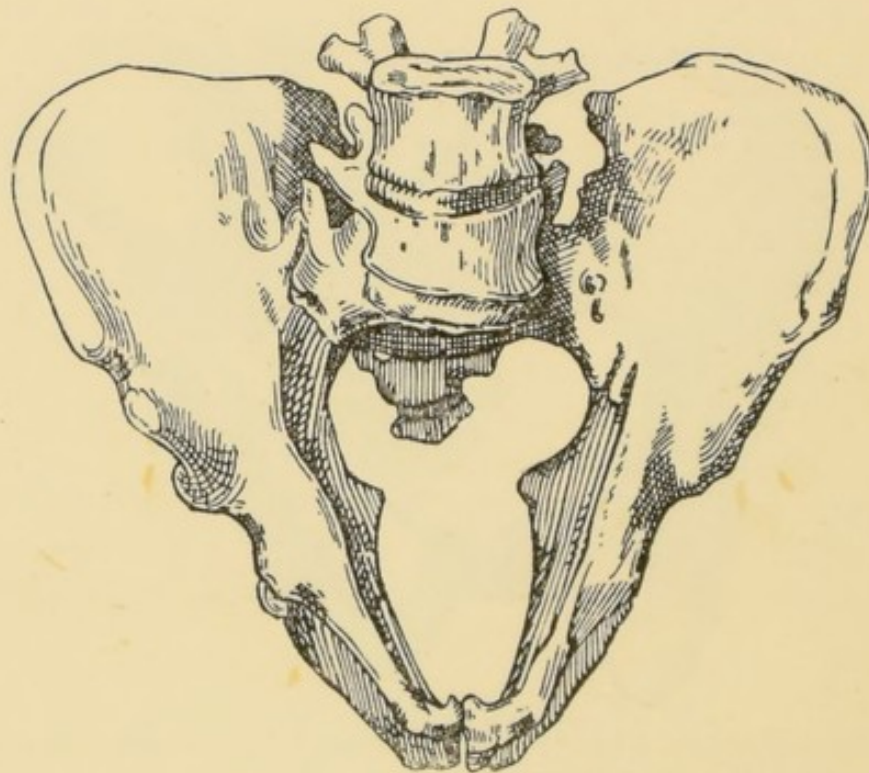
FIG. 85.—Roberts' Transversely (Doubly Obliquely) Contracted Pelvis (after Simpson).

and at the outlet where the antero-posterior diameter is diminished.

(d) *Antero-posteriorly Contracted or Flat Pelvis.*—This may be found with no other deformity, but usually it has to do with rickets; and so it is also called, but not quite accurately, the rickety pelvis. The conjugata vera is diminished, while the transverse diameter of the brim is lengthened, sometimes absolutely and always relatively. Passing to the cavity the sacrum is more or less flattened instead of being curved, and at the outlet the pubic arch

is increased in width, and the transverse diameter is usually wide. As to the false pelvis, the ilia are flattened out and the relation of the interspinous to the intercristal diameter is altered ; the former may be equal to or greater than the latter. The mechanism of the head in a flat pelvis is, briefly, as follows : The head attempts to enter the brim in the ordinary way, but cannot, because of the narrowing of the conjugata vera and obliques. It engages in the most roomy diameter, the transverse. As the head cannot enter the pelvis easily the front part of the head, which is narrower than the back part, is forced down in front of the latter, in other words the narrower bitemporal is substituted for the wider biparietal diameter. The anterior fontanelle comes, thus, to lie on the same level
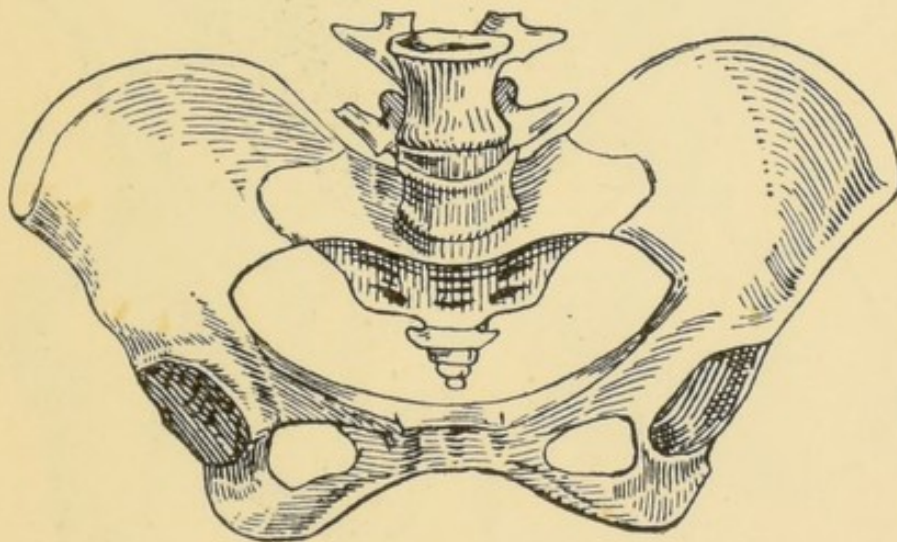
FIG. 86.—Flat Pelvis (Antero-Posteriorly Contracted) (after Simpson).

as or lower than the posterior, unlike the conditions obtaining in a normal mechanism, and instead of the head being flexed it passes through the brim extended. It then passes down through the cavity flexed in the ordinary way now that the obstruction at the brim has been overcome. But as the head passes through the brim, there is also another special movement—Naegelé's obliquity—which consists in a tilting of the head, the front parietal bone passing through the brim before the posterior. The three characteristics in the mechanism in a flat pelvis are therefore a transverse position of the head, increased accessibility of the anterior fontanelle, and

Naegelé's obliquity, and when these are found together a flat pelvis is diagnosed.

Some instrumental means of delivery will often be required in a flat pelvis and the perineum is liable to be badly torn.

(*e*) *Compressed Pelvis.*—This is due to osteomalacia, a disease of adult life which is characterised by a dissolution of bony matter taking place from the centre towards the circumference of the bones. This leaves the bones soft, porous and flexible, and the pelvis becomes compressed
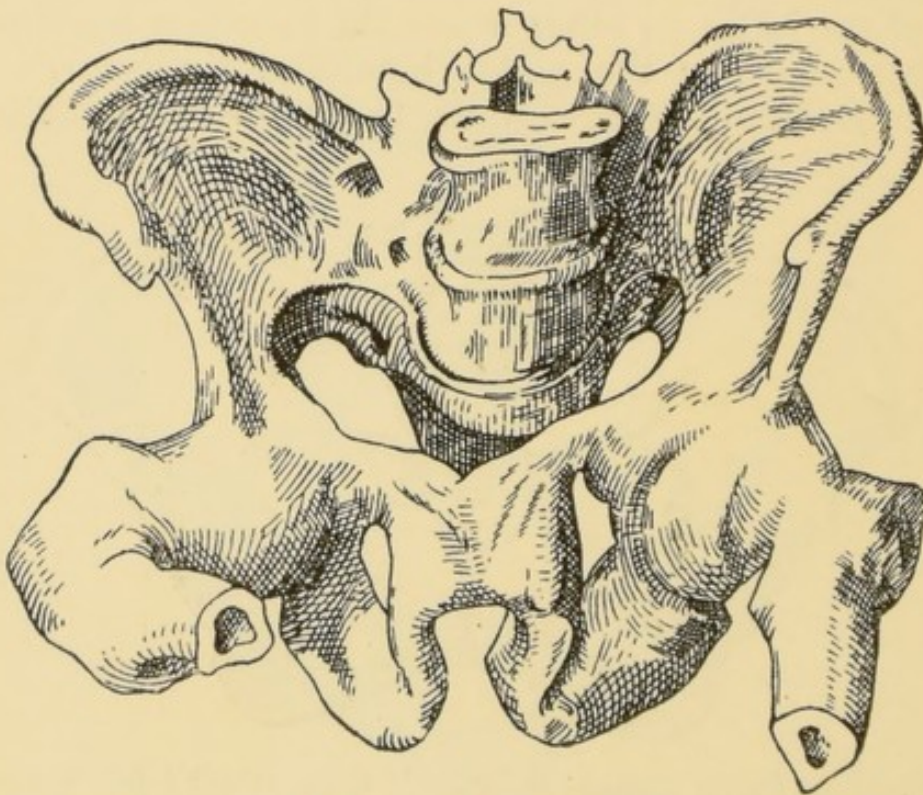
FIG. 87.—Compressed, Osteomalacic or Malacosteon Pelvis (after Simpson).

by the downward pressure of the spinal column and the upward pressure of the thigh bones on the acetabula. While it is prevalent in some parts of the world, as Italy and India, in this country it is almost unknown. The brim of the pelvis becomes stellate or triradiate, one branch running towards the symphysis pubis, the other two towards the sacro-iliac articulations. The illustration gives a very fair idea of the effect on the pelvis. Whereas the actual conjugate of the brim is actually lengthened, the available conjugate for the passage of the

child's head is markedly diminished as a result of the deformity.

(*f*) *Spondyl-Olisthetic Pelvis.* — As a consequence of disease of the lumbar vertebræ, they fall in front of the sacral promontory and thereby cause a narrowing of the conjugata vera. It is nothing more than a curiosity in British midwifery.
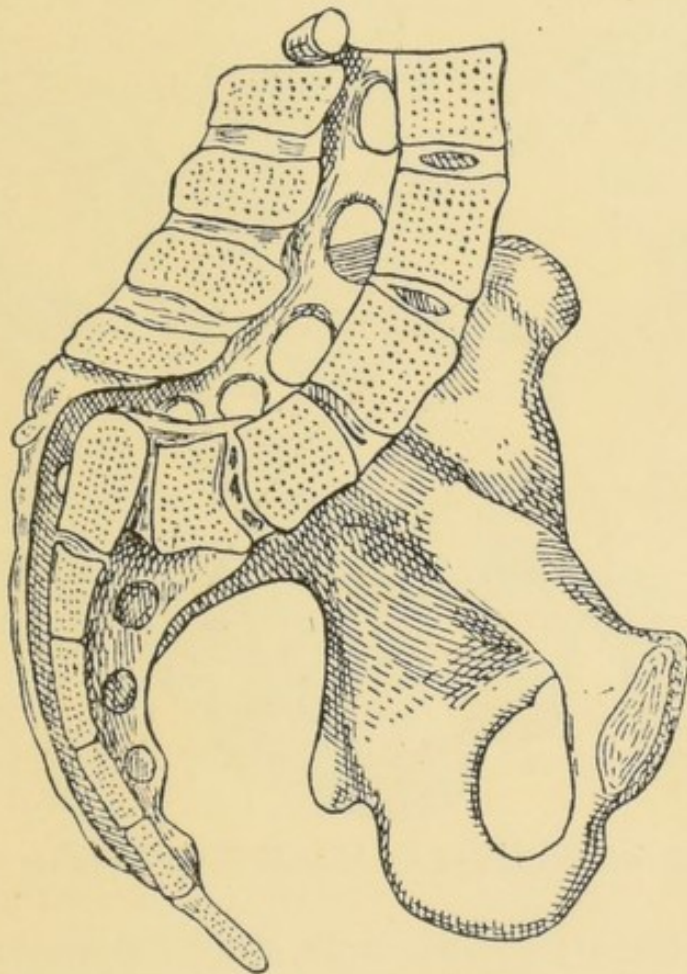
FIG. 88.—Spondyl-Olisthetic Pelvis on Section (after Simpson).

(*g*) *Pelvis Distorted by Morbid Growths or Injury.*— These may be in the form of actual bony tumours affecting various parts of the pelvis, or spinous projections which tear the soft parts. The haunch bone may have been fractured, and the new bone produced at the seat of injury may project into the pelvic cavity and diminish thereby its capacity.

(*h*) *Sacro-coccygeal Anchylosis.*—This, from injury or other cause, lessens the antero-posterior diameter of the

outlet, since normally the coccyx is capable of being bent backwards on the sacrum during the child-bearing period.

We have now to consider the effects of pelvic deformity on labour.

Malpresentations are generally supposed to occur four times as often in a deformed as in a well-formed pelvis, and when the head presents we are more likely to have it
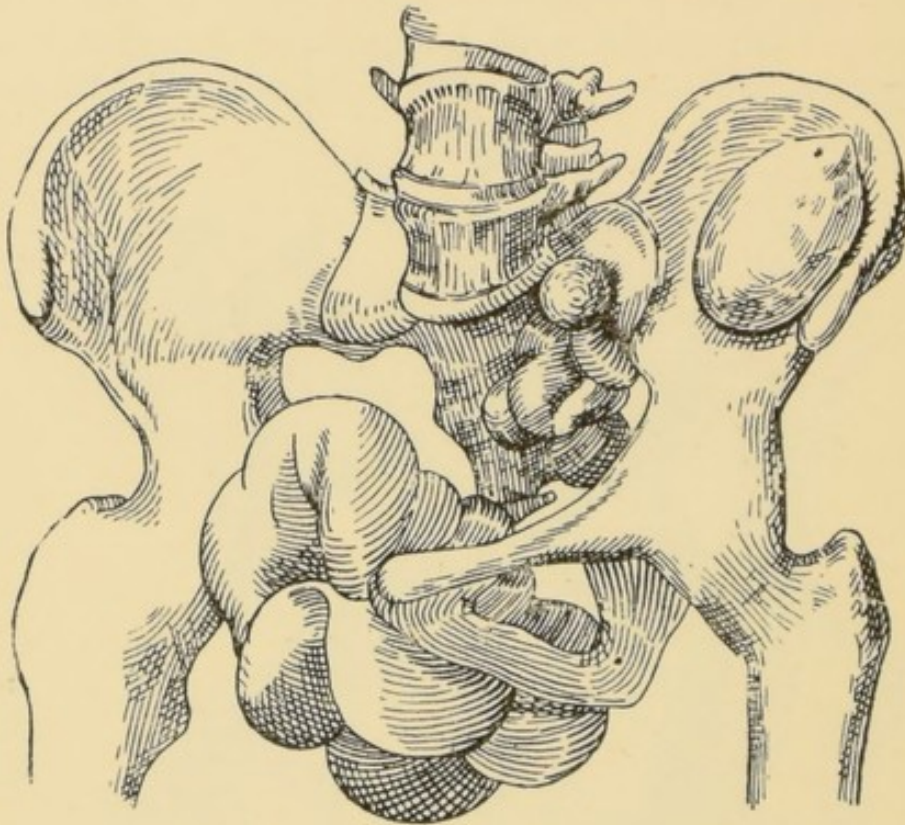
FIG. 89.—Pelvis Distorted by Morbid Growths (after Simpson).

presenting badly; for example, the head may be more or less extended, causing the brow or the face to replace the vertex, and a bad presentation of the head is not uncommonly associated with prolapse of the cord. In pelvic presentations the breech may be replaced by the foot, and transverse presentations in a deformed pelvis are generally worse than they would otherwise be. The membranes are often felt as a glove-like projection through the os (see p. 119) due to the want of support they receive from behind; they are apt for the same reason to rupture early and the liquor amnii may drain away almost entirely. There is also an increased liability to rupture of the uterus owing to extreme retraction of

the passive part which lies below Bandl's ring. The alterations in the mechanism depend on the particular kind of abnormality which is present. The mechanism in a justo-minor and in a flat pelvis has been briefly discussed.

As to the progress of the labour this is delayed to a greater or less extent, depending on the degree of contraction, the ability of the fœtus to adapt itself to such contraction or other deformity and on the length of time which elapses before assistance is given and the operative procedure which is carried out. Only in one case is labour not delayed but rather accelerated and that is in the justo-major pelvis. Here there is the liability to precipitate labour and to consequent post-partum hæmorrhage.

The mortality to the mother and child is increased in proportion to the kind and amount of contraction and to the consequent delay in the labour. The mother may die from exhaustion, from rupture of the uterus, from laceration of the uterus in the case of spiny projections in the pelvis, from sloughing of the soft parts, from the long-continued and severe pressure and, lastly, from the operative procedure undertaken to extract the child through the narrowed canals. As to the child, its life is endangered by the malpresentation, by prolapse of the cord, by the means taken to procure delivery and by the liability to its being still-born.

As to the diagnosis of abnormality of the pelvis the following points will assist us : (1) previous history both as to general health and, in a multipara, confinements ; (2) hereditary tendencies ; and (3) general appearance. A woman of short stature, with narrow hips, lateral curvature of the spine, angular curvature (due to disease of the vertebral column), deformities of the lower limbs, especially bandy-legs, and, lastly, pendulous belly (in a primipara), arouses our suspicions that she has a deformed or abnormal pelvis.

But in order to confirm our suspicions it is necessary to proceed to direct examination of the patient. This, it is needless to say, should, if possible, be done before labour sets in, and when pelvic abnormality is suspected a doctor should be called in who will ascertain by

pelvimetry the nature and degree of pelvic contraction present. Pelvimetry has already been considered briefly, both external, by means of the calipers, and internal, by means of the fingers. The two most important diameters to ascertain are (1) the interspinous, and (2) the diagonal conjugate (see p. 6). Regarding the latter, it should be remembered that whereas in a well-formed pelvis we need not subtract more than half an inch from the diagonal conjugate to ascertain the true conjugate, in a rickety or flat pelvis we must subtract quite three-quarters of an inch, so that should the diagonal conjugate measure four and a quarter inches in a flat pelvis we may be sure that the true conjugate will only be three and a half inches. In addition to pelvimetry we would remind the midwife ot what we said regarding the palpation of the abdomen at the commencement of labour with a view to ascertaining whether or not the child's head has entered the pelvic brim.

Pelvimetry, as practised by internal examination after delivery, by the folded hand and subsequently measuring it with calipers need not detain us.

What is the treatment to be adopted for delivering a woman with a contracted pelvis? The choice between the various obstetrical procedures undertaken is decided to a large extent by the measurement of the true as obtained from the diagonal conjugate.

I.	True conjugate		4-3 inches.	Forceps.
II.	,,	,,	$3\frac{3}{4}$-3 ,,	Turning.
III.	,,	,,	$3\frac{1}{4}$-$2\frac{1}{2}$,,	Symphyseotomy or induction of premature labour.
IV.	,,	,,	3 to 2 ,,	Embryulcia.
V.	,,	,,	below 2 ,,	Cæsarian section.

These operations will be described in turn in a later chapter.

It will be seen that these figures overlap since other measurements and circumstances have to be taken into account in deciding which operation to perform.

3. *Faults in the Passenger.* (1) *Shortness of the Umbilical Cord.*—This is nearly always accidental, due to the cord being twisted round the child. It is usually not discovered until the head is born. It is said to cause

sometimes early separation of the placenta, inversion of the uterus, or rupture of the cord. The management of such a case consists in slackening and freeing the cord; if it cannot be loosened, divide it and lay hold of the ends to control the bleeding and tie as soon as possible.

(2) *Death of the Child.*—This is more often a result than a cause of delay. A dead child does not delay labour, but usually accelerates it, unless it become enlarged in bulk from the collection of gas under the skin (emphysema).

(3) *General Large Size of the Child.*—The infant may weigh nine or ten pounds instead of about seven. Male children are longer in being born as a rule than female, as the head in the former is about one-eighth of an inch larger in its transverse diameter.

(4) *Enlargement of the Head or Body from Disease.*—Such enlargements include hydrocephalus[1] ("water on the brain"), fluid in the chest or abdomen, and tumours of the liver, kidneys, spleen or other parts. It is only the first named that we shall very briefly refer to. The cavities (ventricles) of the brain are distended with fluid and the head is increased in size in varying degrees according to the amount of distension of these cavities. The frequency of hydrocephalus is stated to be 1 in 1,000 cases.

When hydrocephalus is well marked the head becomes the broader end of the fœtus and thus pelvic presentations are frequent, but usually we have to do with cases in which the hydrocephalic head presents. Abdominal examination may reveal nothing further than the fact that the head has not entered the brim nor can it be made to do so on posturing the patient (see page 151), but often the large, bulky head may be felt between the two hands. On vaginal examination the head is found to be not easily accessible. If it can be felt early in labour, it will be found to be bulky. The most characteristic sign is, however, a wide membranous expanse between the margins of the bones which is usually present. Pressure on the thinned bones may elicit a crackling like that of dry parchment.

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[1] Derivation Grk. *hydro*, water; *cephalus*, head.

The point which is most important to realise is that this deformity constitutes one of the commonest causes of rupture of the uterus, and hence the importance of its early detection so that medical aid may be obtained without delay. The lower uterine segment soon becomes stretched and after six or eight hours Bandl's retraction ring becomes well marked, separating the active from the passive parts of the uterus. When such a state of affairs exists the mother is in extreme danger, the high mortality in such cases being due, as we have said, to rupture of the uterus; the active part going on contracting and the passive part continuing to stretch until it gives way. When the breech presents the danger to the mother is generally less as the lower uterine segment is not so much stretched. The child when born is puny and ill nourished. The doctor attempts to diminish the size of the child's head when it has not yet entered the brim by perforating the child's head with aspirator, trocar and cannula, scissors or knife.

To recapitulate, the midwife will suspect hydrocephalus if (a) the head has not entered and cannot be made to enter the brim ; (b) labour pains are quite strong, (c) there is nothing in the pelvis to prevent the head coming down, there being no reason to suspect pelvic deformity ; (d) in head-last cases the trunk, when born, is seen to be shrivelled, puny and ill-nourished.

(5) *Malposition of the Head.*—This we have already referred to under the mechanism of labour (see p. 134) as the occipito-posterior position of the head. We have also seen why it is a cause of delay. The points which lead us to diagnose an occipito-posterior position of the head are (a) the child's limbs are felt more towards the front ; (b) the fœtal heart is heard further round towards the mother's back than in occipito-anterior cases ; (c) the anterior is as accessible as or more accessible than the posterior fontanelle ; (d) the broad, smooth convexity of the back is absent. When an occipito-posterior case is diagnosed, unless the head makes good progress send for the doctor and keep the membranes intact as long as possible. As the labour advances look out for the occiput rolling forwards. If the head remains on the perineum with the occiput posterior get assistance. Be very careful of

the perineum as it is very liable to be torn. Keep the head back until the external parts are well dilated.

(6) *Malpresentation of the Head.*—Instead of the vertex presenting as it does in a normal labour, other parts of the head may present. If flexion be increased as it is, for example, in a justo-minor pelvis, instead of the vertex we should have the occiput itself. A parietal bone may present from the dipping of one of the parietals as in Naegelé's obliquity, the corresponding ear being then easily accessible to the examining finger. This would be most likely to happen in cases of antero-posterior contraction of the pelvis. Thirdly, the brow may present, when flexion is badly marked, this being intermediate between a vertex presentation and that of the face, where the head is fully extended. In a brow presentation vaginal examination would reveal the root of the nose, the orbital ridges, and on the other side the anterior fontanelle. A brow presentation is very rare. It may flex and become transformed into a vertex, or it may become fully extended and be transformed into a face presentation, or the brow presentation may persist as such, the forehead (usually) rotating to the front. The head then flexes somewhat, the vertex passes out, extension then follows and the mouth and chin successively slipping out under the pubic arch. We may say here that the various mechanisms must be practised with a fœtal head and a mannikin in order that they be understood. Then they cannot be forgotten. When the head presents fully extended instead of being flexed we get a face case. The circle of the os is occupied by the centre of the face and nose. It occurs once in from 160 to 200 cases, and with equal frequency in primiparæ and multiparæ. Primary face cases are those in which the head presents in this position prior to labour; such cases are very rare. More frequently we have to deal with a face presentation which has developed subsequently to the onset of labour (secondary face presentation) due to faults in the first, second or third factor of labour. The cause of face presentations is also the cause which prevents the head from passing down flexed as it should do in a normal labour. If the uterus be turned to one or the other side, if it be rendered oblique, the direction of the

propelling force is changed. Suppose, for example, that the uterus is turned to the right the force will act downwards and to the left, and that part of the head which is to the left is pushed down. If this be the occiput flexion is increased, if it be the forehead then we have extension. Secondly, contraction of the pelvic brim tends to cause extension of the head since the smaller bitemporal is substituted for the larger biparietal diameter, with the result that the front part of the head will come down in advance of the occiput. Similarly, if the child's head be large from before backwards, that is to say if the occipito-
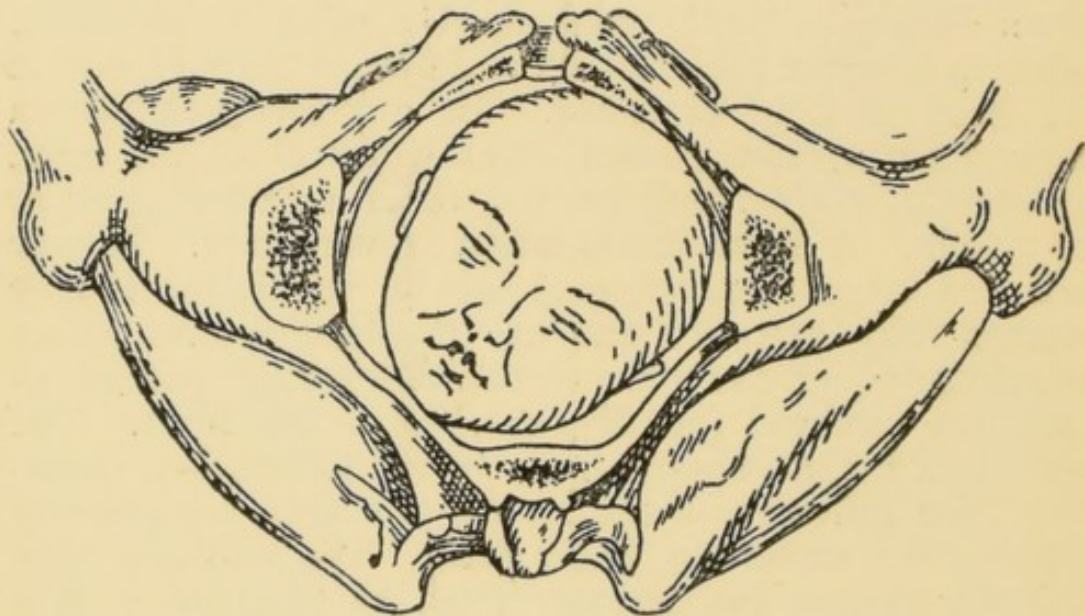
FIG. 90.—Face Presentation I.—Right mento-posterior R. M. P. derived from cranial L. O. A. (first in frequency) (seen from below).

frontal diameter be increased from any cause, the same result will happen. There are other causes which sometimes act in producing a face presentation, for example any conditions which prevent the chin being approximated to the sternum, such as intervention of an arm and excess of liquor amnii. This increases the movement of the fœtus, and instead of the head being kept in the pelvic brim when the membranes rupture the part which happens to be nearest the os uteri presents. This may be the face, often it is a shoulder.

The positions assumed by the face are four, and as we saw the occiput to be the denominator in a vertex case

so here the chin (Lat. *mentum*) is the denominator and the positions are named according as the chin is to the front or back and to the right or left. Thus we have right mento-posterior (R. M. P.) and left mento-anterior (L. M. A.) when the child lies in the right oblique diameter and left mento-posterior (L. M. P.) and right mento-anterior (R. M. A.) when it lies in the left oblique.

By studying the figures and by practising on the mannikin it will be seen that these positions of the face (in secondary cases) are due to extension of the vertex
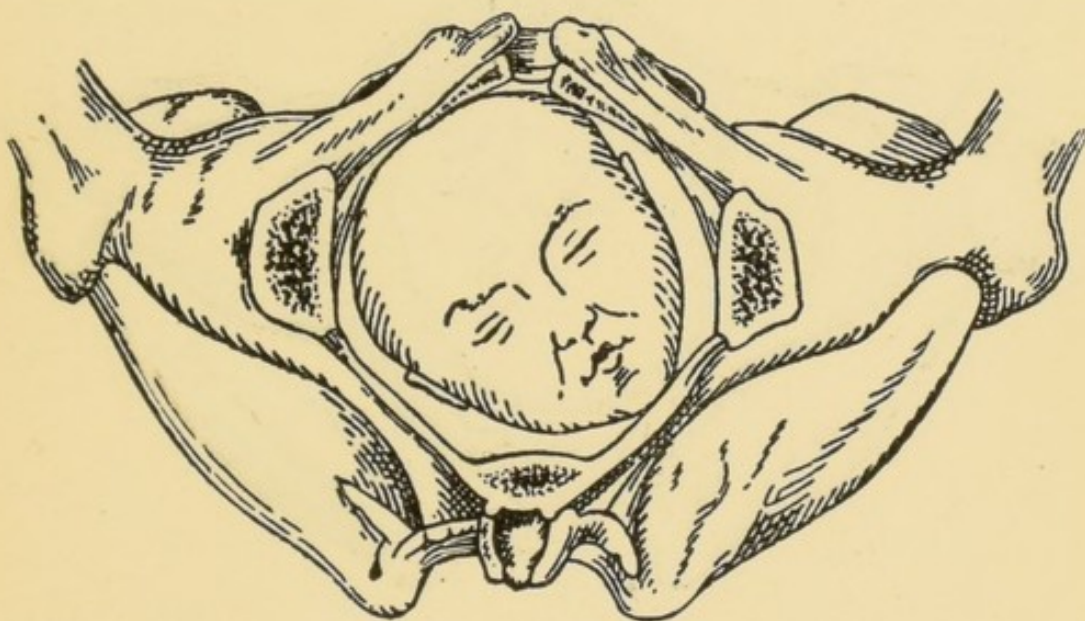
FIG. 91.—Face Presentation II.—Left mento-posterior L. M. P. derived from cranial R. O. A. (third in frequency) (seen from below).

positions. Thus the commonest position of the face, with the chin lying to the back and to the right (R. M. P.), is derived from the first cranial position (L. O. A.) The following table will show this:—

(1st) R. M. P. position of the face derived by extension of the head from L. O. A. position of vertex.
(2nd) L. M. P. position of the face derived by extension of the head from R. O. A. position of vertex.
(3rd) L. M. A. position of the face derived by extension of the head from R. O. P. position of vertex.
(4th) R. M. A. position of the face derived by extension of the head from L. O. P. position of vertex.

In these positions of the face the fronto-mental diameter corresponds to the occipito-frontal in vertex cases. The movements imparted to the face are at all points the converse of those imparted to the head in a vertex presentation. Descent goes on all the way through as in a vertex case. The first special movement is extension, this is an exaggeration of the position occupied by the fœtus and the child thus engages in the brim, the forehead looking forwards and to the left (also the back), and the chin backwards and to the right (in the commonest face position which we are taking as our example). The axis
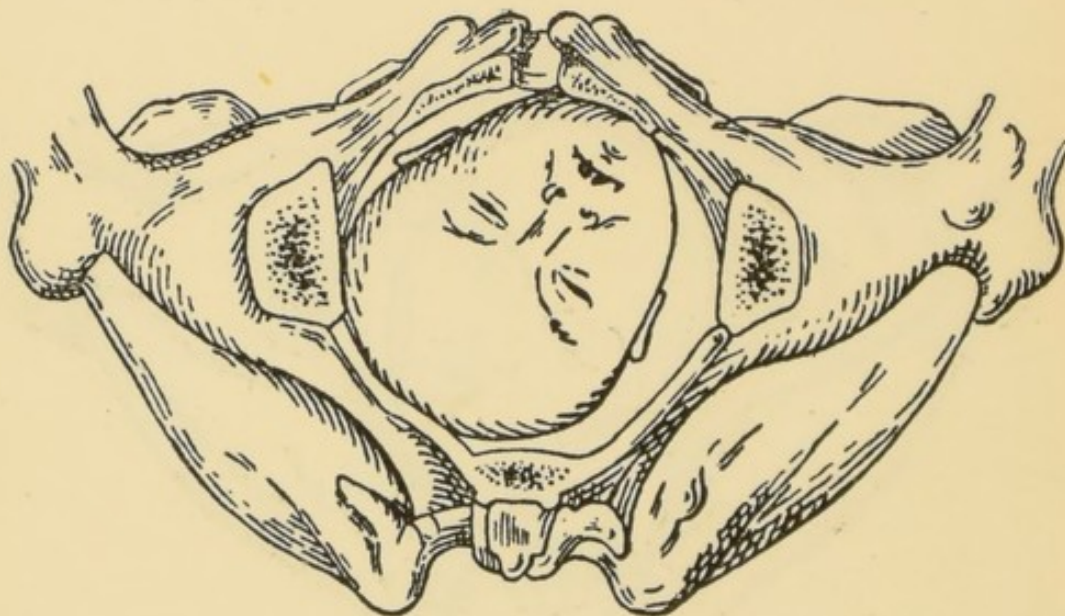
FIG. 92.—Face Presentation III.—Left mento-anterior L. M. A. derived from cranial R. O. P. (second in frequency) (seen from below).

of the brim will be represented by a line drawn from the posterior fontanelle to the centre of the upper lip. So placed, the face descends through the pelvis in the right oblique diameter, the extent of the descent depending on the length of the child's neck. The next movement is the essential one in a face case. This is internal rotation. It takes place when the chin meets with resistance in the floor of the pelvis. The chin rotates right round the right wall of the pelvis until it comes to lie under the pubic arch. After the chin has become fixed in this position flexion takes place, and forehead, vertex and occiput in succession pass over the perinæum. This is

followed, as in a vertex case, by external rotation, the face turning to the mother's right thigh.

Just as in occipito-posterior cases the occiput has a long rotation if the head is to be born with the occiput to the front, so in mento-posterior cases the same happens. Therefore, when the chin is behind, the face presentation may be a difficult one; for, as in a persistent occipito-posterior case, the chin may not rotate forward, but may pass backwards into the hollow of the sacrum. This makes delivery very difficult, unless the pelvic outlet be large and the child small, and may necessitate craniotomy to deliver the child.
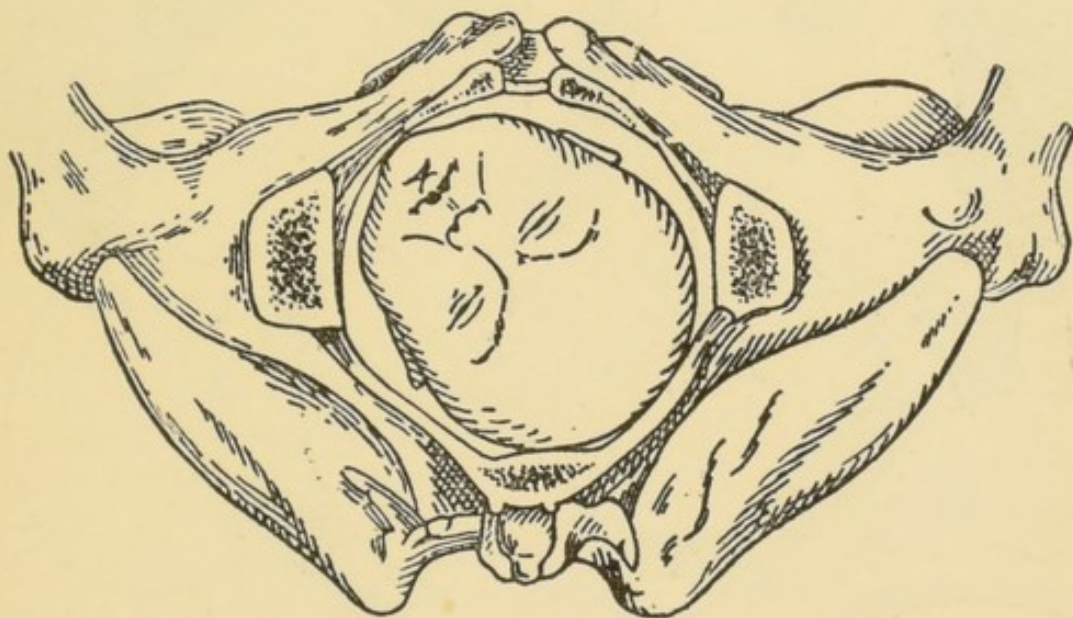
FIG. 93.—Face Presentation IV.—Right mento-anterior R. M. A. derived from cranial L. O. P. (fourth in frequency) (seen from below).

Diagnosis of a Face Case.—The finger, on vaginal examination, misses the round, hard, smooth surface of the skull and the part we touch is softer. The ridge of the nose, the orbital ridges and the mouth are felt. The last named is the most easily identified. The finger put into the mouth comes on the gums and the tongue. It must be remembered that the face is a more delicate part to examine than the bony vertex and care must be taken to be very gentle, otherwise the eyes may be damaged. External manipulation of the abdomen may reveal the head lying to one side and, above it, a depression between

the head and the back. If examination be deferred till after the membranes have ruptured, the diagnosis will be more difficult owing to the swelling caused by the large caput succedaneum, which may cause the face to be mistaken for the breech.

Having diagnosed a face presentation, medical aid is to be summoned forthwith. The midwife will try and make
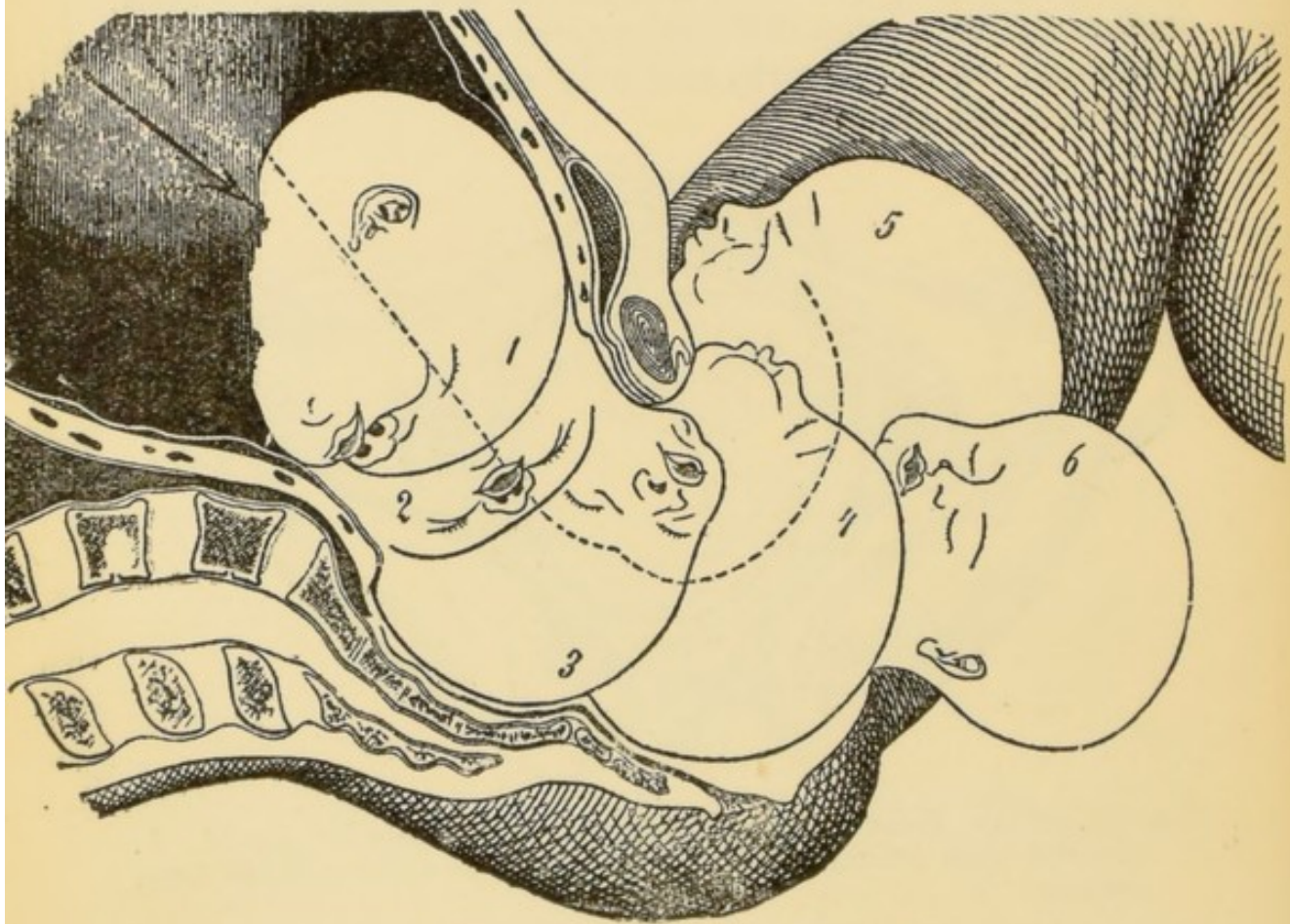
FIG. 94.—Mechanism of the Head in a Face Presentation
(after Simpson).

out the position of the face as it is important in the management of a face case to know whether the chin points to the front or to the back of the pelvis. Why is labour delayed in a face case? This happens because of the conditions present which have caused an extension of the vertex presentation from which the face case is derived (in secondary cases). The face does not act as a sufficient plug to the liquor amnii, the membranes present like the finger of a glove and tend to rupture early, when

the face fails to dilate the cervix so satisfactorily as the vertex. The most common face position is that with the chin behind and there is the liability to a persistent mento-posterior position which renders unaided delivery almost impossible.

Considerable moulding of the child's head takes place and the face is much swollen. The outlook for the child is serious. Thirteen per cent. of the children are born dead either as a result of the delay in the labour or from the severe and long-continued pressure on the head. The child may have to be killed to allow of its delivery. The outlook for the mother is often serious, but by no means unfavourable.

The management of a face presentation should be in the doctor's hands; but it may happen that the midwife is alone when the face is born in a case where the chin is to the front and the labour is fairly easy. In the first place as soon as the face is diagnosed or even suspected be very careful not to injure the eyes, and, to keep the membranes intact, examine only between the pains. The doctor will perhaps decide to turn the child and bring down the feet, especially if the membranes are intact, if the patient is a primipara and if the chin is to the back. If the patient be a multipara he will be more disposed to wait and watch the progress of the case, perhaps at a later stage delivering with forceps. Especially will he do this if the chin is to the front. If the patient is advanced in labour, the membranes have ruptured and the liquor amnii has drained away, turning cannot now be performed, and the only alternatives are forceps and, if they cannot effect delivery, craniotomy. The face is not adapted for forceps as it is hard to get a good grasp as in a vertex case.

Sometimes some part of the upper extremity comes down with the head; the hand or the hand and forearm or the whole arm may be displaced. Such a condition occurs once in 400 labours. If it is discovered prior to rupture of the membranes a little manipulation may replace it; but when it is discovered the midwife had better obtain help straightway. It is more commonly diagnosed after the membranes have ruptured. To distinguish from the foot the separability of the thumb

should be noted and the fact that the hand is in line with the limb from which it springs. The hand may even appear at the vulva. The labour may in such a case be terminated naturally, but frequently operative assistance will be required.

CHAPTER XX.

INSTRUMENTAL LABOUR.

..ow about to consider the second subdivision of ̃ labour, namely, instrumental labour. By it we ̣abour where the head presents, but owing to a ̣f harmony or balance between the factors the ̣ess cannot safely be left to nature. Strictly speak- ̣, an instrumental labour might be taken to refer to ̣se of forceps or the various instruments by which ̣ild's head is reduced in size; but it will be con- ̣. to include certain other obstetric operations such ̣s symphyseotomy, Cæsarian section and the induction of premature labour.

Version (or turning) will be referred to when we speak of transverse presentations as it is more conveniently considered in this connection.

I. *Forceps.*—The forceps may be regarded as a pair of metal hands which are adapted for drawing the head or the breech out of the genital canal. The instrument was invented by Chamberlain in the seventeenth century and has since undergone almost endless modifications. The most perfect instrument at present is the axis traction forceps at first designed by Tarnier. Briefly, the evolution of the forceps may be divided into four periods : (1) the primitive short straight instrument of Chamberlain; (2) the long curved instrument of Smellie and Levret; (3) the addition of handles with compensation curve by Hubert and Aveling; and (4) the axis traction forceps with jointed rods of Tarnier and the various modifications of this instrument now on the market.

The blade consists of three parts, the blade proper, the handle and the lock, the first named being the most important. The midwife should examine the forceps when she has the opportunity, noting the curves of the blades and the lock.

The advantages of the axis traction forceps over the ordinary forceps are that

1. Traction is made in the proper axis of the pelvis, and the normal mechanism is not interfered with.

2. The traction power is increased.
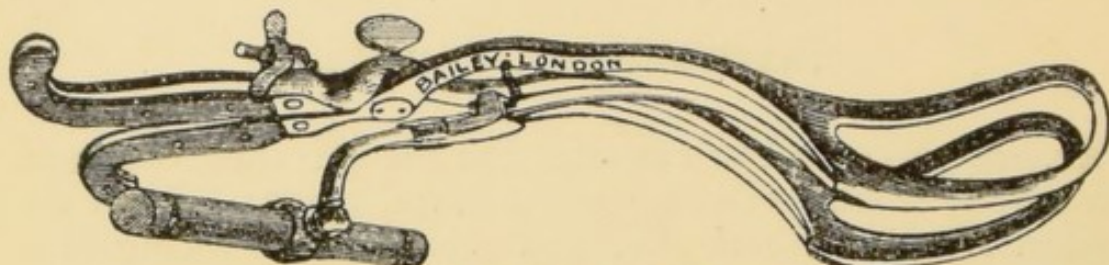
FIG. 95.—Axis Traction Forceps.
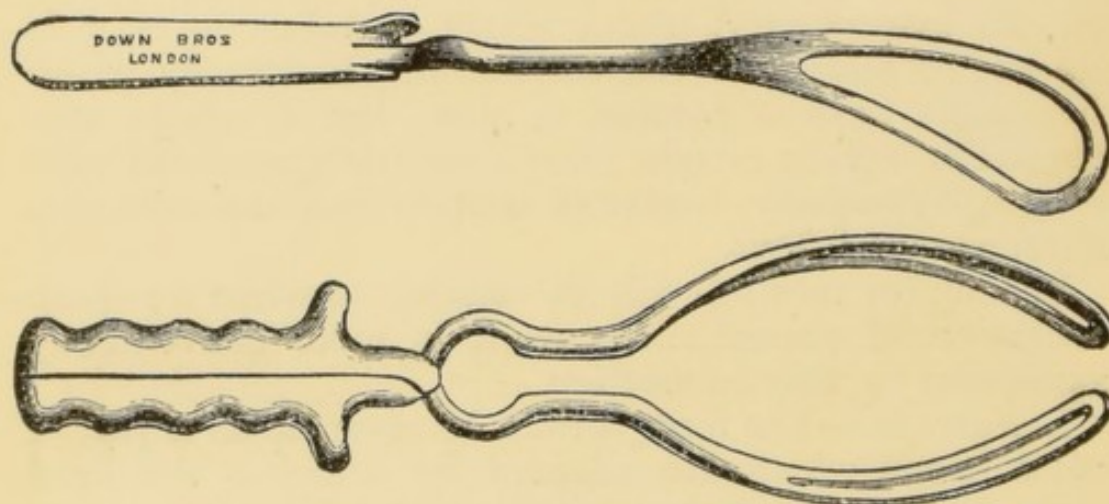
FIG. 96.—Barnes's Forceps with Simpson's Ebony Handles.
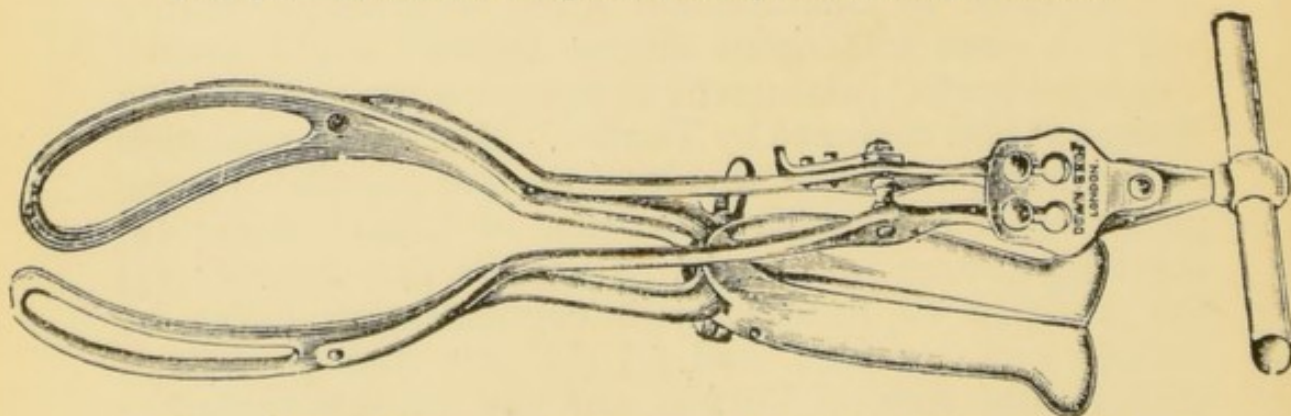
FIG. 97.—Milne-Murray Axis Traction Forceps with Aseptic Metal Handles.

3. The forceps are not so likely to slip.

4. There is less compression of the head.

What are the modes of action of the forceps?

1. *Traction.*—This is the essential action of the forceps.

2. *Compression.*—This usually favours the progress of

the labour when the grasp of the forceps on the head is lateral and not antero-posterior. In the latter case compression may be dangerous.

3. *Dynamic Action.*—The forceps act as a foreign body in the genital canal and stimulate the uterus to contract.

The forceps may be applied to the head when it is at or above the brim (high operation) or when the head has passed through the brim (low operation).

We shall now give the indications for the use of the forceps and then state the rules which Professor Simpson is in the habit of teaching as to their application, with a few modifications. The midwife's duty in all cases of instrumental labour will be to do what the doctor tells her, to make all necessary preparations, and to endeavour to help him as much as she possibly can.

Indications for the use of the forceps :—

A. Delayed labours :—
 1. Faults in powers.
  (1) Uterine—inertia, irregular action.
  (2) Accessory.
 2. Faults in passages.
  (1) Soft canals—cervix (rarely), vagina, perineum.
  (2) Hard canal—pelvic contraction according to its degree and form.
 3. Faults in passenger.
  (1) Large size of the head.
  (2) Malposition of the head.
  (3) Malpresentation of the head.
B. Dangerous labours.
 1. Maternal complications.
 2. Fœtal complications.

The former include conditions such as hæmorrhage, convulsions, heart-disease; and the latter, prolapse of the cord, the after-coming head in a pelvic presentation, where suffocation is threatening, and head-locking in twin labour.

Rules [1] to be observed in using the axis traction forceps:
 . Preliminary :—
 A1. Be perfectly assured of their necessity.

---

[1] We do not expect that the midwife is to commit to memory these rules which in large measure do not concern her at all. We have only included them in the text that she may be the better able to help the doctor.

2. Always tell the relatives and generally the patient (she may be under the influence of chloroform).

3. Be cautious regarding the forecasting of the effect on the child.

4. Always empty the rectum and the bladder.

5. Place the patient on her left side, having her body across the bed and her buttocks well over the edge of it.
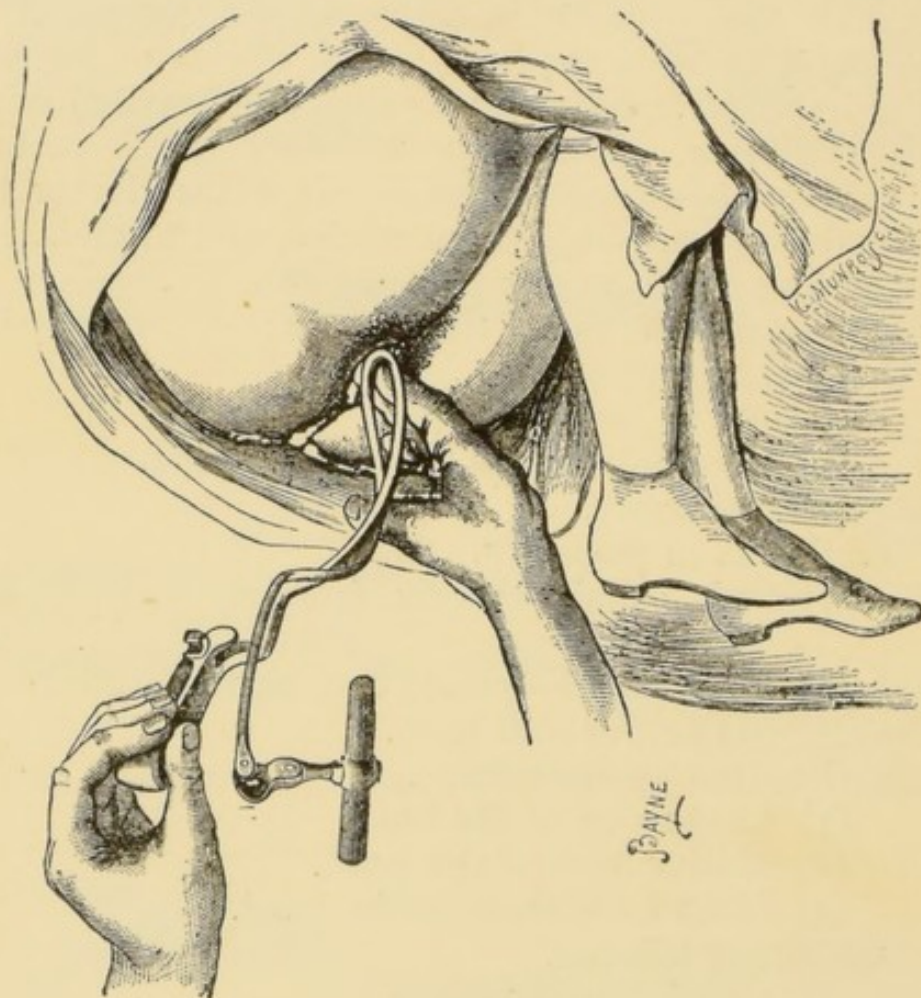
FIG. 98.—Introduction of Left Blade (Simpson).

An assistant supports the upper (right) knee to help the introduction and the use of the forceps. The overhanging buttocks must also be supported.

6. Use an anæsthetic as a general rule.

7. Place the forceps in a jug of hot water which has been boiled; then grease them with an antiseptic lubricant (not perchloride of mercury).

8. Bathe the perineum and vulva with warm antiseptic solution.

9. Assure yourself of the exact position and relations of the head of the child before introducing instruments into the genital canal.

B. Introduction of the forceps :—

1. See that the instrument is clean and warm.

2. Introduce the left blade first (that is to say the blade which will lie on the left side of the pelvis), which has the
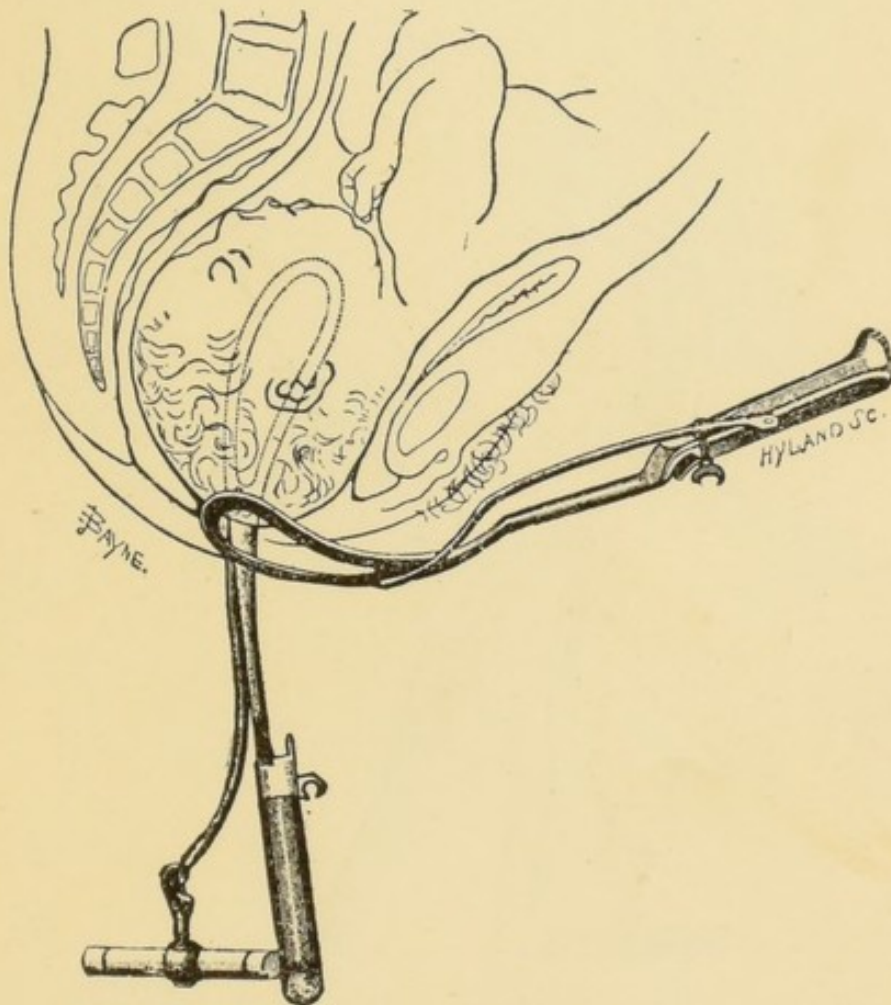
FIG. 99.—Introduction of Right Blade (Simpson).

traction rod and handle to it and is (often) stamped "left, lower, first".

3. Hold it in the left hand and use the fingers of the right hand as a guide.

4. Insinuate the blade gently and do not force on instrument. Introduce the blades between the pains.

5. Keep the point of the forceps always in contact with the head of the child.

6. Introduce each blade so that its concavity is adapted to the convexity of the fœtal head.

7. Enter and apply each blade in the proper axis of the pelvis.

8. When the left blade is fully introduced give it to the midwife to hold firmly in position and use the first two fingers again as a guide.

9. Introduce the right blade with the traction rod swung forwards and pointing it at first towards the hollow of
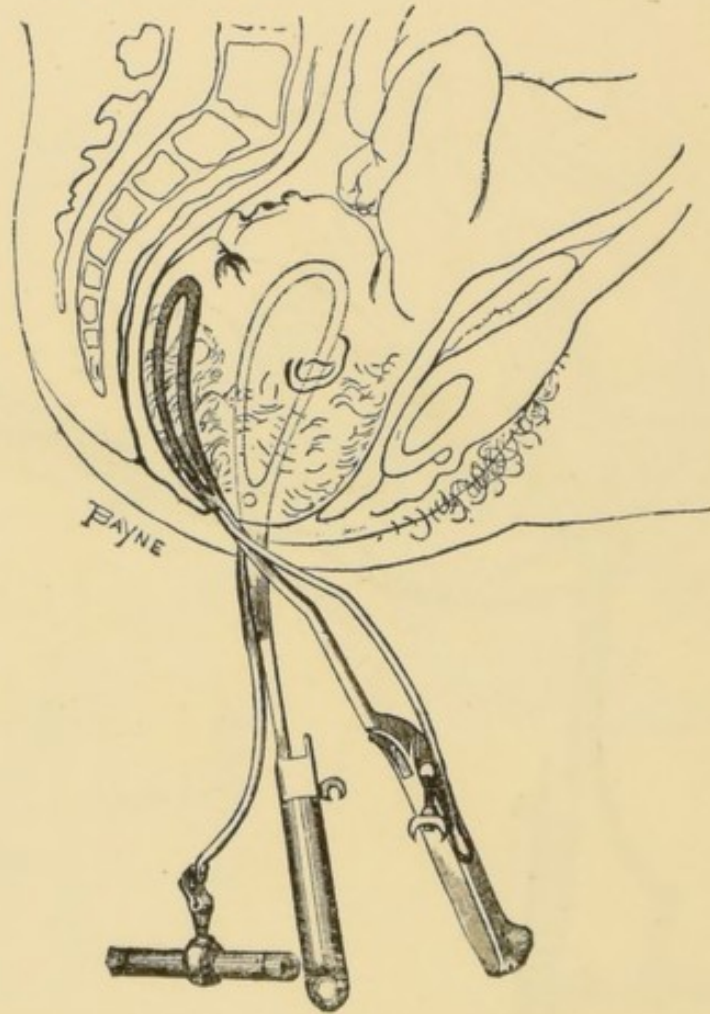
FIG. 100.—Introduction of Right Blade (Simpson).

the sacrum, at right angles to the left blade already introduced.

10. Carry it round the head until it comes into complete antagonism with the blade first introduced.

11. Swing back the right rod and adapt it to the locking plate.

12. Adapt but do not tighten the fixation screw.

C. Working of the forceps:—

1. Grasp the application handles, fix the screw at the point where safe and sufficient compression is secured.

2. Make traction with traction handle during a pain, or, if no pains are present, at intervals, imitating the natural progress of the child's head. If traction is constant it must be gentle.

3. Keep the traction rods parallel with the shanks.

4. After each traction slacken but do not unship the screw and examine the progress of the head.
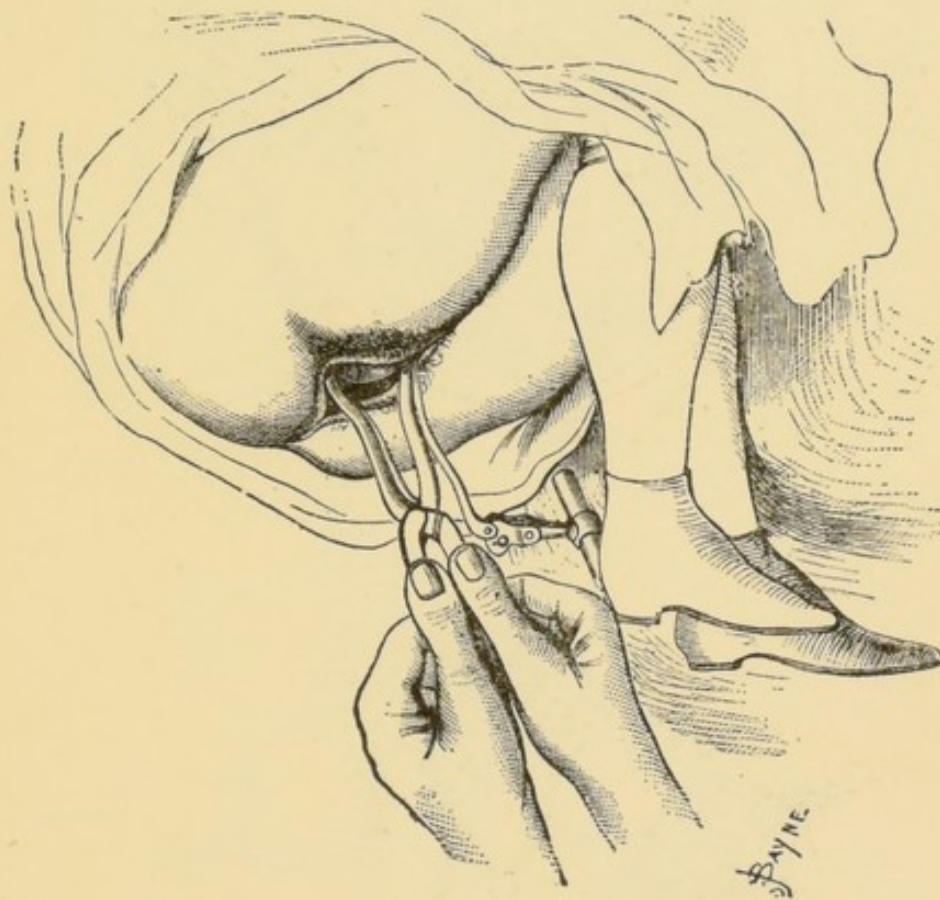
FIG. 101.—The Locking of the Forceps (Simpson).

5. Follow the application handles and the head then descends in the proper axis.

6. Support the perineum carefully with the left hand.

7. Make the head distend it and pass over very slowly and allow the uterus itself as often as possible to complete the expulsion of the head and always of the body, assisting delivery by supra-pubic pressure.

8. Immediately after the birth of the head slacken the screw, free the right rod and remove the blades, first the right and then the left.

9. Examine the maternal canals carefully after using forceps.

10. A vaginal douche of 1-2,000 corrosive sublimate or other antiseptic is now given.

II. *Instrumental Labours which are Destructive to the*
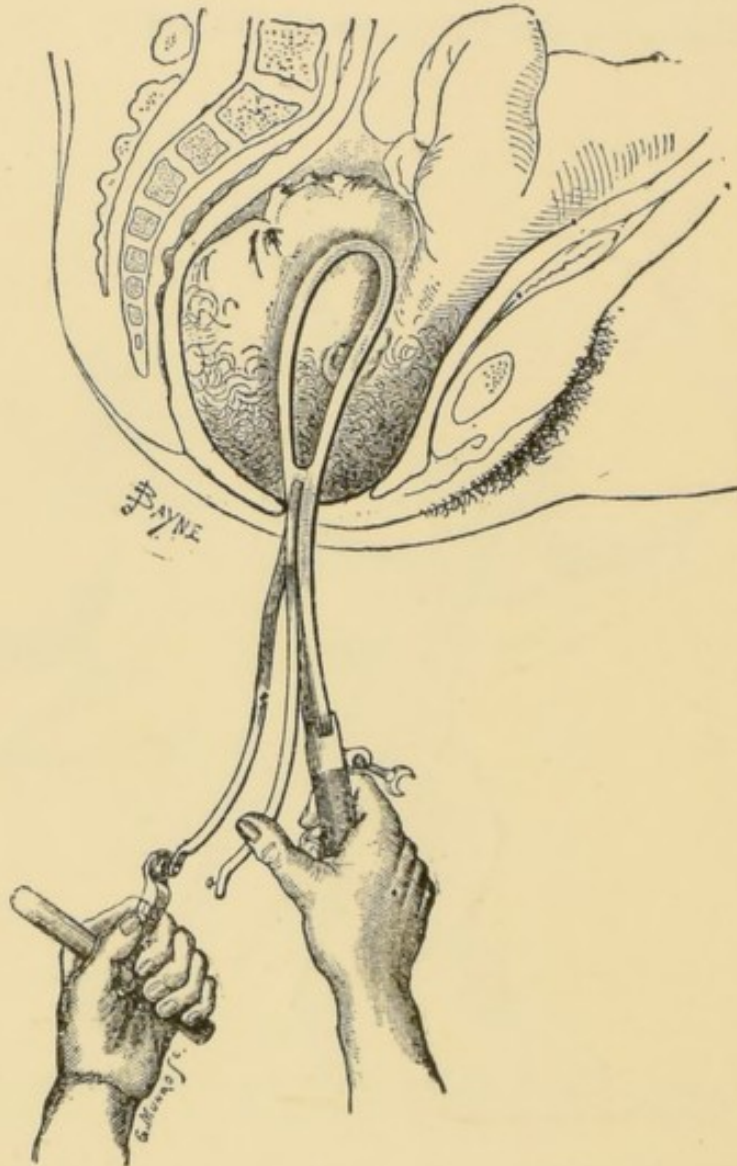
FIG. 102.—The Unlocking of the Forceps (Simpson).

Child.—The operation of embryulcia or mutilation of the child's head to diminish its size is divided into three stages: (1) perforation; (2) head comminution; and (3) extraction. The conditions in which embryulcia may be called for are somewhat the same as those demanding the use of forceps, but obviously occurring in a more severe form, since embryulcia is only resorted to when the

infant must be sacrificed to save the mother's life. Such conditions include those cases of deformed pelvis where the true conjugate is between two and three inches, extreme contraction of the soft parts, uterine and ovarian tumours which prevent the child's head, in its natural
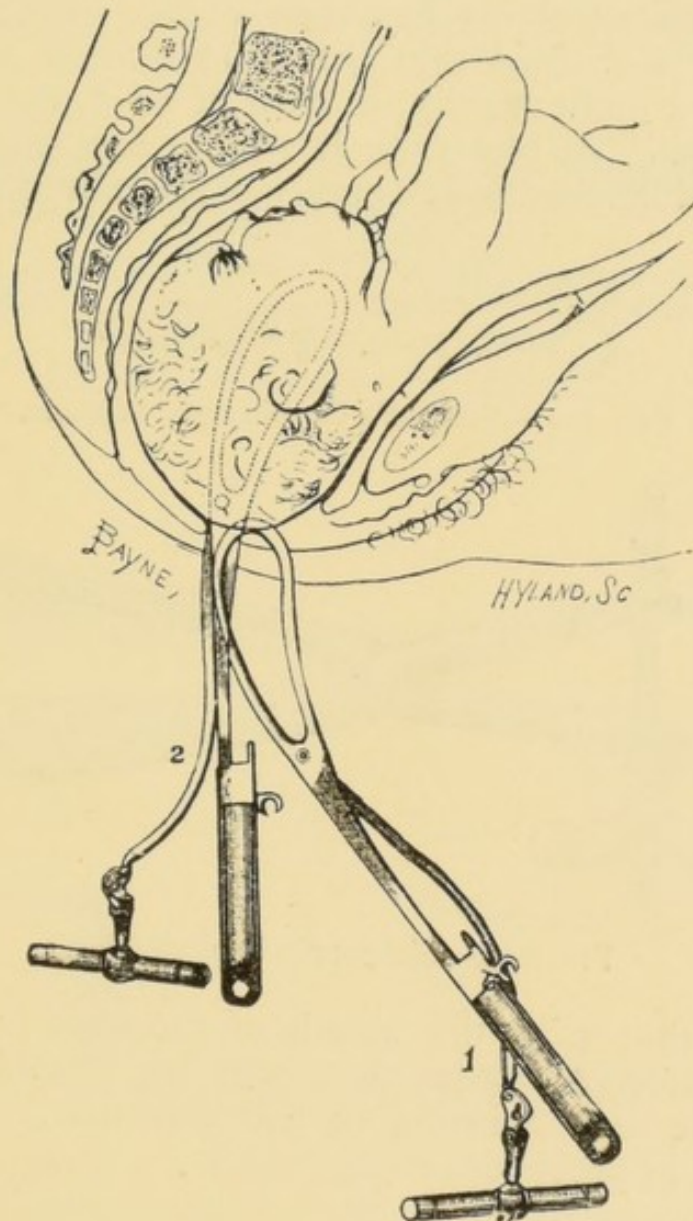
FIG. 103.—The Removal of the Forceps (Simpson).

size, from passing, certain bad face cases where the chin is behind, abnormally large head as in hydrocephalus, certain gross deformities of the fœtus and, lastly, dangerous complications on the part of the mother, where immediate delivery is necessary to save her life, such as hæmorrhage, convulsions, extreme exhaustion, rupture of

the uterus. There is no doubt that embryulcia is a more or less barbarous operation and it is now performed much less frequently than it used to be, because (*a*) axis traction forceps have a more extended application than ordinary forceps; (*b*) Cæsarian section has produced such excellent results and is a less serious procedure than it used to be; and (*c*) symphyseotomy has been revived in recent years.

When it is obvious that the child is dead, embryulcia is performed more readily, in case of need, than it would otherwise be. At one time it was a necessity that the child should be dead before embryulcia could be performed
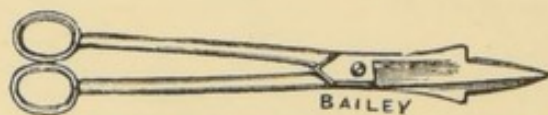
FIG. 104.—Smellie's Craniotomy Scissors.
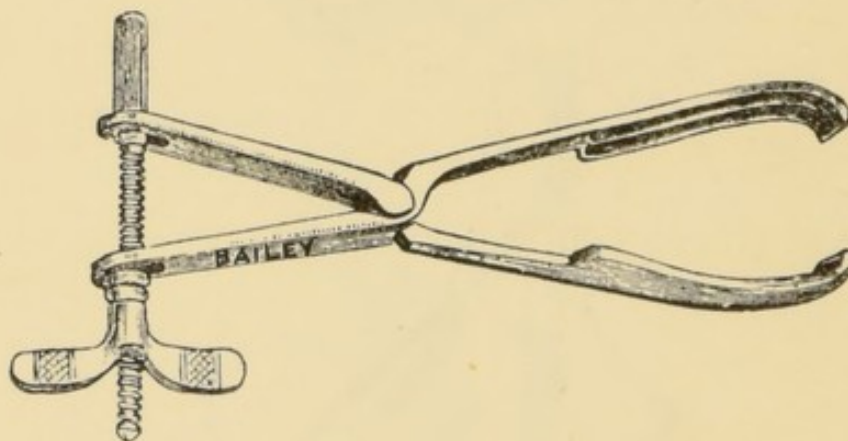
FIG. 105.—Simpson's Cephalotribe.

We hope that with the march of progress in obstetrics the operation of embryulcia will be blotted out, and evidence is now pointing in this direction.

Method of procedure :—

A. *Preliminaries.*

1. The operation and its consequences are explained to the relatives.

2. The doctor summons another medical man.

3. The bladder and rectum are emptied.

4. The patient is anæsthetised.

5. The patient lies in the " forceps position ".

6. A receptacle for the " substances " evacuated is to be at hand.

7. Strict antiseptic precautions are to be observed, as regards (*a*) the patient's vulva and neighbouring parts; (*b*) the operator and assistant's hands; and (*c*) the instruments used.

8. The uterus is fixed from above by an assistant's hands, the head being pressed against the pelvic brim, when possible.
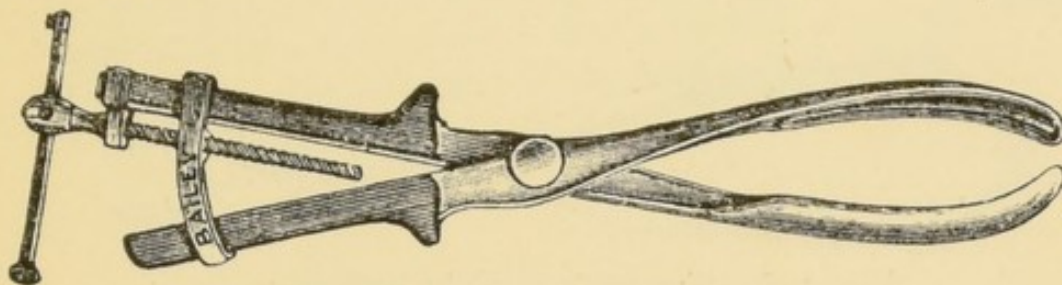
FIG. 106.—Scanzoni's Cephalotribe.
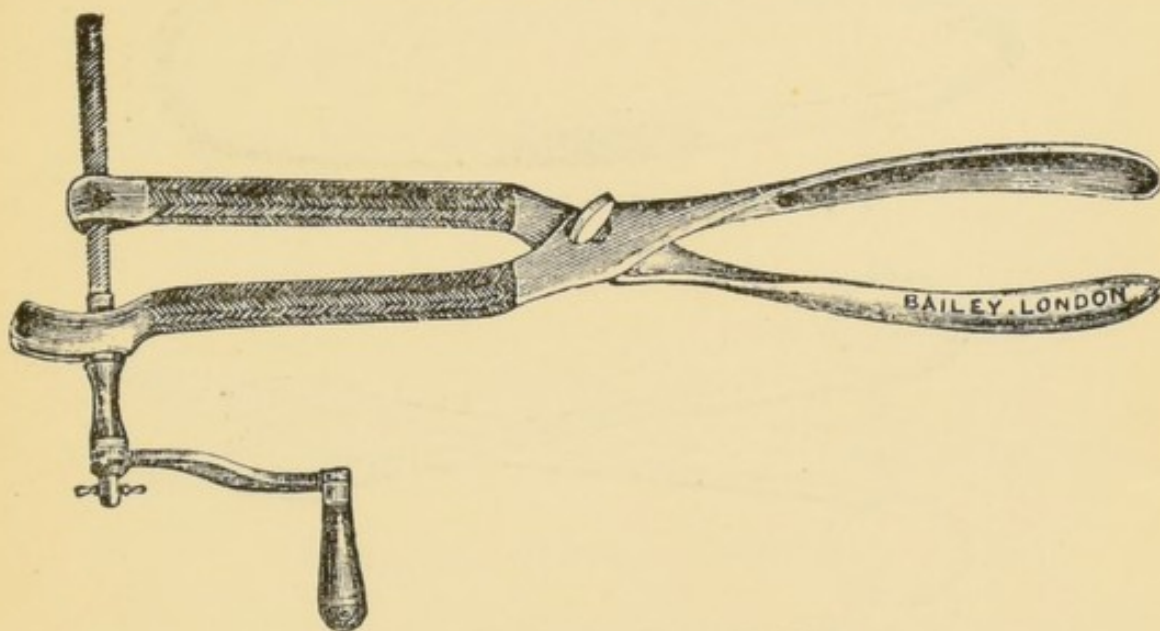
FIG. 107.—Beaudelocq's Cephalotribe.

9. Three parts are made out by the operator: (*a*) the sacral promontory; (*b*) the child's head and its various parts; and (*c*) the os uteri.

B. *Perforation.*

1. The part of the head to be perforated is made out; this is usually one of the parietals. The point of a knife may be sufficient to make an opening through a suture or fontanelle; but, usually, a special instrument called a perforator is used. Smellie made use of scissors with a shoulder to prevent their being pushed in too far.

2. After the relations of the head to the brim have been carefully made out the perforator is passed with the right hand, using the left hand as a guide and guard.

3. A bone, not a suture, is perforated. The perforator is placed at right angles and not obliquely against the bone so as to avoid its sliding off and wounding the soft parts. Perforation is effected by a rotatory or boring motion.
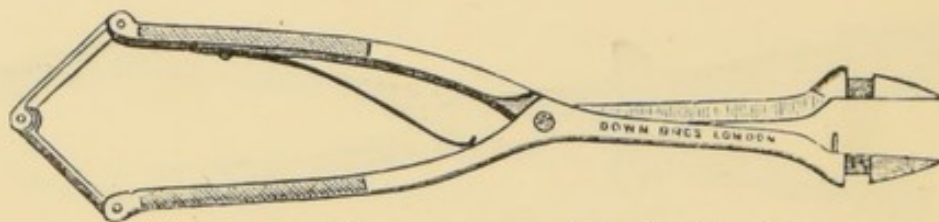
FIG. 108.—Simpson's Straight Perforator.

FIG. 109.—Blunt Hook with Crochet.
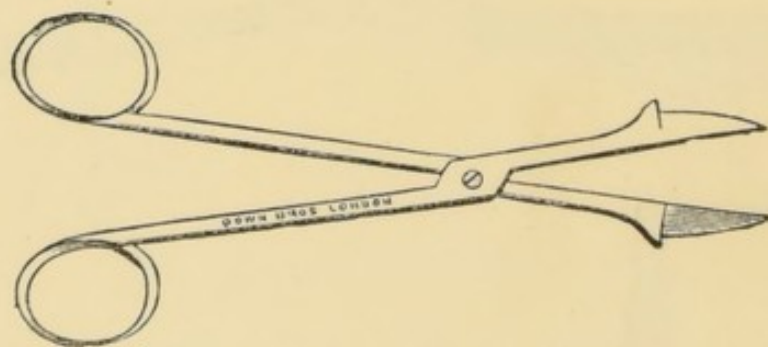
FIG. 110.—Denman's Perforator.

4. After the perforator has been driven in to the stop the blades are opened up widely and moved about to allow of the passage of the cranial contents. The perforator is next passed down to the base of the skull in order to make sure that the child is killed and also to facilitate the escape of the brain matter.

5. The detached portions of bone are carefully removed to prevent any subsequent injury to the soft parts.

6. A disinfectant douche is next given to wash out the canals and the interior of the skull.

C. *Extraction.*—This is performed either immediately after the perforation has been effected or a little delay may sometimes be permitted to allow the uterus to resume its functions. In most cases, however, we proceed, with appropriate instruments, to extract the broken-up head. Sometimes perforation is not sufficient to permit of delivery, and comminution or breaking-up of the head is necessary before it can be extracted. For comminution of the head various instruments are used, such as craniotomy forceps, the cephalotribe, by which the head
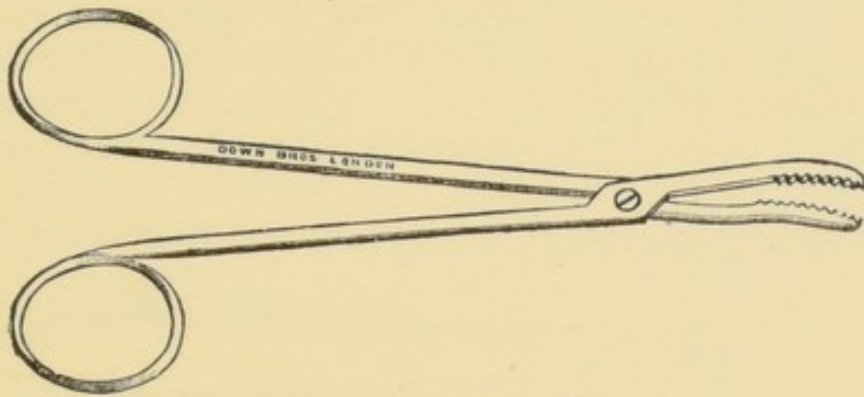
FIG. 111.—Craniotomy Forceps.
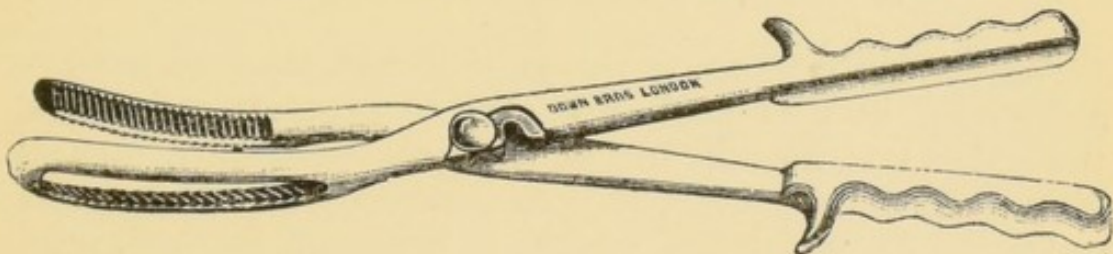
FIG. 112.—Simpson's Cranioclast.

is crushed between its blades, the cranioclast and the basilyst. The cranioclast has a solid blade which is passed into the cranial cavity and a fenestrated blade which is passed over the head.

The basilyst is an instrument which is specially intended for breaking up the base of the skull. It is used in the first place to perforate the skull and then withdrawn while the cranial contents are washed out. It is then reintroduced and passed on to the base of the skull. For extraction, the hook (crotchet), the cephalotribe or the cranioclast are used, the last named being generally the most suitable instrument.

After embryulcia the child is to be made as presentable as possible by stuffing the head.

The mother will require special care as she will probably be suffering from shock.

Various mutilating operations may have to be performed on the child's body in some forms of obstructed labour. To these the term embryotomy is given.

III. *Symphyseotomy.*—By this we mean the division of the symphysis pubis in order to increase the conjugate diameter of the brim. The operation was first described by Sigault and has during the last few years been performed in selected cases with considerable success. The steps of the operation need not be described. The degrees of contraction of the pelvic brim which may call for symphyseotomy have been given (see p. 192). After division of the symphysis the child may be born naturally, but forceps or turning are generally required to effect delivery.

½ SCALE

FIG. 113.—Galbiati's Knife for Symphyseotomy.

After symphyseotomy the pubic bones must be fixed in apposition by a special apparatus to promote union and the patient is kept in bed at least six weeks. A special kind of hammock bed has been devised for use after this operation by which the weight is taken off the body and the pelvis is kept absolutely still.

IV. *Cæsarian Section.*—This term is used to include those operations by which the fœtus is removed by opening the abdomen. The operation was first suggested by noting what took place under accidental conditions when the abdominal walls were torn open. Some patients have been repeatedly delivered thus. We shall briefly describe (1) Cæsarian section proper, and (2) Porro's operation.

Firstly, as to the indications. Broadly, these include all those conditions where delivery by the genital canal is impossible. A conjugate of the brim below two inches demands Cæsarian section, but the tendency nowadays is to replace embryulcia by Cæsarian section as the mortality of the latter has been so greatly lowered and as

Cæsarian section offers a chance of life to the child; therefore a conjugate of three inches may be an indication. Large tumours of the pelvis, especially when solid, may call for Cæsarian section, also cancer of the cervix, extreme contraction of the vagina and some severe complications on the part of the mother, such as accidental hæmorrhage and rupture of the uterus.

When the mother has died and there is a chance of extracting a living child the operation is performed without delay. A great advantage of Cæsarian section is that the period of operation can often be chosen. The doctor has usually made up his mind as to its necessity before labour commences, and the time when the operation is best done is after labour has commenced, but before the membranes have ruptured.

After the membranes have ruptured the danger is increased. By waiting till labour has commenced the benefit of the uterine contractions is secured and the dilated cervix allows of the escape of the lochia. This refers to Cæsarian section proper; Porro's operation is performed before labour sets in. It would be out of the scope of this work to describe the details of Cæsarian section. Such an operation is generally performed in an institution where every appliance and skilled assistance is at hand, but we can conceive of cases where it may be called for in a hurry and where all the appliances and skilled aid cannot be obtained, as, for example, where at the close of pregnancy a woman has suddenly died and the child's life has to be saved. In such a case the doctor may see fit to open the abdomen and extract the child.

Steps of the operation :—

1. The preliminaries include the giving of an antiseptic douche, emptying of the bladder, preparing and sterilising the instruments, washing and disinfecting the skin of the abdomen, and carrying out generally the details required for a surgical operation.

2. The abdomen is opened by an incision at least five inches long in the middle line.

3. The uterus is drawn into and made to bulge through the abdominal incision.

4. The uterus is opened by an incision either vertical or transverse in the spot to be decided upon.

5. The fœtus is extracted, generally head first.

6. The cord is then divided and ligatured and the infant is handed to an assistant.

7. The placenta and membranes are next removed.

8. Appropriate means are taken to control the hæmorrhage by grasping the uterus between the hands or by passing india-rubber tubing round the uterus and broad ligaments.

9. A glass drainage tube is passed through the cervix and made to project into the vagina.

10. The uterine wound is sewn up by deep and by superficial sutures.

11. The abdominal cavity is flushed with hot sterile salt solution, all blood clot being removed.

12. The uterus is pushed back into the abdomen and the tubing or other ligature is removed.

13. The abdominal wound is sewn up and the usual antiseptic dressings with a flannel many-tailed bandage are applied.

As to after treatment, this follows the lines of an ordinary abdominal section. A vaginal douche is given as often as the doctor orders and the glass tube is removed in from forty-eight to seventy-two hours. A four-hourly chart is kept on which are recorded the pulse, temperature and respirations, the actions of the bowels and the quantity of urine passed in the twenty-four hours. The nourishment taken, the amount of sleep obtained, and any symptoms such as vomiting, distension of the abdomen with flatus (tympanites) are to be noted.

The dangers are (1) hæmorrhage at the time of or subsequently to the operation; (2) shock, often arising from the delayed labour; (3) peritonitis, due to soiling of the peritoneum at the time of operation or afterwards from the escape of the uterine secretions through the imperfectly healing wound in the uterine wall.

In Porro's operation, which may be termed Cæsarian hysterectomy (removal of uterus), the uterus and appendages are removed. In this operation the exact time for performing it may be arranged in plenty of time so that all preparations can be deliberately made. The steps of the operation up to the removal of the fœtus are the same as in Cæsarian section proper. Then the uterus

with the membranes and placenta *in situ* is drawn through the abdominal incision, a ligature is placed round the cervix and the uterus and appendages are removed.

Porro's operation has the following advantages over Cæsarian section proper :—

1. The woman cannot again conceive, and this is often an advantage in those cases where such an operation is called for.

2. There is no uterine wound to heal.

3. As now performed there is less risk of septicæmia. But Cæsarian section, too, has its advantages.

V. *The Induction of Premature Labour.*—This signifies the bringing on of labour before the natural end of pregnancy and at a time when the fœtus can reasonably be expected to live apart from its mother. The conditions in which it is called for are those which would endanger the mother's life or that of the child were pregnancy allowed to go on to term and which can be obviated or diminished by a premature delivery. Such conditions include pelvic contraction, where the conjugate varies from three and a quarter to two and a half inches (not less); tumours of the uterus; ovarian tumours; certain dangerous diseases which are aggravated by the growing uterus, as heart affections, uncontrollable vomiting, convulsions, chorea; hydrocephalus, and those cases where the fœtus has in previous pregnancies habitually died towards the close of pregnancy from placental disease. The object is to operate when the fœtus is viable and before the head becomes large enough to seriously obstruct the labour. It is generally recommended that premature labour be induced within a fortnight after the lapse of 230 days since the cessation of the last menstrual period. The patient is carefully watched and examined after the lapse of the thirtieth week, and the operation is delayed, as a rule, so long as it is believed that the head will pass through the brim (in cases of pelvic contraction) so as to allow of the child being as fully developed as possible. It is obvious that we cannot always thus wait, as in cases, for example, of dangerous disease on the part of the mother. To estimate the age of the fœtus it is necessary to corroborate the date given by the patient since her last period by measurement of the uterine swelling and comparing

the two results. A fœtus measuring eight inches will probably be eight months (lunar) old.

Many methods have been advocated for inducing premature labour, such as the administration of ergot

FIG. 114.—Champétier de Ribes' Dilating Bag.
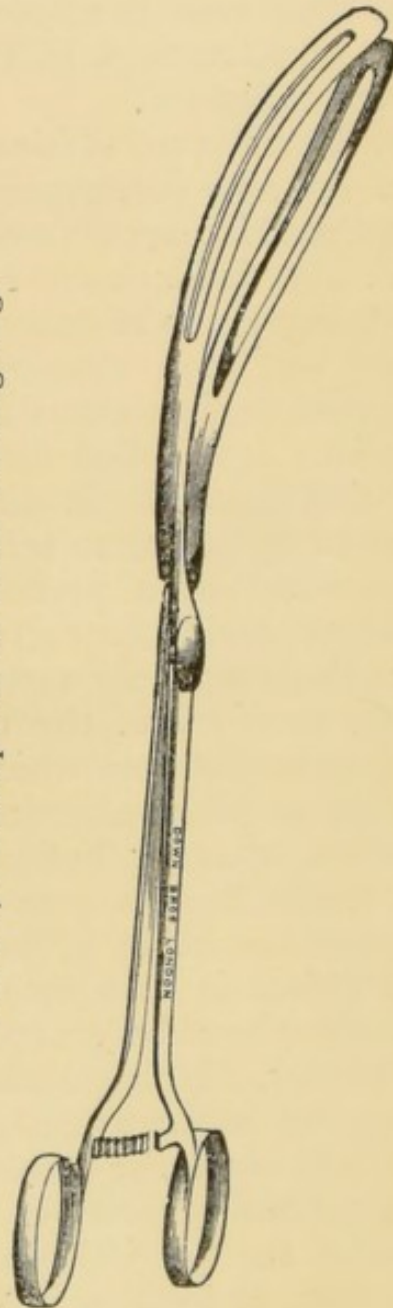
FIG. 115.—Forceps for introducing Same.

and rupturing the membranes; we shall, however, refer only to two methods, both of which are in regular use. It is almost needless to say that premature labour is never to be induced by the midwife.

The Bougie Method.—After douching the vagina, a solid gum-elastic bougie is passed into the uterine cavity

between the membranes and the uterine wall for seven inches, the rest of the bougie being left in the vagina, supported by a pledget of wool or an india-rubber bag, until uterine activity is set up, which usually happens within twenty-four hours. When contractions are set up the bougie is not removed, but it is left until the uterus expels it or until dilatation of the os is in full progress.

This method is most suitable when there is no need for hurry. But where rapidity of action is necessary, and when the bougie method fails, after waiting a reasonable time, resort is had to dilatation of the cervix by means of (a) the fingers ; (b) tents ; (c) Hégar's or other dilators, and, when the os is partially dilated, (d) Barnes's bags ; or (e) Champétier de Ribes' bag. The preliminary dilatation by a tent is useful, if the case is not one of great urgency, as the dilatation is not then so rapid as it is when dilators are used, and there is less likelihood of subsequent laceration. Champétier de Ribes' bag (and the same applies to Barnes's bags) is introduced into the partially dilated cervix after the membranes have been ruptured and is then filled with warm water. The tap is turned off, and the bag is then gently pulled upon to promote the dilatation of the os.

After full dilatation of the os the labour may progress naturally or artificial delivery may be needed by forceps or, if the membranes are intact when the os is fully dilated, by rupturing them and turning before the liquor amnii has drained away.

Means should be at hand to resuscitate and to otherwise deal with the premature child. The services of a wet nurse should have been previously requisitioned and an incubator is to be provided.

The induction of premature labour is not without danger to the mother and the child. The former may succumb from septic poisoning ; and here the importance of the midwife, when assisting the doctor in such a case as this, taking the strictest antiseptic precautions cannot be too strongly insisted upon. The chief danger to the child is, of course, its immaturity.

CHAPTER XXI.

PRÆTERNATURAL LABOUR: PELVIC PRESENTATIONS AND STILL-BIRTH.

WE have seen that there are two varieties of præternatural labour: (1) where the child presents by the breech or lower extremity; and (2) where the presenting part is the shoulder or upper extremity. These we shall now consider in detail. The conditions which are liable to produce the one form are to a large extent responsible for the other, and so we may consider the causes of the two varieties of præternatural labour together. These may be tabulated thus:—

1. Premature labour.
2. Death of the fœtus.
3. Disease of the fœtus, for example hydrocephalus.
4. Fœtal malformations and monstrosities.
5. Multiple pregnancy.
6. Excess of liquor amnii.
7. Organic disease of the uterine walls.
8. Ovarian and other tumours.
9. Placenta prævia.
10. Pelvic contraction.
11. Obliquity of the uterus.
12. Spasmodic contraction of the uterine walls.

Many of these conditions act by interfering with the normal ovoid shape of the pregnant uterus.

It is obvious that, owing to the conditions under which præternatural labour occurs, these irregularities are apt to recur in successive pregnancies, for example it has been recorded that in seven labours in the same woman the presentation was transverse.

Pelvic Presentations. — The frequency of these is said to be about 1 in 30 labours. The varieties are (1)

breech; (2) footling; (3) knee, the last named being very rare.

Diagnosis.—When we were considering the examination of the abdomen at the commencement of labour (see p. 151) we explained how the parts of the fœtus were to be made out by palpation, and, if this is carefully carried out, it will be generally possible to discover that the head is absent at the lower pole of the uterus and is replaced by some softer structure. In the same way, on feeling the upper end of the uterus the hard rounded head will be made out. The back of the fœtus will also be felt for and the child's limbs made out on its abdominal surface as little knobs.

The point of greatest intensity of the fœtal heart will be found to lie above the umbilicus to one or other side. On vaginal examination, early in labour, the membranes may be intact or they may be and often are prematurely ruptured. In the former case they may be felt projecting through the partly dilated os like the finger of a glove (see p. 119) and the presenting part may be hard to get at or it may be inaccessible. After rupture of the membranes the examining fingers, on withdrawal, may be found to be stained with meconium. The firm round head with its sutures and fontanelles is missed and is replaced by a softer part of the child. A cleft is felt, the fold of the buttocks; at one end of this is the tip of the coccyx and at the other end the genital organs, and between the two is the anus. As labour progresses the fold of the groin may be made out, and this is differentiated from the armpit by the absence of the ribs. The foot is distinguished, in a footling case, from the hand by the fact that it is not in a line with the limb from which it springs; the toes are almost on a level with each other, and the heel forms a prominence at an angle to the limb, and there is no thumb, which may be bent into the palm of the hand.

Having diagnosed that the presenting part is the breech, the position has next to be ascertained as in a head-first case. There are four positions, which are named according to the position of the sacrum which corresponds to the occiput in the cranial positions. That is to say, the sacrum may be anterior and to the left or to

the right, or posterior and to the right or left.   Thus we have :—

First position.	Left sacro-anterior.	L. S. A.
Second position.	Right sacro-anterior.	R. S. A.
Third position.	Right sacro-posterior.	R. S. P.
Fourth position.	Left sacro-posterior.	L. S. P.
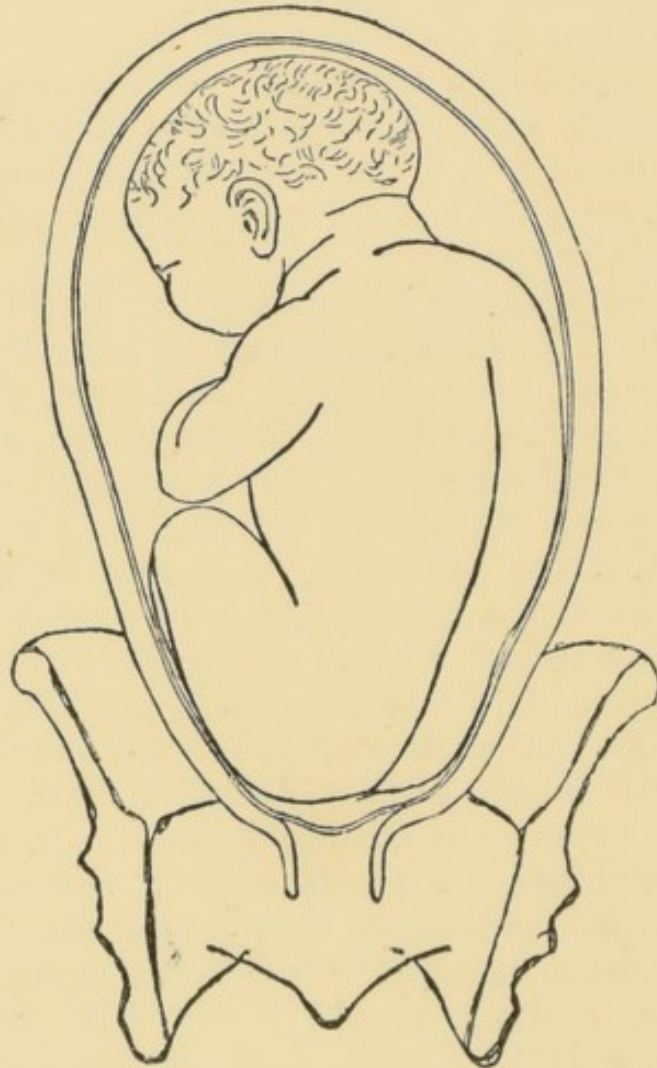
FIG. 116.—The Commonest Pelvic Presentation.   The breech presents in the left sacro-anterior position — the first or commonest of the four positions (Simpson).

By noting the position of the sacrum on vaginal examination and comparing this with the position of the child's back as made out on abdominal examination the position may be diagnosed.

Whether the breech or the foot presents in a pelvic presentation depends upon the degree of rotation of the fœtus on its transverse axis, the latter presenting when

it rotates abdominally. This can be understood when the figures are studied.

Mechanism.—We shall describe the mechanism in the first position, where the breech occupies the right oblique diameter and the sacrum is forwards and to the left.

FIG. 117.—Footling Presentation—the second variety of Pelvic Presentations. The fœtus is placed in the right sacro-posterior position —the second in frequency of the four positions (Simpson).

1. *Compaction.*—This corresponds to flexion in a cranial presentation. The uterus closes round the child and the breech becomes engaged in the pelvic brim.

2. *Internal Rotation.*—The hip next the anterior wall of the pelvis passes forwards under the symphysis pubis. It should be noted that the denominator, the sacrum, does not pass forwards, as the occiput does in a vertex case.

3. *Extension*.—The anterior hip (the left in a L. S. A. position) is caught under the pubic arch, while the posterior hip in contact with the perineum is expelled.

4. The anterior hip slides under the pubic arch and is born, the child's body following.

5. The shoulders are born with the arms flexed over the chest, the left shoulder rotating under the pubic arch.

6. Then occurs the rotation of the head, the face rolling into the hollow of the sacrum and the occiput rotating forwards under the pubic arch.
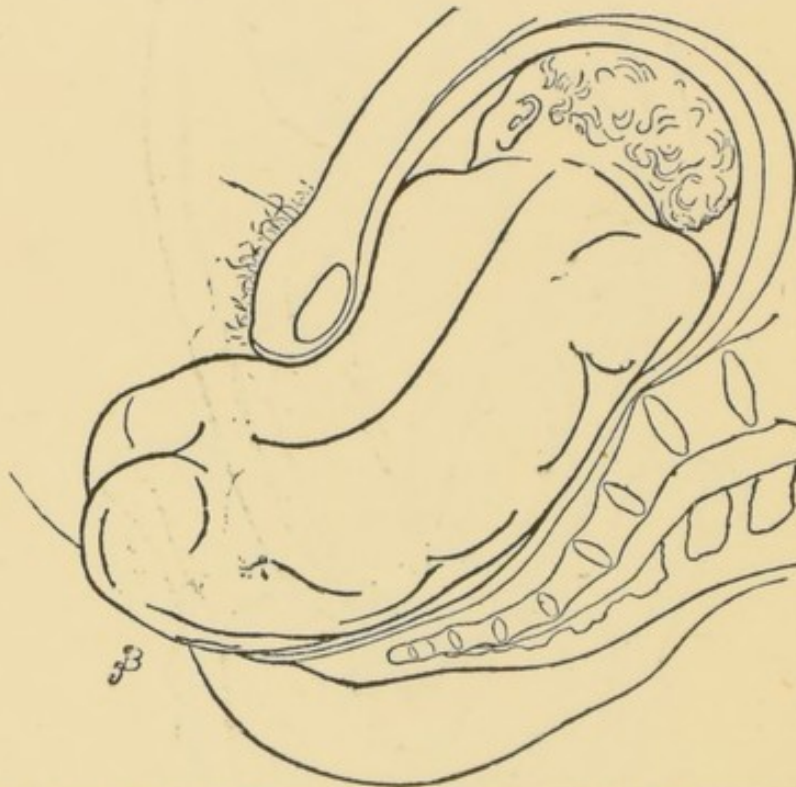
FIG. 118.—Left Sacro-Anterior Position. The left haunch fixed under the pubes, the right has passed over the perineum (Simpson).

7. The head now becomes flexed, the neck is caught under the pubic arch, and the chin, face, forehead and vertex pass in succession over the perineum and are born.

Breech cases are attended with more danger to the mother and child than are head-first cases. The danger to the mother is not, however, usually at all marked, but labour is generally more tedious even when everything progresses satisfactorily. The interference which may be necessary on account of the child adds to the gravity of the case. The child is often still-born and this has an untoward effect on the mother during the puerperium.

The dangers to the child are much greater than in a head presentation, owing, among other causes, to prolapse of or pressure on the cord, or pressure on and too early separation of the placenta, and consequent interference with the fœtal circulation, and to inspiration taking place prior to the head being born, when blood, mucus, meconium or liquor amnii may be sucked into the air passages and cause suffocation, partial or complete.

The bones of the limbs are more liable to be fractured than in head cases.
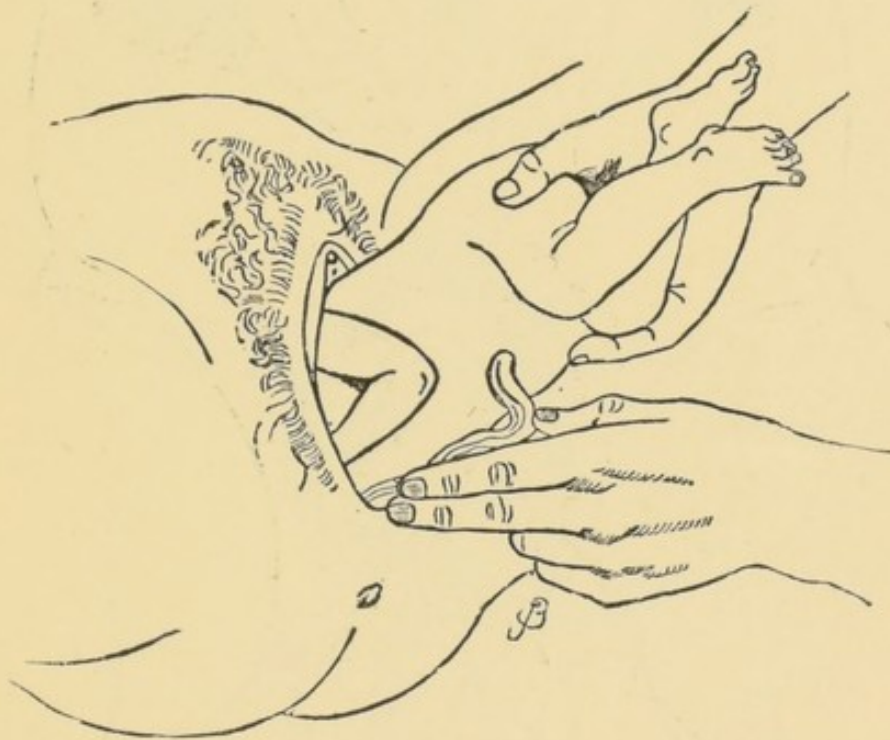
FIG. 119.—Pulling down of a Loop of the Umbilical Cord after the Lower Limbs are Born (Simpson).

Management.—We consider that a midwife who is well qualified to attend a natural labour unaided may be entrusted to take charge of a breech case, but she must be fully alive to the complications which may ensue and be ready to summon medical assistance whenever such arise or when labour ceases to progress.

Since the membranes are so liable to rupture early and dilatation of the os is usually slow, the duration of the labour is expected to be longer, but so long as the breech continues to descend and the cord is not prolapsed, there is no cause for uneasiness. The buttocks become turgid

and swollen, the caput succedaneum forming there or on the genitals. The time when extreme watchfulness is necessary is when the trunk has been expelled.

The following rules are modified from those which Professor Simpson lays down :—

1. Do not attempt to ameliorate the position.
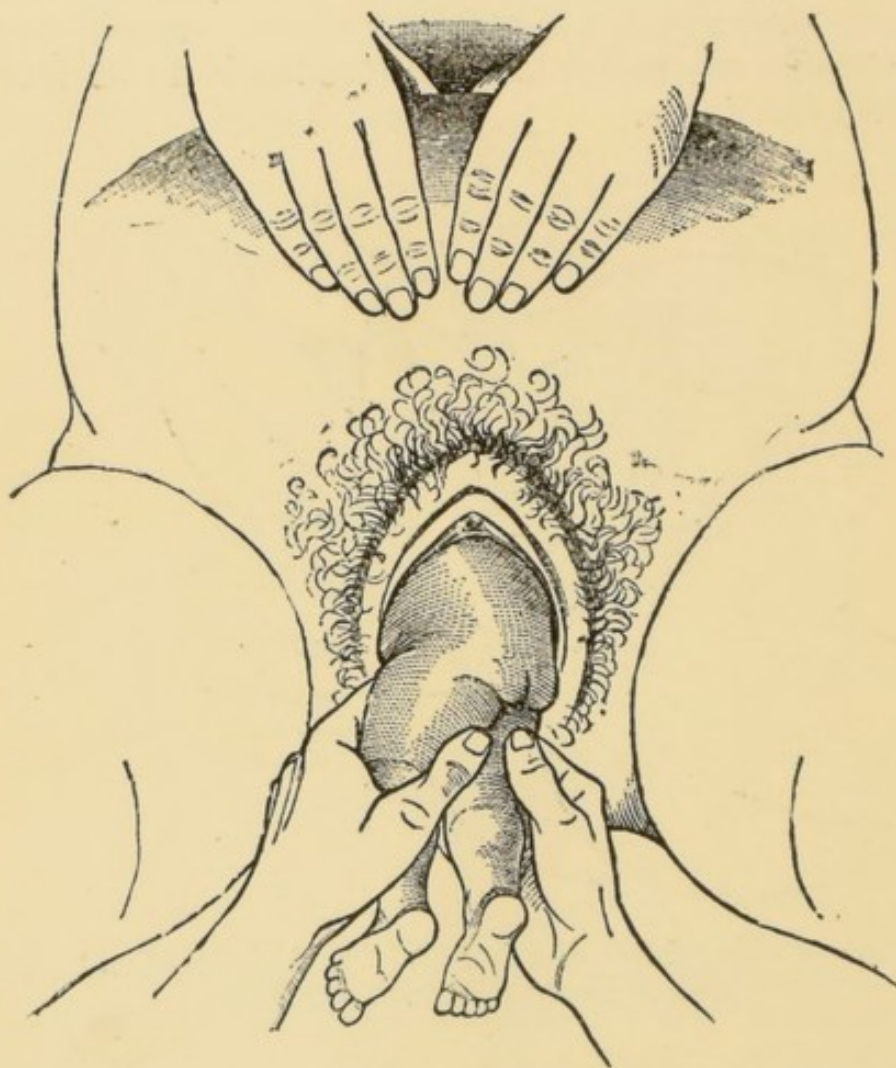
FIG. 120.—Mode of Laying Hold of Lower Limbs and of making Supra-pubic Pressure (Simpson).

2. Leave the case alone and preserve membranes intact till the os is fully dilated. If the membranes have ruptured the breech is allowed to dilate the cervix.

3. Leave the case alone till the breech is born, allowing the powers to expel the lower limbs and buttocks.

4. When the child protrudes as far as the umbilicus pull down a small loop of the cord.

5. If the cord pulsates well do not interfere further till

the child escapes as far as the armpits. If the pulsation is feeble or there is struggling and drawing up of the lower limbs send for a doctor, and in the meantime assist delivery by compression of the uterus through the abdominal walls (see Fig. 120), remembering that traction from below is dangerous and is likely to lead to subsequent complications. If pulsation in the cord is absolutely gone and the child shows undoubted evidence of being dead, there is then no special need of hurry.
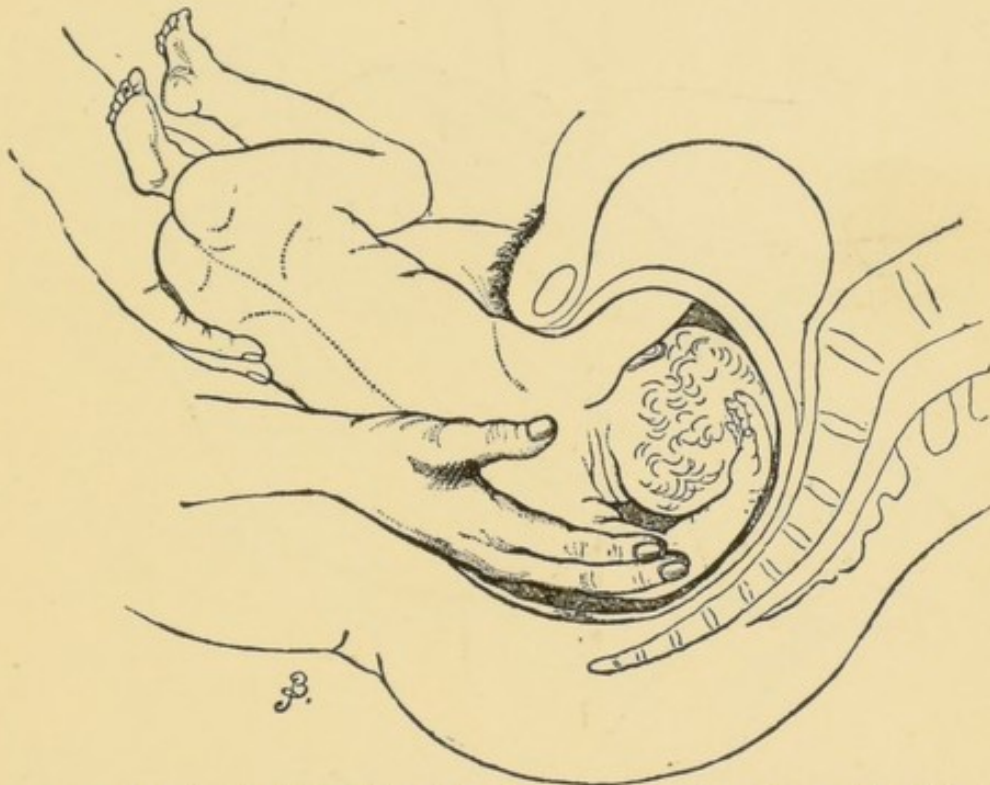
FIG. 121.—Method of Freeing the Arms. The trunk carried forward by the left hand, while the fingers of the right pass up to the elbow in the hollow of the pelvis (Simpson).

6. As soon as the body is born place the cord on one or other side of the body to be out of the way of pressure, and envelop the protruded part in a warm cloth to prevent contact with the air causing inspiratory efforts, which we are anxious to avoid.

7. Free the arms. They may have slipped up by the side of the head even when there has been no active interference and in such a case get medical help if at all possible. Where the legs, instead of being flexed, are extended, the feet being under the chin, we are suspicious that the arms are thrown up by the side of the head.

The arm which is the more accessible is first freed and brought down. To avoid injuring the arm the fingers should be passed along it till they reach the bend of the elbow, which is to be brought over the face and anterior aspect of the child. To free the anterior pass draw the trunk gently backwards and *vice versâ*. Figs. 121 and 122 illustrate these points admirably.
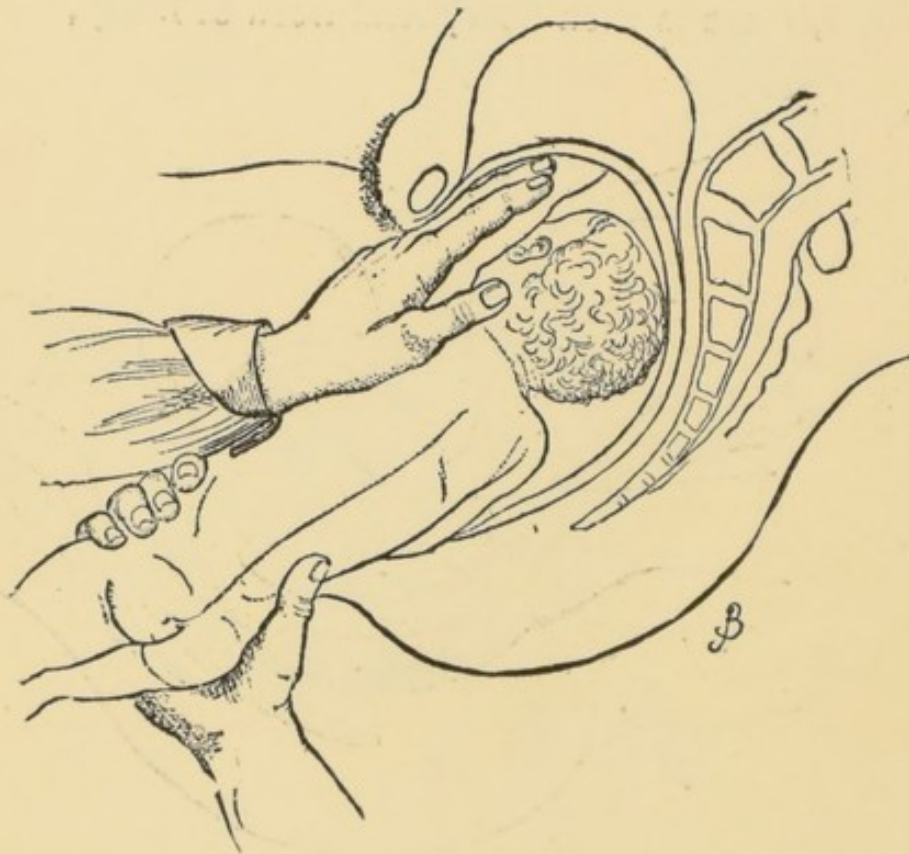
FIG. 122.—Freeing the Anterior Arm. The trunk of the child carried backwards to render the anterior arm more accessible (Simpson).

8. For the rapid and safe delivery of the head, at which we aim, it is necessary that it should pass through the canals flexed; if traction is made on the trunk the head is thereby extended and its birth seriously delayed, and so the attempts to deliver the head by pulling on the trunk must never be made, at any rate by the midwife. Instead of this, pressure must be made from above.

Another danger of trying to accelerate delivery by pulling on the trunk is that the soft parts may be lacerated; the head is larger than any part which has yet escaped, and if the os be not fully dilated the cervix may be badly

torn if the head be pulled rapidly through it, also the vagina, perineum and vulva.

Again, undue hurry in delivery may be followed by uterine inertia and post-partum hæmorrhage as in head presentations.

When the head is being born the chin is brought past one side of the coccyx and the head is kept with the chin pressed on the chest.
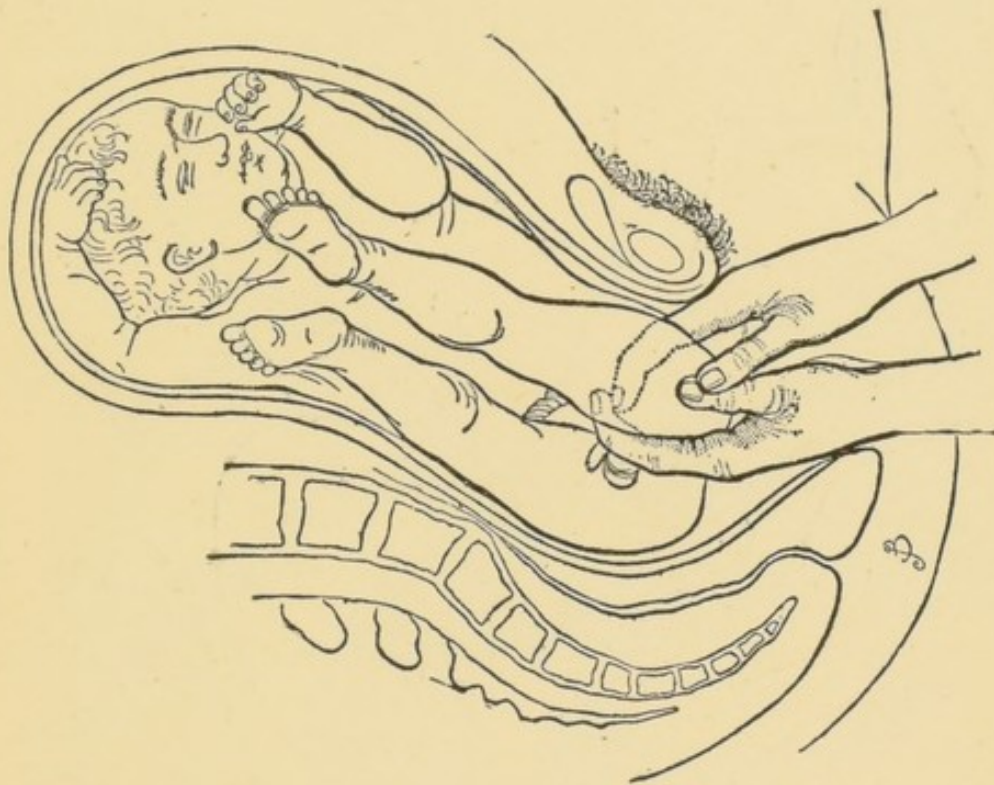
FIG. 123.—Extraction of the Impacted Breech by means of the Fingers hooked in the Groin (Simpson).

Complications which may arise in a breech case:—

1. The breech may be impacted in the brim from one cause or another, for example as a result of pelvic contraction or from the child being unduly large. The doctor is to be sent for. He will try to bring down one of the feet; if he cannot succeed when the legs are extended he will put his fingers in the fold of the groin (see Fig. 123), and if he cannot then succeed he will have resort to forceps applied to the breech or, rarely, to breaking up the breech (to be followed by embryulcia).

2. *Extension of the Arms above the Head.*—This we have referred to.

3. *Extension of the After-coming Head.*—This is probably the commonest cause of delay in a breech case.   We have seen how it may be caused.   The great point is to try to promote flexion of the head by supra-pubic pressure, and by traction on the upper jaw on each side with two fingers of the left hand, one on each side, while the right
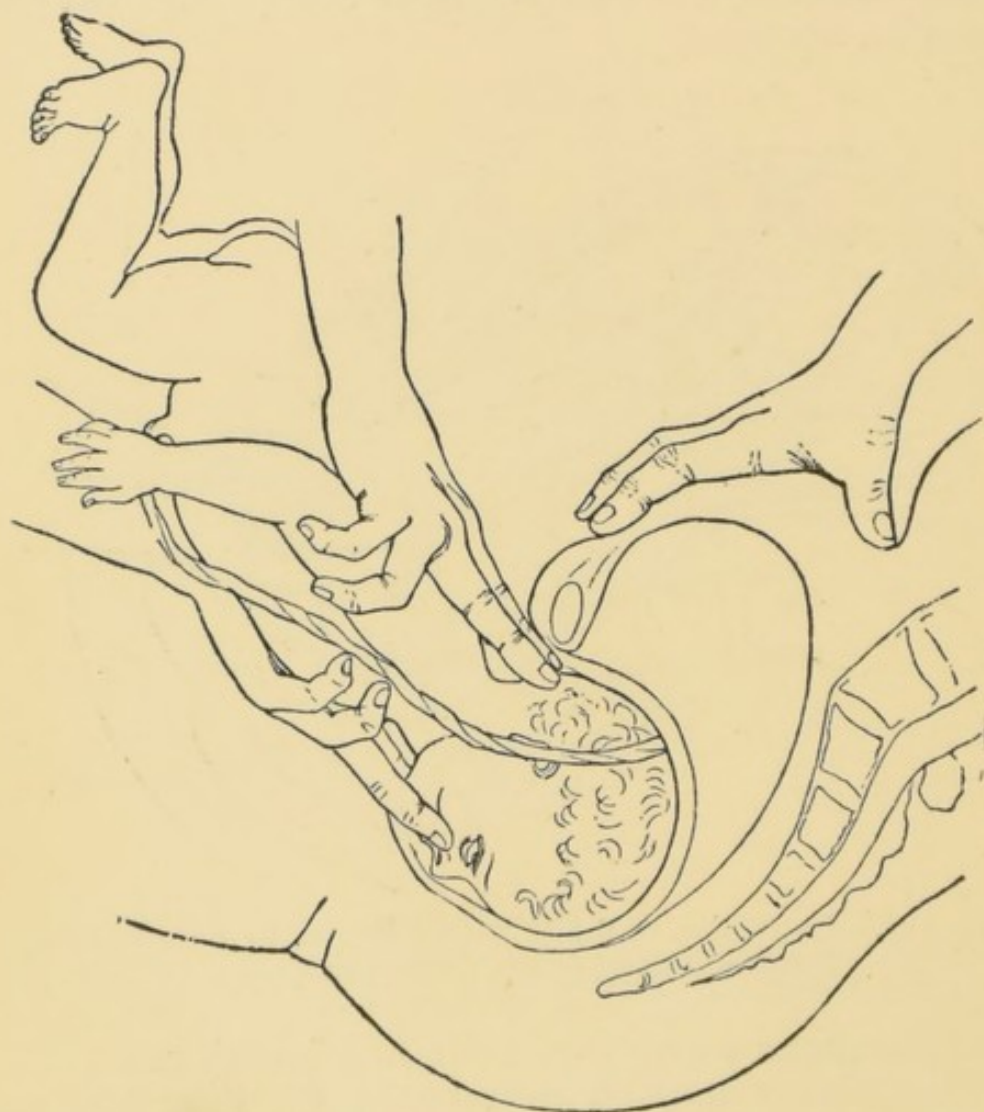
FIG. 124.—Smellie's Method of Delivering the Head (Simpson).

hand is used to push the occiput upward, the trunk of the child being drawn forwards.   This, which is known as the Smellie grip, is well shown in Fig. 124.

It may be necessary to apply forceps to the after-coming head or to perform craniotomy to effect delivery.

If the extended head is not born in a few minutes the child will probably soon die as the cord is almost certain to be pressed on.

It will be convenient now to briefly refer to still-birth, since this is one of the special dangers to which the child is exposed in head-last labours, owing to the liability to interference with the fœtal circulation from (1) compression of the cord; (2) compression of the placenta; and (3) too early separation of the placenta.

When the child is still-born it is in a state of suspended animation. The heart is still beating, but it does not breathe or move. When the heart has actually stopped
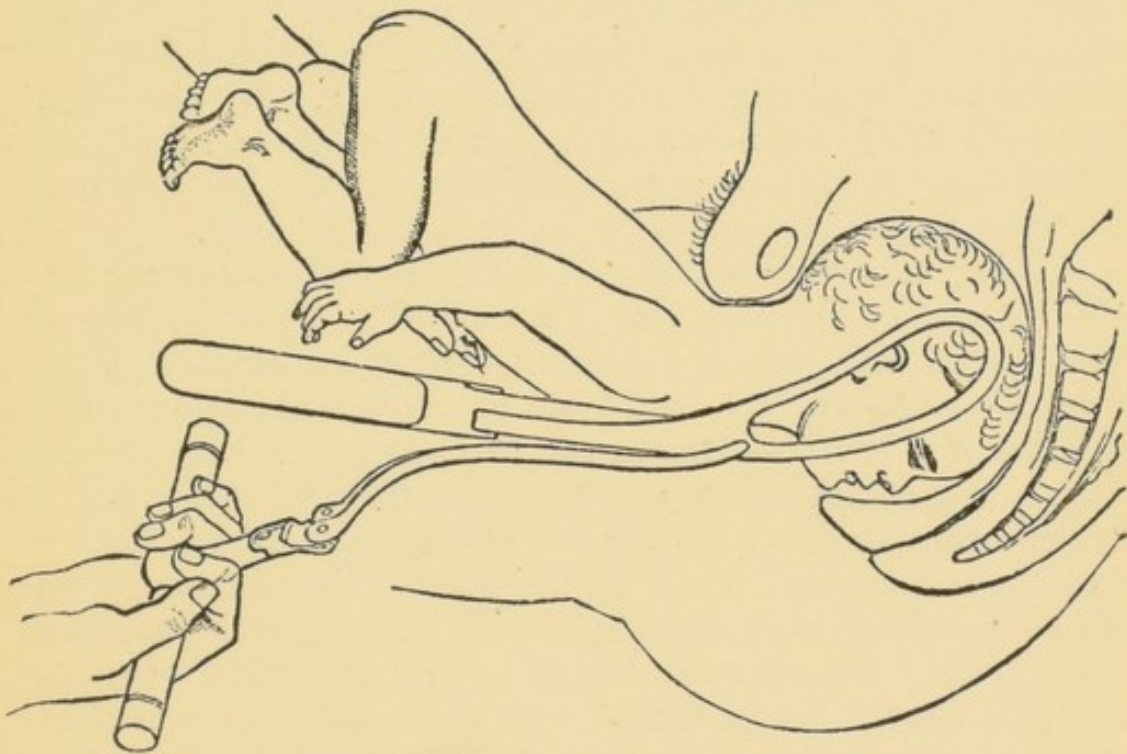
FIG. 125.—Application of Axis Traction Forceps to the After-coming Head (Simpson).

beating the child is of course dead. How do we ascertain that the child is dead? The cord is to be felt as we have already mentioned when the child is born as far as the umbilicus. It pulsates with each beat of the heart, and the strength and regularity of these pulsations form an index to the heart's action. After the cord is tied apply the hand and the ear, in turn, to the left side of the infant's chest when the heart beats are felt and heard. Do not feel and listen for a less period than two minutes, since the heart may be beating irregularly and there may be an interval of some seconds or even a minute between the beats.

In addition to the cessation of the heart beats there are other signs of death of the fœtus which are present or not according to the length of time which has elapsed since death. Perhaps the most important of these additional signs is peeling off of the skin ; others are a marked discoloration of the liquor amnii (by no means a certain sign), the presence of air under the scalp and a sensation of looseness of the skull bones.

There are two appearances which a still-born child may present ; it may be white like a corpse or it may be blue, congested or cyanosed (Grk. *cyanos*, blue). The former condition is the more serious of the two, the limbs are flabby and we cannot make them move. In the blue state the limbs are firm and can often be moved spontaneously and the child can generally be revived, but even in the blue form the outlook must occasion anxiety.

Management of Still-birth.—The mouth and nose are cleared out to promote the entry of air. This is done in both varieties. The subsequent treatment varies according as we are dealing with blue or with white asphyxia.

Blue Asphyxia.—Divide the untied cord, a little bleeding is beneficial when the pulse is strong and face livid. Not more than two teaspoonfuls of blood should be allowed to escape however; then tie the cord. Lay the child on its face, taking care that the mouth is free, and press on the back of the chest to try and expel any fluid from the air passages. Then invert the child, slap the buttocks with a wet towel, sprinkle cold water on the face and chest. If these methods are unavailing perform artificial respiration in the following way.

Hold the child with the thumbs on the surface of the chest, the first fingers in the axilla and the other fingers along the back on each side, the face of the child being turned away from the midwife. In this position the child is swung upwards so that the lower end of the body turns over towards the midwife and the chest is thus compressed and the inspired fluid is driven out of the respiratory passages. Next, an inspiration act is produced by swinging back the child's body and thus extending it again, by which it returns to its former position. This is repeated about every five seconds; it is known as Schultze's method.

Do not on any account give up trying to resuscitate the child until there is no doubt that the heart has stopped beating.

White Asphyxia.—It is best in this form of asphyxia to tie the cord at once and divide it, taking care no blood is lost from the fœtus in so doing. Then perform artificial respiration by Sylvester's method. Draw out the tongue and keep it out, lay the infant on its back with its head hanging down; then take hold of the arms above the elbows and draw them firmly upwards and outwards above the head. Keep them there a moment, and then bring them downwards and forwards to the sides, and make moderate pressure with them against the sides of the chest. These movements take about three seconds and they should be performed about twelve to twenty times a minute. They are to be carried out deliberately and coolly, and should not be discontinued until life is extinct.

The upward movement of the arms expands the chest and draws air into it, while the downward movement, and especially the pressure against the sides of the chest, forces the air out. When the child shows signs of life it will commence to inspire in a jerky kind of manner, this will be repeated after a short interval and respiration will be slowly established. The heart will now beat more forcibly and gradually the skin will assume a more natural tint. It is now and not till now, in our opinion, that other auxiliary methods should be employed in cases of white asphyxia. These include a hot bath, followed by friction of the body with the hand, rubbing the body with brandy or vinegar, or plunging the child alternately into hot (98° to 100° F.) and cold (50° to 60° F.) water.

There is one other method of resuscitation which may be tried as a last resort and that is to pass a catheter, if possible, into the windpipe. If it goes into the gullet which lies behind the windpipe it will do no good. This may act by stimulating (reflexly) the respiratory function.

The midwife must treat all cases of still-birth as if they afforded a chance of recovery, and she may have to persevere for an hour with her efforts. Finally, she must not neglect the mother whose life is of far more value than

that of the child. She should send for medical aid when pulsation in the cord is feeble, and this is all the more necessary, since she cannot attend to a still-born infant and the mother at one and the same time. But she may have to act alone and then she can only do her best, assuring herself that the mother is in no actual danger, and getting an assistant to compress the uterus, rather than leaving it alone to look after itself.

Before leaving the subject of still-birth it may be said that there are causes other than interference with the fœtal circulation which may produce it. It may occur under conditions which interfere with the mother's circulation, such as hæmorrhage before delivery, eclampsia, death of the mother and certain other complications on the mother's part. It may also arise in cases where the cord and placenta are unaffected, but where the child's head or chest are unduly compressed. This may arise, for example, in face cases and certain difficult forceps operations.

CHAPTER XXII.

PRÆTERNATURAL LABOUR (*continued*): TRANSVERSE PRESENTATIONS AND VERSION.

TRANSVERSE or shoulder presentations, or, as they are sometimes called, cross births, are much rarer than pelvic presentations. Their frequency is generally considered to be 1 in 230 labours. The long axis of the child does not here correspond to the long axis of the uterus as we have seen to be the case in head and breech presentations; but neither is the long axis of the fœtus actually transverse; it is really oblique. In those cases where the child is really lying transversely and not obliquely, labour becomes still more difficult and cannot take place without assistance.

We have already studied the causes of transverse presentations; suffice it to say here that shoulder presentations are far more common in premature and dead decomposing children. As the shoulder is the denominator, corresponding to the occiput and the sacrum, they are often called shoulder cases. The shoulder, the hand or the elbow may be the presenting part.

Diagnosis.—On abdominal examination, if the fingers are pressed downwards in the manner already described (see p. 151), the head will be felt in one or other iliac fossa and the other end of the fœtus may be felt higher up on the other side of the abdomen. The head will be distinguished by its hardness and its roundness. More often than not in a shoulder case the uterus appears to be ovoidal as in a head case, especially while it is contracting, it is only in the intervals that the disposition of the fœtus can be discovered. The diagnosis may be made only on vaginal examination. The arm or hand may present and make the diagnosis easier. The os is high up, the membranes, if unruptured, are probably

pouching, the cervix is not dilating properly, the presenting part is not easily accessible and does not fill up the pelvic brim, and the hard head is absent. The shoulder is felt as a bony projection, and radiating from it are three ridges, the ridge on the scapula or blade bone behind, the collar bone in front and the bone of the upper arm. Higher up we may be able to pass the fingers into the axilla and feel the ribs. It has been pointed out that when the hand presents we may ascertain whether it be the right or left by noting how it is related to our own hands, right or left, if we imagine we are going to shake
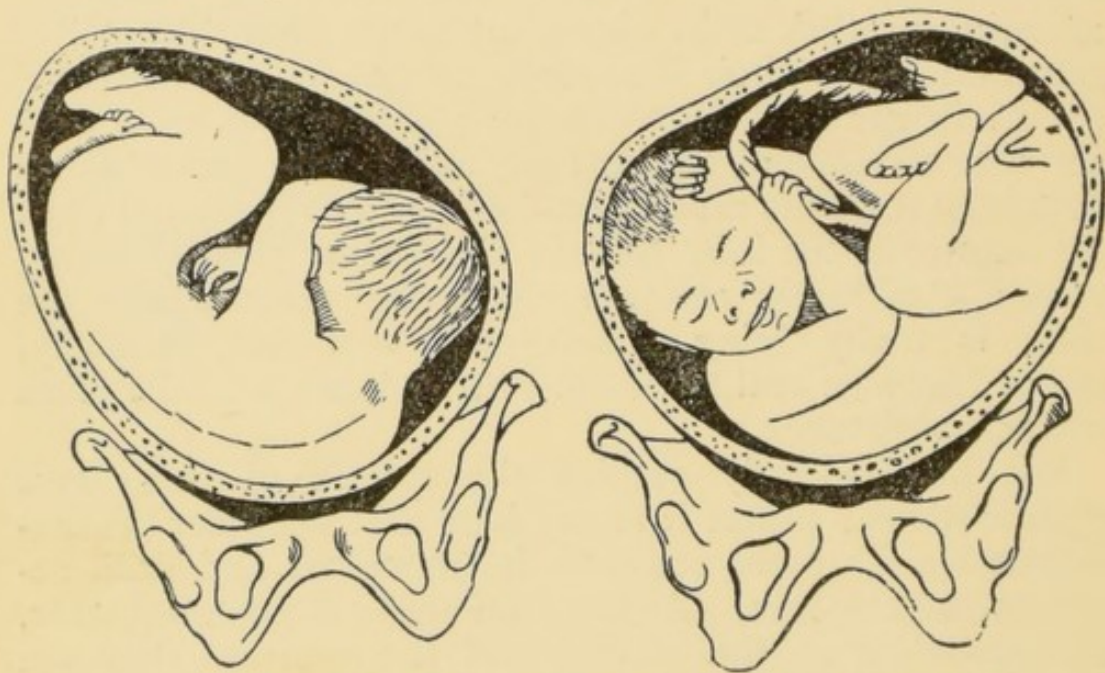
Fig. 126.—Transverse Presentations.

Left acromio-anterior L. A. A.   Right acromio-posterior R. A. P.

hands. The right hand of the fœtus would accommodate itself to our right hand and *vice versâ*.

It has been recommended, and with some reason, that when a shoulder case is suspected on abdominal examination, the vaginal examination should be made through the front wall of the uterus and not through the os so as to avoid any chance of rupturing the membranes.

The positions are not quite so easy to understand as in head and breech cases. A good way to understand the commonest position is to start with a left occipito-anterior. Suppose from obliquity of the uterus or other cause the child slides over to the left we then get the commonest

shoulder position, the back is to the front and the head to the left. The bony prominence of the shoulder is the acromion and this is made use of in the nomenclature. Thus we have L. A. A., that is to say the acromion to the front and to the left, and in the same way R. A. A. (right acromio-anterior), where the acromion is to the right and in front. The third and fourth positions, R. A. P. and L. A. P., are named in the same way, the acromion being behind and to the right or to the left. The words "left" and "right" apply to the mother and not to the left and right acromion of the fœtus. These positions are of no special importance in treatment; we want to know two things in a transverse presentation: (1) is the back to the front or to the mother's back; and (2) is the head lying in or above the right or the left iliac fossa?

This gives us another variety of nomenclature.

Thus we have :—

Dorso-anterior (back to the front) } 1. Head to left (left cephalo-iliac) = L. A. A.
2. Head to right (right cephalo-iliac) = R. A. A.

Dorso-posterior (back to mother's back) } 1. Head to right (right cephalo-iliac) = R. A. P.
2. Head to left (left cephalo-iliac) = L. A. P.

The outlook in a transverse presentation depends on the stage of the labour. If the condition is discovered prior to the rupture of the membranes the case is much more favourable, also if the child be premature or dead. If labour is advanced spontaneous delivery is almost impossible. Nearly half the children are lost.

Mechanism.—The requirements on the part of the fœtus for spontaneous delivery in a shoulder case are that it should be dead or premature, and therefore small and flexible, and when this state of affairs is present one of four things may happen.

(*a*) Early in labour the contracting uterus may change the presentation by pushing the child's head towards the middle and perhaps into the pelvic brim. This turns the shoulder into a head presentation and is called spontaneous rectification.

(*b*) The uterine contractions if strong later on in labour may turn the child if there be plenty of liquor amnii. Generally the shoulder is replaced by the breech, rarely

by the head. Another necessity for such an event as this to occur is that the fœtus be alive or so recently dead as not to have lost the resiliency of its tissues. This is spontaneous version. Both (*a*) and (*b*) are rare.

(*c*) The third mode of spontaneous delivery is known as spontaneous evolution. Briefly, this consists in the shoulder and chest becoming impacted in the pelvis low down, till the ribs press on the perineum, the head lying over the symphysis pubis and the shoulder under the pubic arch. Evolution now occurs, the shoulder is the fixed point and the trunk begins to be folded past it and allows the pelvis and lower limbs to pass over the perineum, and the head is left to escape much as in a pelvic presentation. The requirements for spontaneous evolution (as described first by Douglas) are very powerful action on the part of the uterus, a dead child with soft and relaxed tissues and small in size. Such a condition, though always rare, is most likely to happen in a twin labour in the case of the second twin, which is smaller than the first, and where the passages have already been well dilated by the larger twin.

(*d*) Lastly, spontaneous expulsion may occur, when the child is simply driven through the genital canal in a doubled-up condition, the chest and abdomen being born first. The necessary conditions for this are that the child be premature, small and dead.

Management.—The two things a midwife must do when she has found a shoulder presentation or even suspects it are (1) to send at once for assistance; and (2) do all she can to preserve intact the membranes. She will keep the patient as quiet as possible and try and restrain the pains. Very early in labour or previous to it when the condition is discovered she may try by external manipulation (to be described) to adapt the long axis of the child to the long axis of the uterus. The doctor, knowing the dangers of a shoulder presentation and also the risks of leaving such a case to the chances of spontaneous delivery, at once proceeds to rectify the presentation by turning the child. There are exceptions to this almost universal practice, as when, for example, the child is premature and dead, the uterine contractions are strong, labour has not been long in progress and the genital canal

is roomy; but the exceptions only go to prove the rule. Occasionally turning may be impossible and the only course open may be to mutilate and break up the fœtus by evisceration, decapitation or breaking up the spinal column.

What are the dangers of leaving a shoulder case to spontaneous delivery? There are four dangers to the mother; the first and most important is rupture of the uterus, the lower uterine segment stretches till it becomes thinner and thinner and eventually tears, and the fœtus escapes between the active and passive parts of the uterus into the peritoneal cavity. The mother may die of exhaustion, she may suffer from inertia of the uterus and from sloughing of the soft parts in the genital canal from the long-continued pressure.

There is liability to fœtal death or still-birth from compression of the cord.

We now come to consider turning or version, and it is conveniently discussed in this connection, since it forms, in the vast majority of cases, the correct treatment of a transverse presentation. Other indications are some face and brow presentations, some cases where speedy delivery is necessary, as when labour is complicated by hæmorrhage, convulsions, sudden death of the mother, prolapse of the cord and rupture of the uterus. It comes into opposition with forceps in some cases of contracted pelvis, the range of contraction being generally considered as being from three and three-quarters to three inches (conjugate of the brim). What is the object of turning? It is the artificial substitution of a more favourable presentation for the one already present by which delivery is facilitated.

The varieties are cephalic, where the head is substituted, and podalic, where the breech is substituted.

The methods employed for turning are (1) by external; (2) by internal; and (3) by combined manipulation.

1. *External Manipulation.*—This can only be done when the membranes are intact, the liquor amnii copious and the presenting part not engaged in the brim. The patient lies on her back with the knees drawn up. One hand is applied to the head and the other to the breech. The one hand presses down the one end of the fœtus while the other end is pushed up. This must be done

only between the pains ; while the uterus is contracting the fœtus is kept fixed in the position it has been placed in. There is no harm, early in labour or previous to its onset, when a transverse presentation has been diagnosed and a doctor is not at once available for the midwife to try and change the presentation by external manipulation alone.

2. Internal version consists in the bringing about of a pelvic presentation by laying hold of one or both of the lower limbs and bringing them down through the canals. This is podalic version. It is usually the only kind of version which can be used when the membranes have ruptured, and for its performance the whole hand is passed into the uterus. There is a risk when performing this of rupturing the uterus, since, after the escape of the liquor amnii, the uterus is tightly contracted round the child and the hand has to pass in through the thin uterine wall. Rupture may occur while the hand is being introduced or when the manipulations are being carried out. In addition to this risk there is the risk to the child that is always present in a head-last labour.

Stages in performing internal version :—

(1) *Preliminaries.*—The patient is anæsthetised, she lies on her back or on her left side with the knees drawn up, in either case the rectum and bladder having been previously attended to. When the left lateral position is used, as it generally is, the midwife supports the right knee. The exact position of the child's back is ascertained, because the right or left hand is used to turn according as the back is behind or in front. The hand that is used has to adapt itself to the front of the child. The coat is taken off, the shirt sleeves and vest sleeves pinned above the elbows. The hands are well washed, scrubbed and antisepticised, the midwife then lubricates with an antiseptic lubricant the back of the hand and arm that is to be introduced into the genital canal, leaving the palm and the tips of the fingers clean. A vaginal douche of 1 in 2,000 biniodide of mercury is used before the hand is introduced.

(2) *Introduction of the Hand.*—The hand is passed in through the vulva in the shape of a flattened cone during a pain, so that there may be the interval between two

pains to effect the version in. The hand is passed forwards ; if the os is still small, the fingers are introduced gradually. If the membranes are unruptured, they are now ruptured at or near the os, and the hand is introduced at once into the uterine cavity so as to avoid the escape of the liquor amnii. The hand is passed along the front of the fœtus, being flattened out against it when a pain sets in.

(3) *Change of Position of the Child.*—A foot or knee is grasped and pulled upon. All this time the other hand has been applied to the uterus externally and this hand assists the internal one by pushing down the breech. The limb is now pulled down with a wavy motion over the front of the child.

(4) *Extraction of the Child.*—The case is left to nature if there is no hurry and conducted as a breech case. It may be necessary to complete labour artificially as in complicated breech cases.

3. There is now practised a special kind of podalic version by combined manipulation named bipolar. It is performed when the membranes are unruptured and the os uteri is sufficiently open to admit two fingers. It has the advantage over internal version that the hand is not introduced into the uterus and it can be used in emergencies when the os is only partly dilated. The preliminaries are as before. The whole hand is passed into the vagina, and two fingers through the internal os in the intervals of a pain. The external hand is placed on the fundus uteri. The object is to gradually push the presenting part with the two fingers in the os to one side of the uterus while the other end of the fœtus is pushed by the external hand in the opposite direction. During a pain the fœtus is kept in its new position. The operator continues to push the fœtus round till a knee presents at the os. The membranes are now ruptured and the knee brought down, and the case is then conducted as one of ordinary podalic version.

CHAPTER XXIII.

COMPLEX LABOUR: UTERINE HÆMORRHAGE.

A COMPLEX or complicated labour is one in which there is some complication on the part of the mother or the child quite apart from the presentation of the fœtus. Complex labours may be thus classified :—
    A. Complications on the part of the mother :—
        1. Hæmorrhage.
        2. Rupture of the uterus.
        3. Inversion of the uterus.
        4. Eclampsia.
    B. Complications on the part of the child :—
        1. Prolapse of the cord.
        2. Plural births.

The first complication we shall consider is uterine hæmorrhage. This is the most dangerous complication of pregnancy and labour, and the midwife must thoroughly understand how to deal with it, as there may be no time to wait for assistance.

We have seen that hæmorrhage may occur early in pregnancy before the child is viable; this is a sign of threatened or inevitable abortion in nearly every instance. It may occasionally be due to uterine disease, but then it is not often profuse, as, if it were, it is unlikely that the patient would have conceived.

For all practical purposes uterine hæmorrhage is of three kinds, namely, accidental hæmorrhage, unavoidable hæmorrhage and post-partum hæmorrhage. The first two occur towards the close of pregnancy or in the first stage of labour, the last named occurs after delivery.

Accidental hæmorrhage and unavoidable hæmorrhage are due to separation of the placenta. In the former the placenta is attached in the upper or middle part of the uterus in the active contractile part of the womb, and its

separation before the child is born is an accident and does not happen as a matter of course. In the latter case, however, the placenta is partly or entirely attached to the lower, expansile, passive part of the uterus, below Bandl's ring, and its separation is therefore inevitable before the child can be born. Thus the term "unavoidable" is used. It is also called placenta prævia (Lat.
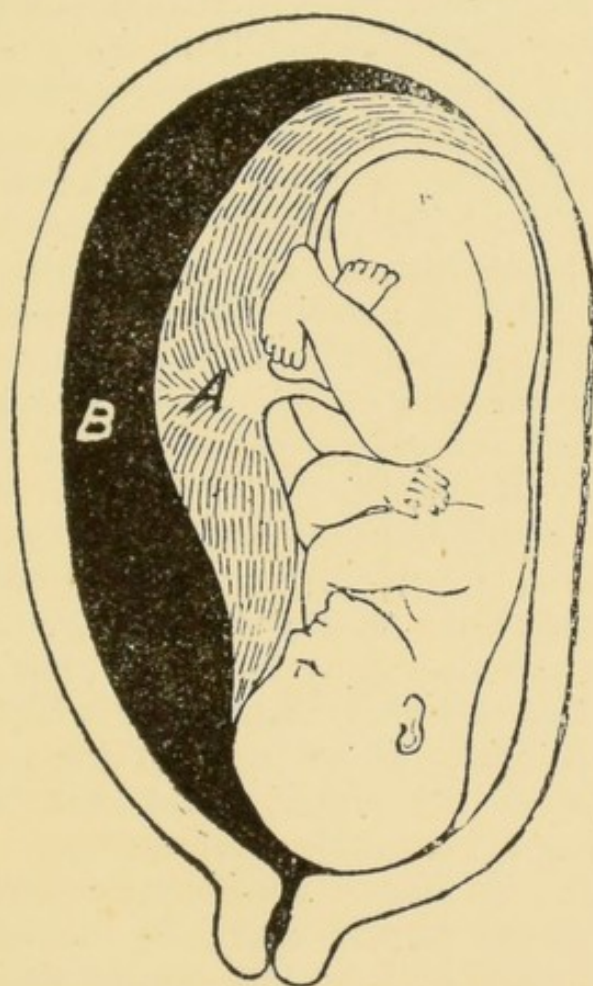
FIG. 127.—Accidental (concealed) Hæmorrhage.
A, Placenta : B, Blood-clot.

præ, before ; *via*, the way), which means that the placenta is in the way of the child.

1. *Accidental Hæmorrhage.*—The causes which bring about separation of the placenta before the birth of the child, when it is normally implanted in the active part of the uterus are rather obscure. Some unusual excitement, exertion or strain, a fall, a blow, a squeeze or crush may be the exciting cause ; but often there is a cause which predisposes to it as old uterine inflamma-

tion, various forms of placental disease and a diseased state of the blood-vessels passing between the uterus and the placenta, rendering them liable to rupture on slight provocation. It seldom occurs in young robust women and in primiparæ, it is far more common in multiparæ and especially those who are worn out, underfed, hard-worked and debilitated by disease.

Diagnosis.—It used to be said that accidental hæmor-rhage is to be distinguished from unavoidable hæmor-rhage (placenta prævia) by the fact that the hæmorrhage in the former case entirely ceases during a pain, whereas in the latter case the opposite happens; but this is not strictly correct, and the diagnosis between accidental and unavoidable hæmorrhage can only be made by vaginal examination when the os is large enough to admit the finger. It is true that the blood escapes from the torn vessels in the intervals of the pains and stops during the pains, when the vessels are squeezed and contracted, but this does not of necessity apply to its flow from the vagina; for the blood which flows between the pains may be retained in the vagina until the onset of a pain when it is expelled; in the same way, in unavoidable hæmorrhage, the flow may continue after the pain has ceased. Therefore, this distinction which used to be insisted on is really of no use. If the os is not large enough to admit the finger, accidental cannot be dis-tinguished from inevitable hæmorrhage. When it is large enough, the finger will come upon the smooth membranes in the former case; in the latter case it is the placenta that will be felt occupying the whole or part of the circle of the os.

There are two forms of accidental hæmorrhage, the external and the internal or concealed. In the former there is an escape of blood from the vagina either in a gush or in a dribble, in the latter there is no such escape, but the blood is retained in the uterus either between the membranes and the wall of the uterus, or within the amniotic cavity.

In the external form the placental separation takes place at its lower edge; in the concealed variety the separation may take place at the upper edge or in its centre, the placenta being then attached by its edges.

In such a case as this, blood collects behind the placenta (retroplacental hæmatoma), and this is seen as a cup-shaped cavity in the placenta, containing clot, when the after-birth is born.

In the concealed form, when the blood is poured out in considerable quantity into the uterine cavity, there is severe pain in the uterus, a feeling of sudden distension, with the usual symptoms attending profuse hæmorrhage, such as pallor, an anxious expression, feeble pulse, a feeling of faintness or actual fainting. The uterine contractions are feeble, owing to the distension of the uterus interfering with its action. On examining the abdomen the regular ovoid outline of the uterus is lost, it becomes rounded, hard and tense, and bulging may be noted here and there, especially at the fundus. In such a case the uterus is very sensitive to pressure.

The outpouring of blood between the placenta and the uterine wall, when its edges are not separated, in fact when the blood is circumscribed and shut in, so to speak, gives rise to no symptoms or, at any rate, to far less severe symptoms than does the commoner form of concealed hæmorrhage. The two varieties may, however, occur together.

In the external form the diagnosis has been referred to. There is probably some complaint of pain due to the separation and perhaps, too, the laceration of the placenta.

The danger of accidental hæmorrhage depends, of course, on the amount of blood lost. Concealed hæmorrhage is always more serious than external. It may be only a trifling complaint, but, on the other hand, it may give rise to very severe symptoms or even cause death. The amount of blood lost cannot be estimated in the concealed variety, and so more importance is to be attached to the appearance of the patient than to the quantity of blood lost. What one woman may lose without serious danger may kill another woman. As danger signals, great pallor, quick, feeble pulse, clammy perspiration, an anxious expression of the face, a tendency to throw herself about with great restlessness and sighing should be noted. The presence of these symptoms must always give rise to anxiety.

On vaginal examination the cervix and lower uterine segment are normal and the finger meets the membranes. A clot of blood may lodge in the os and be mistaken for a part of the placenta, but it breaks down on touching and can easily be brought away by the examining finger. The history of the case must, if opportunity allows, be inquired into.

To distinguish accidental hæmorrhage, when concealed, from rupture of the uterus is not always easy. The following points will assist the midwife.

In concealed accidental hæmorrhage :—

(*a*) The uterus increases in size and is painful.

(*b*) The presenting part does not change its position.

(*c*) The accident occurs in the first stage before the membranes rupture (generally) or prior to labour.

(*d*) There may be the history of an accident.

In rupture of the uterus :—

(*a*) The uterus diminishes in size.

(*b*) The presenting part alters its position.

(*c*) The accident occurs, generally, towards the close of labour.

(*d*) The history of the case may help and the symptoms and signs which have preceded the accident.

Management of Accidental Hæmorrhage.—As soon as hæmorrhage occurs, prior to delivery, from whatever cause, at once send for medical assistance and let the doctor know why he is wanted so that no time may be lost. The essential point is to get the uterus to contract. If the hæmorrhage is slight and the patient has no dangerous symptoms, give a hot vaginal douche (105° to 110° F.) and do not rupture the membranes, but wait for the doctor to do so. If, however, the hæmorrhage is at all free, and especially if it affects the patient by giving rise to any of the danger symptoms we have enumerated, do not wait for the doctor's arrival, but rupture the membranes without delay in order to promote uterine contraction. The disadvantages of rupturing the membranes before the os is dilated, with which the midwife is by now familiar, are outweighed by the importance of getting the uterus to contract. Next, put a binder tightly round the abdomen to press firmly on the uterus. If the bleeding is profuse and the doctor has not yet arrived the

woman must be kept as quiet as possible, another very hot douche (not less than 120° F.) is given, warmth is applied to the lower limbs, the head is kept low, the foot of the bed is raised and the window widely opened. It is better not to give any stimulants.

The midwife is recommended not to plug the vagina, as this will probably convert a case of external hæmorrhage into one of concealed hæmorrhage. It is recommended by some when the uterus is strongly contracting, but we would counsel the midwife not to do it.

What is to be done if the hæmorrhage continue to be severe in spite of everything which has been done and a doctor is not immediately available? If the os is only partially dilated a hypodermic injection of a quarter of a grain of morphia is given. If, however, the os is fully dilated or very nearly so (the membranes have of course been already ruptured) we would, under these exceptional circumstances, recommend a hypodermic injection of citrate of ergotine (one-hundredth of a grain) with sulphate of morphia (one-sixth of a grain). These hypodermic tabloids are put up by Burroughs & Wellcome, and we would suggest the midwife carrying them in her hypodermic syringe case to be used in such emergency as this. Needless to say, it is only very rarely that the treatment recommended will not answer till a doctor arrives, without having to resort to ergot or morphia hypodermically.

Last, but not least, the midwife must keep her head whenever she is brought face to face with uterine hæmorrhage, so that she may not only be able to render first aid intelligently, but also assist the doctor promptly where every moment is of value. She must do all she can, too, to reassure her patient.

When the doctor arrives he will take steps to empty the uterus. If the hæmorrhage is slight he may be content to merely rupture the membranes and see if the hæmorrhage then ceases and if labour progresses. More often, however, he will proceed to deliver the child, first dilating the cervix with the fingers or Barnes's bags and then putting on forceps or turning according as he thinks fit. After delivery he takes special pains to secure strong uterine contraction, because accidental hæmorrhage is

frequently followed by post-partum hæmorrhage. In cases of concealed hæmorrhage where there is a serious obstruction to rapid delivery, Cæsarian section or Porro's operation is generally performed. Embryulcia is seldom called for.

2. *Unavoidable Hæmorrhage or Placenta Prævia.*—We have already stated why this kind of hæmorrhage is called inevitable and what is meant by the term " prævia ". It used to be thought by the older obstetricians that in placenta
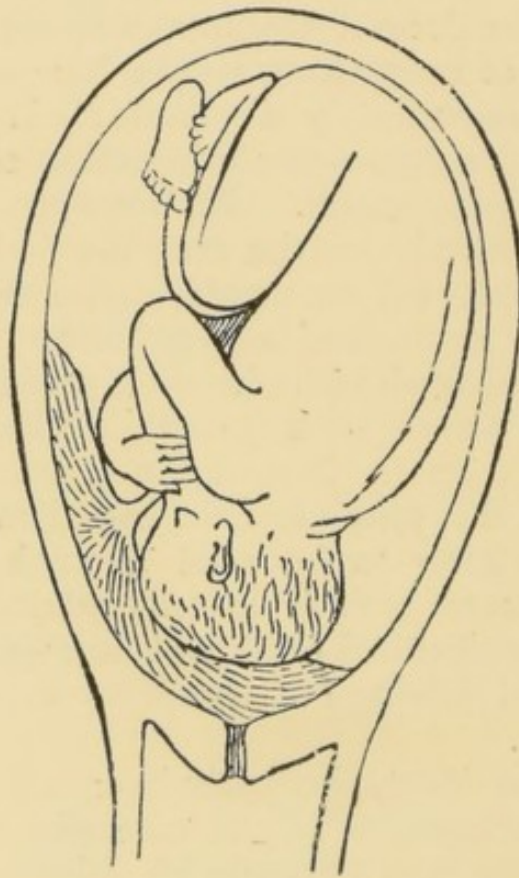
Fig. 128.—Placenta Prævia.

prævia the placenta was originally normally implanted on the uterine wall and that it had slipped down when labour commenced ; but we know now that it is implanted originally in the passive expansile part of the uterus. The average occurrence is once in 1,000 cases and it is more frequent in multiparæ. One observer found that out of 136 cases only 11 were primiparæ. It is said to be six times as common in multiparæ. When it does occur in primiparæ they are usually beyond the usual age of first pregnancies.

Chronic uterine inflammation (and therefore indirectly the various causes of this condition) accounts probably for nearly all cases of placenta prævia. The uterus, which is the seat of chronic inflammation, has thickened and smooth walls, the natural folds by which the impregnated ovum is caught after its entry into the uterus from the Fallopian tube being obliterated. The uterine cavity is, too, expanded. Hence the ovum passes farther down into the cavity than it would otherwise do. This morbid implantation probably often results in early expulsion of the ovum, but when it lodges in the lower uterine segment and develops there, then it is that placenta prævia results.

Varieties.—There are three varieties of placenta prævia: When the placenta covers the os uteri all round so that on complete dilatation nothing but placenta can be felt presenting, the placenta prævia is complete. When only one side of the os is covered so that on complete dilatation the membranes can also be felt presenting, it is partial. When on complete dilatation the placenta does not cover the os at all, but its edge can be felt just above the os, it is marginal. As we should expect, the central variety is the most dangerous, and the marginal the least.

Before the child can be delivered hæmorrhage is inevitable. It begins with the commencement of the dilatation of the internal os, by which the cavities of the uterus and cervix become one. But it may begin in the later months of pregnancy, from the sixth month onwards. Quite a large number of miscarriages are due to placenta prævia, and the nearer the hæmorrhage occurs to the end of pregnancy the more profuse it is. An important and characteristic point about this hæmorrhage, which contrasts it with accidental hæmorrhage, is this: it generally comes on without any apparent cause and without the least warning. It may happen when the woman is in bed and asleep. It may come on little by little for several days and then in a gush. Whenever a woman after the seventh month of pregnancy tells us that she has even the slightest amount of hæmorrhage, she must be most carefully watched until labour commences and she must always be within hail of a good nurse and a doctor. The hæmorrhage may or may not be accompanied by pain.

As we have already said, the cause of the hæmorrhage is

separation of the placenta, which is brought about by the stretching of the lower uterine segment, and the source of the blood is the ruptured vessels in the lower uterine segment and in the cotyledons of the placenta.

The symptoms produced by the hæmorrhage are those we have already seen; they vary according to the severity of the hæmorrhage and the effect such loss of blood has on the patient, such effect varying in different individuals. Increasing pallor, restlessness, a feeble, quick pulse, cold sweats and an anxious countenance are what we expect in cases such as this.

On vaginal examination the lower uterine segment feels thickened, soft and "cushiony," even before the finger is passed into the os. On further examination what is generally described as a "wormy" feeling is conveyed to the finger by the vessels. All this makes one suspicious, but the only absolute sign is the feeling of the placenta through the os, covering it in part or in whole, and obscuring the membranes and the presenting part altogether or only partially. We have seen how a placenta prævia and a blood clot are to be differentiated.

With each pain, when placenta prævia occurs during labour, a portion of the placenta is separated, and with the separation of each portion there is a fresh accession of blood.

The outlook for the mother is worse the greater the amount of placenta which is attached below Bandl's retraction ring, on the passive expansile portion of the uterus, the farther from term she is and the less active are the uterine contractions. The dangers to the mother are (1) immediate death from hæmorrhage; (2) subsequent exhaustion; (3) blood-poisoning (septicæmia); and (4) the methods of delivery employed. The dangers to the child are (1) premature delivery; (2) arrest of circulation; (3) operative procedures; and (4) suffocation.

About 8 per cent. of mothers die in all varieties of placenta prævia and every other child is born dead.

Management.—As soon as the condition is suspected send for a doctor and do not leave the patient till he arrives, even if the hæmorrhage be slight and occur in pregnancy. When placenta prævia occurs before term, say at the seventh month, and the bleeding is slight, the

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doctor may see fit to use palliative measures to allow the
uterus to go on to its fuller development. He enforces
absolute rest lying down, in a cool, well-ventilated room,
and he orders an opiate to suspend uterine activity. If
he temporises thus, he keeps within call of the patient
and he is prepared to return at short notice; in any case
he returns in about twelve hours, and if there has been
no more hæmorrhage he will let the patient go on; but
he comes now prepared to empty the uterus, and if he
finds that palliative treatment has once failed he will
complete delivery without delay.

But far more commonly the uterus is emptied as soon
as placenta prævia is diagnosed without resorting to
palliative measures, and always when labour has com-
menced and where the hæmorrhage is more than slight.

If the implantation is marginal and the os fully dilated
it may suffice to rupture the membranes, the presenting
part then comes down and labour may progress naturally.
If the head does not come down, the labour is expedited
by putting on forceps or by podalic version.

If the case is one of partial or complete placenta prævia
and if labour has not commenced, it is started by firmly
plugging the vagina with pledgets of absorbent cotton-
wool wrung out of a warm 1-20 carbolic solution. This
starts uterine contraction and may check the hæmorrhage
(some authorities, however, deny this). After six hours
the plugs are removed and if the os is found to be suffi-
ciently dilated, bipolar podalic version is performed (see
p. 243). If it is not dilated, the finger or a tent, and later
Barnes's bags are used to dilate it and bipolar version is
carried out as before. After the fœtus is turned it is left
to act as a plug for a few minutes. There may be now
almost no further hæmorrhage.

Before rupturing the membranes and bringing down
the foot, after turning the child, the placenta is separated
from the uterine wall as much as possible. Delivery is
effected very slowly, the uterus being allowed to expel
the breech, and after delivery the doctor is on the look-out
for post-partum hæmorrhage, which is very apt to occur.
He remains several hours after delivery before he feels he
can safely leave his patient. The placenta is removed
immediately after the child is born.

The midwife will do all she can to help the doctor, observing the general points which we have already mentioned under accidental hæmorrhage. She avoids rupturing the membranes unless the case is one of great urgency, as this renders the condition more difficult to deal with afterwards. If she has to act quickly we would recommend an air-ball pessary (well disinfected and vaselined before use) or the largest of Barnes's bags to plug the vagina with, rupturing the membranes first in severe cases of hæmorrhage. The air-ball pessary we recommend the midwife to carry always in her bag.

3. We shall now say a few words about hæmorrhage in the third stage of labour. The patient is liable to this so long as the placenta is retained. The commonest cause on the part of the uterus is inertia and this is generally due to mismanagement of the previous stages. The uterus cannot be outlined and its cavity is perhaps distended with blood, the placenta, which has been separated in part or in whole, acting as a plug, or the blood may escape externally and the uterus be soft and flaccid. This is treated by liquid extract of ergot (two drachms) or hypodermic injection of ergotine or ergotinine. The fundus uteri is grasped and compressed and stimulated to contract.

There may be a condition of irregular or hour-glass uterine contraction where the area of placental attachment is inert, the rest of the organ being active. The inert area becomes pocketed. This may be felt on abdominal palpation, and on vaginal examination we may trace the cord up to this flaccid area through a firm ring which we have difficulty in passing through. The patient is put under chloroform and the folded hand is slowly passed through the contracted part into the flaccid area beyond and the placenta extracted. The fundus uteri is at the same time compressed by the external hand.

Another cause of retention of the placenta is found in morbid adhesions to the uterine wall which prevent the contracting uterus from expelling it. Hæmorrhage only occurs when the adhesions are partial, when adherent entirely there is no separation and therefore there can be no hæmorrhage. If the placenta remains in the uterus for more than an hour after the child is born it

is spoken of as retained; and, if the doctor has not been summoned on account of hæmorrhage, he must now be sent for to extract the placenta from the uterus. The patient may be chloroformed. While he passes his right hand into the uterus and peels off the placenta, commencing at its upper edge, his left hand compresses the uterus externally. It may be possible only to remove the placenta piecemeal. The midwife is to have hot water at a temperature of 120° F. ready in case of severe hæmorrhage and also a solution of 1-5,000 perchloride of mercury or other antiseptic solution in appropriate strength for the doctor to use to wash out the uterus.

It is only under exceptional and most urgent conditions, when a doctor cannot be got, that the midwife is to attempt to extract a retained placenta from the uterus. She must, before resorting to such a procedure, give ergot and try to express the placenta with the hand on the fundus of the uterus, in the way we have already described.

When the placenta is adherent, part of it may be left behind after it has been peeled off the uterine wall. This will be discovered when the placenta is examined and is found not to be complete. The signs to which it gives rise are intermittent hæmorrhage, offensive lochia and irregular shape of the uterus. The after-pains are generally severe.

4. *Post-partum Hæmorrhage.* — By this is meant hæmorrhage after delivery, but some authorities make it include hæmorrhage after the birth of the child, that is, hæmorrhage in the third stage. We have already referred to hæmorrhage in the third stage, but it is not easy, nor do we think it advisable, to draw a sharp distinction between this and hæmorrhage after delivery; we would prefer to include under post-partum hæmorrhage all hæmorrhage occurring after the birth of the child. If the hæmorrhage occur more than twenty-four hours after birth it is called secondary. Every woman loses some blood after confinement, some more than others. An average normal quantity to be lost is from half to one pound of blood. Post-partum hæmorrhage is the worst accident that can happen in midwifery practice, often it cannot be anticipated, it may come on with the

least possible warning and there is no time to get assistance. The midwife has to act on the spot.

How is hæmorrhage prevented from occurring in a natural labour after delivery, beyond of course what is the normal loss? This is due to the tonic or continuous retraction of the uterus, whereby the organ gradually diminishes in size, also to the clonic or periodic contractions of the organ. Its muscular fibres compress the blood-vessels and the blood clots in them. After labour when the hand is placed upon the uterus it is felt to be alternately hard and flaccid, but normally in the latter state there is no hæmorrhage, which goes to prove that apart from the periodic contractions the tonic retraction is sufficient to stop hæmorrhage. But the periodic contractions are a powerful help.

Post-partum hæmorrhage, that is to say, dangerous bleeding after confinement, is due to an absence of this tonic retraction.

The chief cause, then, of post-partum hæmorrhage is uterine inertia, that is to say, a want of activity in the organ by which its retraction and contraction are inefficient to compress the open mouths of the blood-vessels in the placental site. The various conditions that bring about uterine inertia in the three stages of labour may be indirectly responsible for causing post-partum hæmorrhage. These we have already studied. Other rarer causes of the hæmorrhage are an extensive tear of the cervix, by which a large blood-vessel may be opened, inversion or the uterus and partially adherent placenta which interferes with the proper uterine retraction. There may be one or more little detached islands of placenta in the uterus— placentæ succenturiatæ—which act in the same way and thus bring about post-partum hæmorrhage; this cannot be detected by examining the placenta. Where the placental site is unduly large as after plural births it is liable to occur.

It is more likely to happen after tedious and prolonged labours, after instrumental delivery and other operative procedures, after accidental or unavoidable hæmorrhage, and where the uterus has been distended with excess of liquor amnii or twins. The woman may be what is known as a "bleeder".

Lastly, we desire to emphasise the importance of not delivering too quickly. Too rapid delivery, even in a normal labour, is responsible for many cases of post-partum hæmorrhage. One of the surest ways of producing it is to drag the child away while the uterus is in a state of inertia and the pains are absent.

Symptoms.—The escape of blood may be in a continuous drain; more often it occurs in gushes. Sometimes there is no external escape, the hæmorrhage is concealed, when a clot blocks the os. This is the worst form. There are present the general signs of hæmorrhage in a marked degree; a weak, rapid pulse, great pallor, cold extremities, restlessness, rapid breathing, gasping, sighing, and a cold perspiration, ending, perhaps, in collapse and death. Hope even in the most alarming cases is never to be lost so long as the heart is beating.

Management.—This is preventive and curative. If the midwife is conversant with the management of normal labour and has done her duty she has carried out the preventive treatment already. As to the curative treatment, the first thing to do is to get the uterus to contract. Grasp the uterus firmly with the right hand, the fingers pointing upwards towards the navel, and do not let go of it. If it cannot be felt, rub and knead the lower part of the abdomen until the uterus can be felt hardening under the hand. Still keep hold of it to keep it contracted, and if it does relax continue the rubbing and the kneading. While this is done tell the assistant to give a teaspoonful of the liquid extract of ergot, superintending the measurement of the dose. But the contraction may be only momentary, or in spite of these efforts it may be impossible to get the uterus to contract at all. Then order the assistant to get water so hot that the finger can only be held in it a moment without being scalded. Be careful to see that the water is as hot as this, otherwise it is useless. If there is a bath thermometer see that it registers not less than 118° F. when placed in the water. While this is being got, introduce the left hand, first rinsed in 1-1,000 perchloride of mercury or other anti-septic solution, into the vagina and then into the uterus, keeping the right hand in its original position the while. Feel for any piece of membrane or of placenta, clear out

these and all the clots, in fact everything that is found, and make sure the uterus is empty.

The empty uterus is now to be firmly pressed between the two hands, and while this is done the assistant injects the hot water, while the left hand remains in position, as high up as possible. If the assistant be not capable
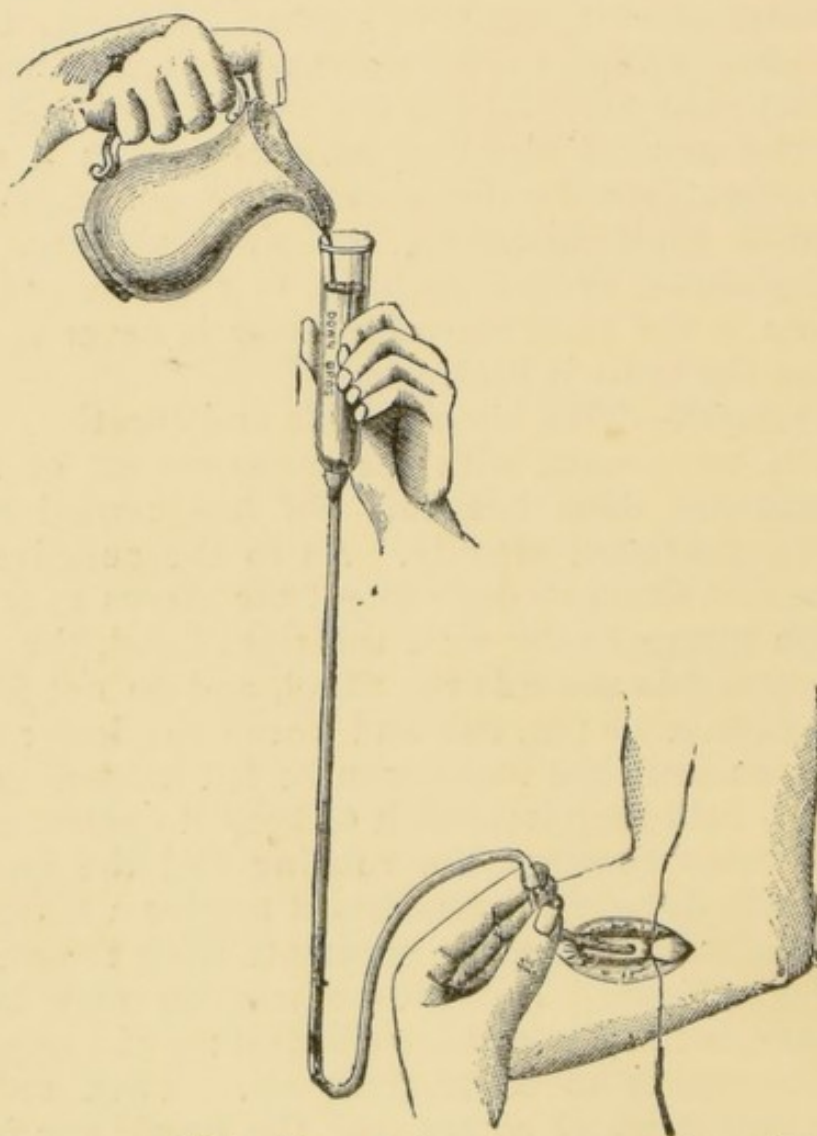
FIG. 129.—Saline Transfusion Apparatus (Horrock's).

of doing this the uterus must be kept firmly compressed between the two hands as long as strength allows of this being done. By this time further aid will probably have been procured. When the right hand is tired out apply a bowl or a firm pad, such as a small book wrapped in a diaper, over the uterus and press it down with the hand. As soon as the external hand can be removed, and this

should not be done under half an hour, citrate of ergotine and morphia (see p. 249) may be injected hypodermically. Other points which should be attended to as far as is
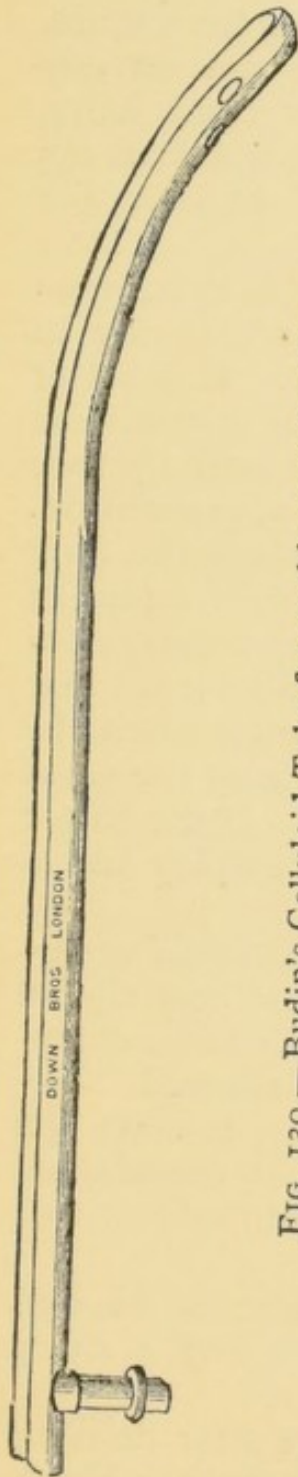
FIG. 130.—Budin's Celluloid Tube for washing out the Uterus.
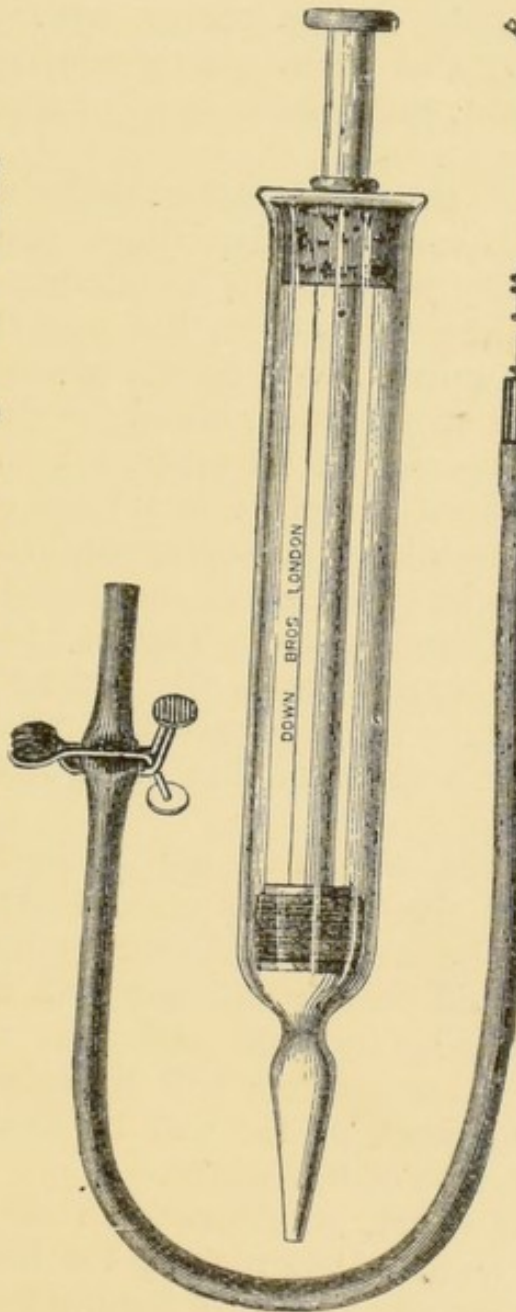
FIG. 131.—Saline Transfusion Apparatus (Lane's).

FIG. 132.—Simpson's Sharp Curette.

possible are the following, but they are not to take the place of what we have recommended. They are simply supplementary measures. Keep the patient as calm and

quiet as possible, have plenty of fresh air in the room, lay her on her back with her head hanging low, raise the foot of the bed, put the baby to the breast, put hot bottles to the feet, bandage the extremities from below upwards.

What is the midwife not to do? Never plug the vagina. Do not use any cold application, and do not on any account leave hold of the uterus with the right hand, until it is firmly and permanently contracted, unless the hand is tired out, then use a bowl or a pad to assist the hand.

We have, of course, been considering a dangerous case; but all cases of post-partum hæmorrhage are to be looked upon by the midwife as dangerous. It is better to exaggerate the gravity of such a case than to minimise it in one's own mind. We do not mean to infer that we are to excite or worry the patient by our apprehension. This is to be avoided at all costs. To replace the fluid lost from the blood-vessels a rectal injection of a pint of warm water containing a dessertspoonful of common salt is useful. It is to be given every quarter of an hour till four injections have been given. This is indicated when the pulse is not perceptible or hardly perceptible at the wrist and its effect on the pulse is carefully noted. If the doctor have arrived he will order this or he may employ transfusion.

As to after-treatment this will be in the hands of the doctor who will give his instructions. At first only sips of hot water may be ordered. As time goes on milk, champagne or egg-and-brandy mixture will be allowed. But vomiting is easily induced and this may re-start the hæmorrhage. Great thirst will probably be complained of, and small pieces of ice will be found to relieve this sometimes, or sips of hot water.

The patient must, of course, on no account be left. She must be watched sedulously for hours, and a sharp look-out kept for any return of hæmorrhage.

Supposing there is profuse hæmorrhage after delivery and the uterus is well contracted and retracted the bleeding comes from a laceration in the genital canal, either the cervix, the vagina, the perineum or the vestibule. Send for assistance as quickly as possible and try and locate the tear, and compress the edges of the lacerated

part until help arrives. If the lacerated point cannot be located give a vaginal douche of not less than 110° F. If this does not quickly check it increase the temperature to 118° F., testing it, if there be no bath thermometer, in the way we have mentioned.

When the doctor arrives he will examine the genital canal, locate the tear and proceed to suture it with catgut or other sutures.

Secondary uterine hæmorrhage is very uncommon. It may be due to undue exertion soon after delivery. When it occurs later on in the puerperium it is probably due to organic disease unless it arise from a piece of retained placenta. The uterine cavity in such a case is explored and curetted if a piece of retained placenta be found. Any growths on the surface of its walls are removed.

Recently considerable discussion has taken place in at least one prominent medical journal as to the correct treatment of post-partum hæmorrhage, but all authorities are agreed on the prime importance of securing efficient uterine contraction. One writer believes that in every case of this calamity the end of the bed should be raised up on a table and that the abdominal aorta should be firmly compressed ; by so doing, he argues, the hæmorrhage is temporarily arrested, and this gives time to the exhausted uterus to recover itself and perform its duty of contraction and retraction.

CHAPTER XXIV.

COMPLEX LABOUR (*continued*).

WE have now to study other accidents and abnormal conditions which complicate labour. The first of these to be considered is rupture of the uterus.

This accident is not now so common as it used to be, owing to increased knowledge of and improved methods in the conduct of labour, and a better appreciation of the conditions which render it liable to occur, which permits, often, of the accident being guarded against. It used to be said that rupture of the uterus was due to the use of instruments; now we know that it' is generally due to a want of their use.

Its frequency is not easy to determine, but one thing we know, it is far more common in multiparæ; only about 12 per cent. of the cases occur in primiparæ. Its occurrence during pregnancy is exceedingly rare. It is, then, probably associated with accidental hæmorrhage, or it may be due to an accident, for example, when a cart-wheel passes over the abdomen.

It is only with its occurrence as a complication of labour that we shall concern ourselves.

Any condition which brings about undue retraction of the upper, active, contractile part of the uterus with consequent stretching of the lower, passive, expansile part (that is to say, the lower uterine segment) becomes, indirectly, a cause of rupture of the uterus. We have seen two conditions under which it is especially liable to happen, namely, hydrocephalus and transverse presentations. These are among the most common causes. But it is obvious that there are many other causes which may produce the state of affairs which we have mentioned. The fault may be in the passages, hard or soft, or in the passenger. As examples, we may mention contracted

pelvis, occlusion or undue rigidity of the os, obliquity of the uterus, cancer of the cervix, fibroid or ovarian tumours, certain face cases and operative delivery. How does rupture actually happen ?

We shall only refer to rupture occurring at the junction of the active and passive parts of the uterus. The active part gets smaller and harder; the passive part is pulled up by the active part higher and higher, while it is fixed below by being compressed between the presenting part and the pelvis. Therefore, it becomes more and more thinned and stretched until it gives way and rupture actually takes place.

This is what usually happens, and what we wish to impress on the midwife is that the accident can often be foreseen ; for the division between the two parts is usually to be felt by examination through the abdominal wall, when rupture is threatened, as a furrow running across the uterus two or three fingers' breadth above the symphysis pubis. The tear may involve the entire thickness of the uterus, complete rupture, or the mucous membrane may be left intact, incomplete rupture. The laceration is more often lateral, commonly on the left side. It may be transverse, longitudinal or oblique. Rupture takes place, as a rule, slowly, the uterine wall yielding bit by bit.

The symptoms are divided into those which occur when rupture is threatened, premonitory; and those which point to actual rupture. The conditions under which it is liable to occur are kept in mind. The palpation of the uterus through the abdominal wall we have already mentioned. On vaginal examination we may find it hard to get at the presenting part, and the cervix is found to be thin, firm and undilatable. The uterine contractions are strong. Before rupture is threatened the midwife will probably have sent for a doctor, owing to the abnormality which has delayed the labour. If she has not had reason to send, as soon as signs of threatened rupture are found, and these she must always be ready to recognise, she will now do so without further delay.

The symptoms of actual rupture are a sudden cessation of the pains, which were probably strong before rupture. This is accompanied by all the symptons of extreme collapse which we have described under uterine hæmor-

rhage. There may be a peculiar pain complained of at the time of rupture, as if " something had given way ". There may or may not be external hæmorrhage ; there is generally internal hæmorrhage into the peritoneal cavity. On examination there is recession of the presenting part or a change of presentation may take place. The child may be easily felt, sometimes, lying in one part of the abdomen and the contracted uterus in another part. The midwife may be able to detect the rent in the lower part of the uterus, but it is better for her not to persist in searching for it if she cannot readily feel it. Probably the doctor will be in attendance now and the midwife has simply to obey his orders. When the rupture is incomplete the pains become weaker, but they do not suddenly stop as is the case in complete rupture. The child does not recede to such an extent as in complete rupture, nor can it be felt so distinctly through the abdomen. We have already referred to the distinguishing points between accidental (concealed) hæmorrhage and rupture of the uterus (see page 248).

The treatment of rupture of the uterus is in the first place preventive. It occasionally cannot be avoided, but on the other hand it often can be, and the midwife must get help early in any case where labour is obstructed or unduly delayed. The condition of tonic contraction of the uterus, where the pains run one into the other, is to be the danger-signal. When this is present the woman is in grave peril, the longer she remains unassisted the worse she will get, and if she does not receive help she will die.

When rupture has occurred relieve the state of shock by hot bottles applied to the feet and stimulants, and inject a quarter of a grain of morphia. This is if the doctor have not arrived. But there has been a serious error made if the doctor have not been sent for long ago ; and a case of rupture of the uterus occurring in the midwife's practice without a doctor having been sent for is seldom excusable ; we would go further than this and say it may be even criminal.

When a doctor is called in to a case of threatened uterine rupture he will send for a colleague, place the patient deeply under chloroform to keep in check the

uterine contractions, and deliver without loss of time. If rupture has occurred and the tear be small and the head presents, the child is extracted through the genital canal if the presenting part can be reached. The uterus is emptied and made to contract, the passages are washed out with sterilised water, the clots removed, and the rent plugged with iodoform or other antiseptic gauze.
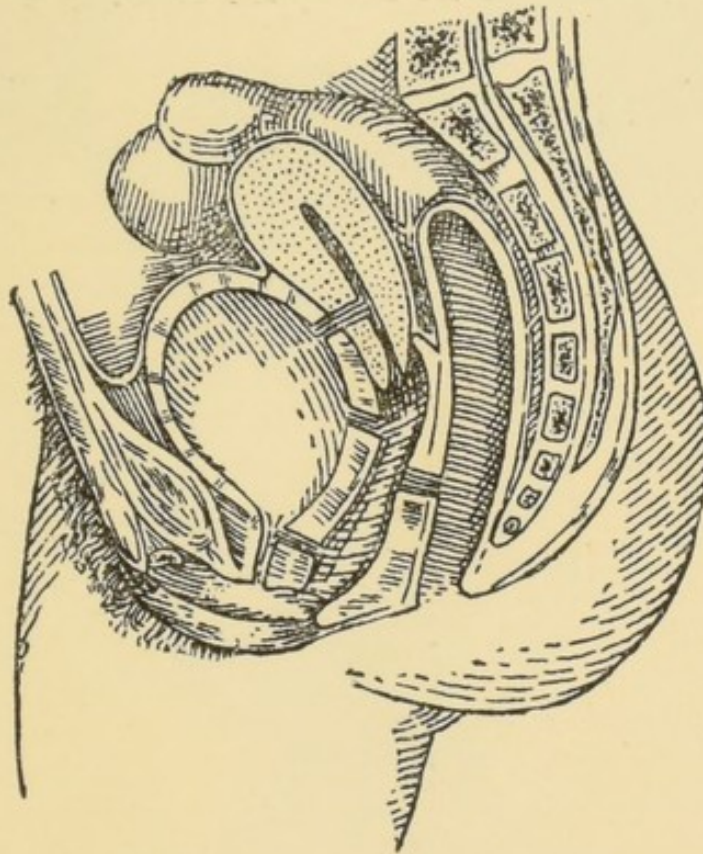
FIG. 133.—Fistulous Openings between the Bladder and the Uterus, the Bladder and the Vagina, the Urethra and the Vagina, and the Vagina and the Rectum (Simpson).

If the presenting part has receded, if the rent be at all extensive, if the shoulder presents, or the hæmorrhage be not arrested after delivery, the abdomen is opened, the child removed, and the rent in the uterus sewn up. It may be decided to perform Porro's operation (see p. 218).

The cervix, the vagina and the perineum are all liable to laceration. We have referred to cervical and perinæal tears. Vaginal lacerations are very rare. The tear is exposed and sutured. The peritoneum may be implicated, also the bladder. In the latter case a fistulous opening

may occur between the vagina and the bladder, vesico-vaginal fistula.

Acute Inversion of the Uterus.—This is an exceedingly rare complication. It may occur in the third stage or not until after delivery. The uterus is turned inside out so that its inner surface becomes its outer and occupies the vagina. If, when the uterus is flaccid, the cord is pulled upon, owing to its being too short or coiled round
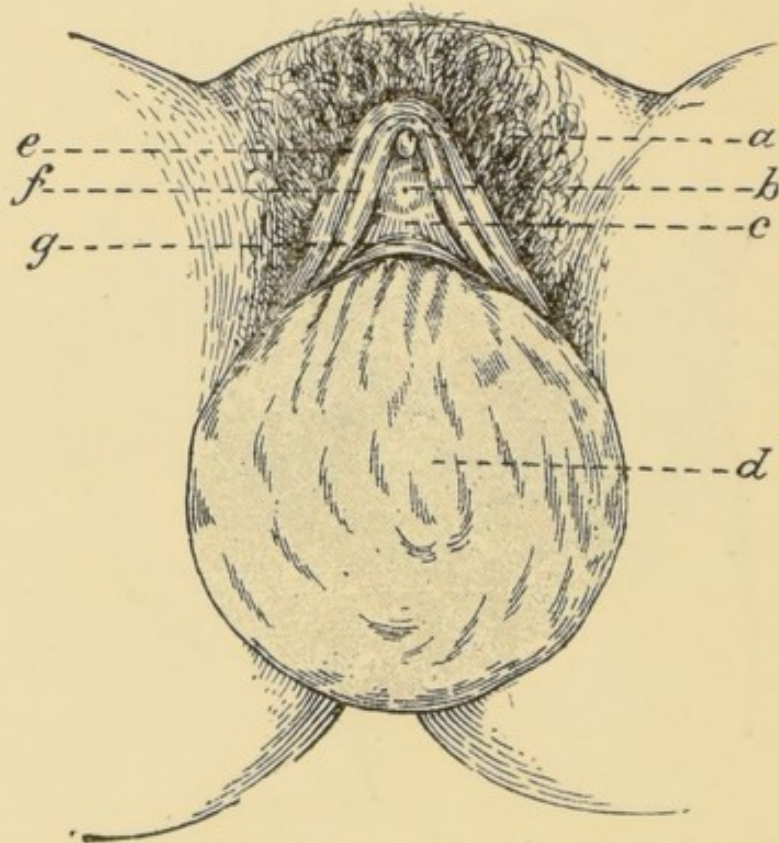
FIG. 134.—Inversion of the Uterus.

a, Clitoris; *b*, Orifice of urethra; *c*, Anterior vaginal wall; *d*, Internal surface of uterus (inverted); *e*, Right labium majus; *f*, Right labium minus; *g*, External os.

the child, or owing to the midwife pulling on the cord after expulsion of the child, it is liable to occur, especially if the placenta be adherent. Pressure downwards from above when injudicious efforts are made to express the placenta and there is inertia of the placental site may produce inversion. After precipitate labour, too, in the erect posture it has been known to occur. It may occasionally come on spontaneously after labour when the uterus is flaccid. When a part of the uterus becomes

invaginated, the contractions tend to increase the invagi-
nation, this part being driven through the cervix. There
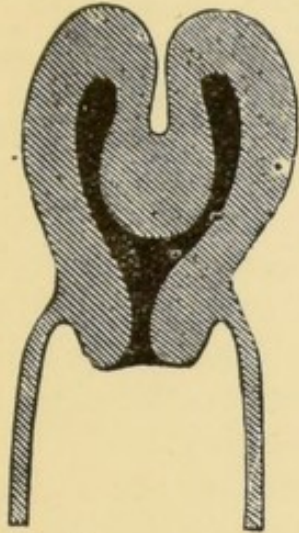
FIG. 135.
Diagram to illustrate In-
version (partial) of
the Uterus.
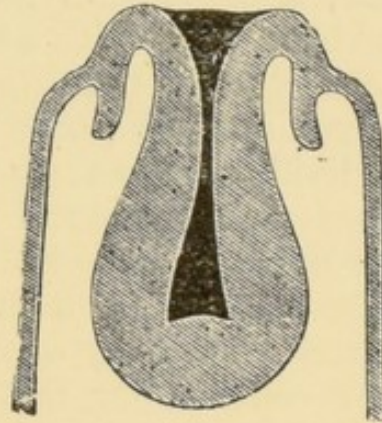
FIG. 136.
Diagram to illustrate
Inversion of the
Uterus.
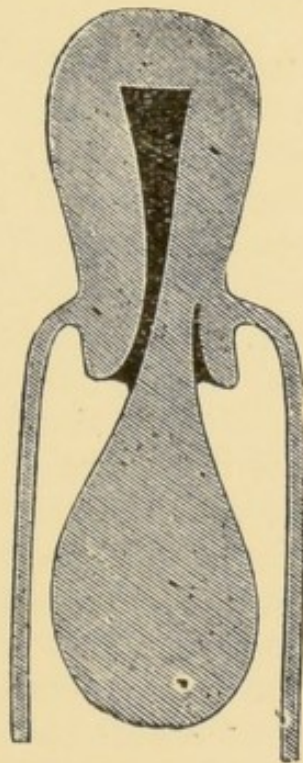
FIG. 137.—Uterine Polypus. Uterus in normal position.

are three degrees : (a) a simple depression in some part
of the uterus; (b) partial; and (c) complete inversion.

The symptoms are hæmorrhage, generally but not always severe shock, expulsive straining efforts and pain, when the inversion is partial. On examining the abdomen the uterus, in complete inversion, cannot be felt however much the abdomen be kneaded; if of the first degree, a depression may be felt in it. The vagina is found to be filled with a large, soft, fleshy swelling, limited and encircled by the ring of the cervix high up. At times the swelling may present at or through the vulvar orifice as a livid red mass to which the placenta or a fibroid tumour may be found adhering. In cases of doubt a metal catheter may be passed into the bladder, and this can be touched by a finger in the rectum showing the absence of the body of the uterus intervening.

The outlook for the mother depends on the rapidity of interference. Death often results; it is usually due to shock or hæmorrhage or both.

The midwife must act quickly. If the uterus is not reduced at once, one-third of the cases die. Spontaneous restoration is very rare; it never happens in complete inversion.

The treatment is to replace the uterus; it is easily done if done at once. The thumb and fingers of one hand are used to push up the body of the uterus, while counterpressure is made into the ring formed by the cervix, with the fingers of the other hand applied to the lower part of the abdomen. As the body goes up let the internal hand follow it. Immediately the accident has happened send for the doctor, but do not wait for his arrival before acting; but try and reduce the uterus in the way mentioned. If it cannot be done, and no brute force must be used, the doctor's arrival must be awaited. If the uterus projects through the vulva it is covered with a small towel wrung out of hot antiseptic solution. If the placenta is attached reduction may be made with it *in situ*. If it cannot be thus effected await the doctor's arrival, as if it is peeled off severe hæmorrhage may follow.

The hands must be washed and dipped into an antiseptic solution before attempting to replace the uterus. After reduction a sharp look-out for post-partum hæmorrhage must be kept. The consequent shock and exhaustion have to be treated after the uterus is reduced.

After an inverted uterus has remained unreduced twenty-four hours the immediate risks are over and the condition becomes one of chronic uterine inversion. This is a gynæcological condition.

Eclampsia.—This is an important complication of pregnancy, labour, or of the puerperium, about which the midwife should know something. It occurs once in about 400 cases. It is an acute disease, characterised by tonic (continuous) and clonic (interrupted) convulsions, accompanied by loss of consciousness, and ending in coma and death or recovery. The convulsions generally come on during labour, they may set in during the last weeks of pregnancy and sometimes they do not occur till after labour is completed. In one series of statistics analysed it was found that out of 455 cases 236 occurred during labour, 109 before labour and 110 after birth.

The convulsions seldom occur before the sixth month of pregnancy.

Eclampsia is five times more frequent in primiparæ. Its occurrence is closely associated with disease of the kidneys and, to a less extent, with undue distension of the uterus, as by hydramnios or twins. We have already referred to the importance of examining the urine for albumin during pregnancy (see p. 67). This is because pregnant women are liable to kidney disease. There may be albumin in the urine and no other symptoms of kidney trouble. But if albumin be present as more than a trace, it is usual to find other symptoms and signs pointing to kidney mischief, such as headache, flashes of light before the eyes, impairment of sight, deafness or singing in the ears, uncontrollable vomiting, bleeding at the nose, puffiness or actual swelling of the face, eyelids, hands, and especially the labia majora, shortness of breath, and a rapid pulse which is hard to feel. If the urine be submitted to a doctor for microscopical examination, casts of the tubules of the kidney (tube casts) may be found, which will confirm the diagnosis. When albumin is found in the urine of a pregnant woman, and especially if other symptoms of kidney disease be present, the midwife must insist on a doctor being called in and she must realise that the patient is in a serious condition ; for eclampsia occurs in one out of every three of such cases. It may be the

presence of one or more of these symptoms and signs which directs attention to the examination of the urine; but this is not to be relied on; and the urine is to be examined during pregnancy as a routine practice.

The fits are of an epileptiform nature, but on inquiry we shall probably find that the patient has not suffered with fits before.

The loss of consciousness distinguishes the convulsions of eclampsia from some other conditions such as hysteria. If the eyelids be separated and the ball of the eye be gently touched with the tip of the finger no response is elicited as would be the case in hysteria.

The onset of the fit may be the first warning given by the patient; there may be no prodromata or premonitory symptoms such as we have mentioned as being suggestive of kidney disease. The patient may be lying in bed, she stops in the middle of her conversation, a vacant look passes over her face, the eyes become fixed and she may now recover and resume her conversation. This is a very short and mild convulsive seizure. More commonly, the muscles of the face begin to twitch, the eyes become fixed or roll about, the face is twisted and turned to one or other side, causing great distortion of the features, the body next becomes involved, the trunk being held rigid and the back arched. The limbs, too, are rigid, the hands firmly clenched, breathing is momentarily suspended, the face becoming of a purplish hue, the tongue may be protruded and often bitten, and there is complete loss of consciousness. This state of affairs lasts from a few seconds to half a minute or more, and leaves the patient more or less dazed. If the fits rapidly succeed each other the patient is in a state of stupor in the intervals and passes into a state of coma followed by death. The severity of a case of eclampsia is gauged by the frequency of return of the convulsions and by the length of time consciousness is lost. The convulsions are generally attended by a rise of temperature and always by an increase in the frequency of the pulse rate.

The mortality to the mother is high; about 30 per cent. die. Death may be attributable to the actual fit, to the length of the coma, to brain disease, to apoplexy, or to the accompanying kidney disease.

Eclampsia developing in pregnancy is more serious than when it occurs in labour, and when accompanied by serious kidney disease the outlook is more grave. The fœtus runs the risk of being born prematurely and of suffocation.

It would be out of place in such a work as this to go into the question of the part which the presence of albumin in the urine and kidney disease play in bringing about the convulsions of eclampsia. Albuminuria may be consequent on eclampsia, but in many cases it has pre-existed. The inefficiency of the action of the kidneys as the removers of waste material from the body causes its accumulation in the blood, and, doubtless, these waste matters play an important part in the production of the convulsions.

Management.—This implies the treatment of albuminuria during pregnancy. When albuminuria is discovered the case is reported to a doctor and the patient is placed under his care. It is important to recognise albuminuria as early during the latter months of pregnancy as possible, so that the patient may be kept under close observation and receive appropriate treatment. For this early recognition we rely on the well-trained midwife's co-operation. It is a wise rule to treat such patients as if they might be going to have eclampsia. An absolute or an almost entirely absolute milk diet is ordered, about four quarts daily, and this is not departed from, and then only with caution, until the albuminuria has disappeared. Milk lessens the work of the kidneys and acts, too, by flushing them.

There are four objects which the doctor keeps in view in addition to dieting the patient. He takes care that the bowels are kept freely opened by saline purgatives; for example, white mixture, Glauber's salts and cream of tartar. He promotes the action of the skin by Turkish, vapour or ordinary hot baths, and administers drugs which increase the quantity of urine (diuretics), such as sweet spirits of nitre and acetate of potash, and, lastly, he uses remedies to lower the pressure of the blood in the arteries; the pressure is usually increased in kidney disease and the heart has to work harder to overcome it By lessening the pressure, therefore, the work of the heart is lessened.

If a fit is threatened during pregnancy or labour, as

evidenced by the presence of one or more of the pre-monitory symptoms mentioned, send for the doctor at once. If he cannot get to the house within a few minutes give two teaspoonfuls of the syrup of chloral, or if the symptoms are urgent and especially if convulsions begin, give an enema of thirty grains of chloral in three ounces of warm water. Inject it as high up as possible and slowly. Then make a large mustard and linseed-meal poultice and put it on as hot as it can be borne across the loins, or wring a large piece of spongiopiline dry out of boiling water and place it across the loins as hot as the patient can bear it. Wrap the patient up in blankets and extemporise a vapour bath by putting bottles filled with hot water, and protected, all round her to in-duce a copious perspiration. Send for calomel in five grain powders (if the chemist can be got at more quickly than the doctor) and place one of these powders on the tongue. If she cannot swallow put it right at the back of the tongue. Loosen all the garments, prevent the patient injuring herself during a fit by placing something hard between the teeth, allow the access of plenty of fresh air. If the patient is in a confined room or on a "four-poster bed" take her out, wrap her in blankets and lay her on a mattress on the floor and take care that she is watched constantly. Keep her lying on her left side, if in a fit, so that the fluids may run out of her mouth easily and not choke her.

As soon as the doctor arrives, if the patient is in a fit, he will administer chloroform. Two quickly acting drugs named croton oil and pilocarpine are very useful in the doctor's hands in treating the fits of eclampsia. The former in two drop doses on a little bit of sugar placed at the back of the tongue is a quickly acting aperient; the latter, injected hypodermically, quickly induces a profuse perspiration. We do not recommend the mid-wife to use either of these drugs on her own respon-sibility as they are powerful remedies and must be used with caution. The course which is usually adopted is to treat the eclampsia first and then to induce labour, or when labour is in progress to terminate it as quickly as is consistent with the safety of the mother by forceps, turning, or other operative procedure as may be indicated.

In dangerous cases of eclampsia many doctors have got good results by drawing blood (venesection) from one of the veins in the neighbourhood of the elbow.

If, after labour, albuminuria and other signs of kidney mischief persist, there may be a repetition of the eclampsia in the succeeding pregnancy and labour.

We now turn to the second subdivision of complex labours, namely, those in which there is some complication on the part of the child. The first of these is prolapse of the cord (prolapsus funis). This occurs once in 150 labours.

It may occur with any presentation. There are three varieties: (1) the cord may present at the os at the beginning of labour; this is known as chorda prævia (like placenta prævia); (2) there may be a falling down of the cord when the membranes rupture; and (3) the cord may, at a later stage, be pressed out alongside of the presenting part. The condition, thus, may be noted before the commencement of labour, during the first stage, when it may be felt in the bag of membranes, or not until after the waters have broken.

Prolapse of the cord is more common in multiparæ. It is a dangerous complication, not to the mother, but to the child, because the cord is nipped between the child's head and the pelvis, and this leads to asphyxia. In these cases, because of the hardness of the head, the long-continued compression of the cord generally causes the child's death. We have had occasion to refer to prolapse of the cord as a complication of breech presentations. It is not nearly so serious a matter in this presentation because there is more room for the cord to lie in while the soft passages are being dilated. In head presentations 64 per cent. of children die, and in other presentations 32 per cent.

The causes of prolapse of the cord are various. In the first place any condition which prevents the accurate adaptation of the head to the genital canal may allow the cord to slip past the head. We have seen what these conditions are. There is one especially that we would mention, namely, contraction of the pelvic brim. Therefore if there is prolapse of the cord early in labour suspect a contracted pelvic brim. We should expect prolapse of

the cord to be more common in præternatural presentations as the presenting part is not so nicely adapted to the os uteri, and so it is. An abnormally long cord and a cord attached low down on the placenta may act as causes, and, lastly, a sudden escape of a large quantity of liquor amnii may carry down the cord with it.

Management.—If there is no pulsation in the cord no special treatment is necessary as the child is dead. So long as there is pulsation the midwife's endeavours must be directed to preventing the cord from pressure as far as she can. While the membranes are unruptured the bag of waters prevents the cord from being unduly pressed upon, so the midwife keeps the membranes unruptured as long as possible. Meantime she will try and get the cord to slip back by placing the patient in the "knee-chest" (genu-pectoral) position (see p. 110), when the uterus becomes nearly vertical, the os being the highest part and the fundus the lowest. The cord, therefore, falls down towards the fundus. At least ten minutes should elapse before she is changed from this position and then she should lie on the side opposite to that on which the cord was felt to come down. She should not be allowed to walk about, but must be kept lying down and be cautioned not to strain or bear down, since the object is to keep the bag from breaking for as long as possible. It may be necessary, if the cord come down again, to replace the patient in the knee-chest position, keeping her in this posture for fifteen to twenty minutes on this occasion. If the posturing does no good and, always, if the prolapse occur after the membranes have ruptured send for a doctor. If the waters have only just ruptured posturing the patient may be tried before the doctor is sent for, but if not immediately successful do not wait, but send for assistance at once.

Various methods of treatment are in vogue. If the membranes are intact and posturing does no good the doctor will probably wait for full dilatation of the os, and then turn the child and deliver (when the head presents).

If the membranes have ruptured and the os is dilated and posturing alone is useless, with the hand in the vagina he will try to push up the cord between the pains

above the presenting part, with the patient, as before, in the knee-chest position. If he cannot do so, he will have recourse to forceps or turning. If the membranes are ruptured, but the os is not fully dilated, and posturing has been tried without success, combined with pushing up the cord with the hand, a catheter, with the two ends of a piece of tape threaded through a hole bored at its end to form a loop to snare the prolapsed piece of cord, is sometimes used. This is carried up to the fundus when the loop is loosened and the catheter drawn out. If this is of no avail the cervix is dilated by Barnes's bags or other dilator, and forceps or turning are employed as before.

Plural Births.—Labour may be in progress before twins are discovered, especially if the uterus be contracting strongly. The diagnosis of twins has already been discussed (see p. 72).

What is the effect of twins on labour?

They are usually expelled prematurely (in two-thirds of all the cases). One may be born prematurely and the other carried to term, or one may die and either be expelled by itself or be retained in the uterus. In half the cases both present by the head; in a third of the cases one presents by the head and the other by the breech. Other much rarer variations are (1) both breech presentations; (2) one head, one transverse; (3) one breech, one transverse; and (4) both transverse.

Very often it happens that the first twin is born before the second is discovered.

In the next place we must inquire what is the influence of a twin labour on the mother?

A twin labour is undoubtedly more serious than is a single labour, and that for several reasons.

The uterine contractions are usually weaker, because the action of the uterus is hampered by its undue size. Hence labour is slow and there is a liability to uterine inertia. Another reason why labour is delayed is on account of the abnormal presentation of one or both twins as not uncommonly occurs. The liability to hæmorrhage, septic absorption and more particularly eclampsia is increased; the reason of the proclivity to septic absorption is that the placental site, being unduly large, offers

a larger raw surface for absorption of poisonous material. Lastly, the heads of the twins may become locked in the genital canal and require some operative procedure to permit of delivery.

Management.—If there is any undue delay or abnormality found, assistance must be at once procured.

The following rules should be observed in the management of a twin labour :—

1. After the first twin is born, unless the second follows immediately, apply a binder firmly over the uterus.

2. After the first twin is born tie the cord in two places, as the circulations of the two children may communicate.

3. When a second child is found to be following the first, take care not to alarm the patient. Explain to her that the second child will come more easily than the first. This is because it is usually the smaller of the two.

4. Get the relative or attendant present to do all that circumstances permit of, to prepare clothing, etc., for the second child.

5. Bear in mind the liability to uterine inertia and to post-partum hæmorrhage, and therefore deliver slowly, grasping the uterus firmly after the twins are born, and being especially careful to secure good and permanent retraction.

6. If the membranes of the second child remain intact, after the first child is born, wait half an hour. If the placenta of the first child within this time has been expelled do not hurry on the birth of the second child, as the woman is in no danger. After waiting a full hour, if everything else is normal, the patient can be left temporarily. Leave orders that you are to be sent for as soon as labour pains return. In any case visit the patient within twelve hours.

7. If the placenta of the first child is not expelled from the uterus within half an hour of its birth, and the membranes of the second child are intact, rupture them if the head or the breech be found presenting, and promote uterine contraction by rubbing and kneading the fundus of the uterus.

8. But if the presentation of the second child cannot be

made out, or if a transverse presentation is suspected or diagnosed, do not rupture the membranes, but send at once for assistance.

9. If the membranes of the second child have ruptured and the head or breech present conduct the labour in the usual way. But if the head or breech do not present send, as before, for assistance.

10. Remember that in a twin labour the third stage is often delayed either owing to inertia of the uterus or to the large size of a single placenta; and if, after waiting half an hour after the birth of the two twins, the placenta has not been expelled from the uterus express it, being careful to grasp the uterus firmly and to follow down the placenta, with the hand on the uterus as it escapes. Do not pull on the cord.

11. Give a teaspoonful of the liquid extract of ergot after the second twin is born.

12. If the membranes of the two twins present together send for assistance.

For the various complications which may arise in a twin labour medical assistance is to be got as soon as possible. Forceps, turning, embryulcia or embryotomy may be required to effect delivery.

Various types of fœtal monstrosites occasionally occur, which are apt to delay or obstruct labour. It would be out of place to describe these varieties. Suffice it to give as examples the following varieties: (1) two separate bodies united by thorax and abdomen; (2) two nearly separate bodies united back to back at the lower part of the spine; and (3) double-headed monsters.

PART VI.

THE NATURAL PUERPERIUM.

CHAPTER XXV.

THE PHENOMENA OF THE PUERPERIUM AND THE MANAGEMENT OF THE LYING-IN WOMAN AND NEWLY BORN CHILD.

THE month after confinement is called the lying-in period or puerperium. During this time the changes which took place during pregnancy are gradually done away with, and the parts affected return to nearly, but not quite, the same state as they were in before pregnancy occurred. There is also developed lactation or suckling. The phenomena of the puerperium we shall describe under various headings.

1. *The Pulse*.—After delivery the pulse should fall to below eighty, and after twenty-four hours it drops still more, to sixty or even less. The slowing usually begins twenty-fours after labour, and it may continue for from ten to fourteen days. When the pulse is over eighty after twenty-four hours the patient will require to be carefully watched. If it reaches above a hundred after the first twenty-four hours a doctor should be called in.

2. *Temperature*.—This is a valuable index of the patient's condition. The temperature is taken by the clinical thermometer, which is a graduated glass tube, ranging from 90° to 110° or higher. Each degree is divided by four smaller transverse lines to render the reading more accurate. These small lines correspond to the even numbers between one and ten and the spaces between to

the odd numbers. If, for example, the column of quick-silver reached the level of the third line between 101° and 102°, we should read the temperature as 101·6°. It is sufficient to say that the quicksilver contained in the bulb of the glass is made to expand and rise or to con-tract and fall by the application of heat and cold respec-tively. The temperature is commonly taken in the mouth or axilla. The temperature of the body in health is not constant, but for all practical purposes it may be stated to be about 98·4° in the mouth and armpit. The ther-mometer should be left in position for five minutes, but in cases of doubt it is a good rule to leave it in position until the quicksilver has been stationary for a few minutes. Patients who are having their temperature taken for the
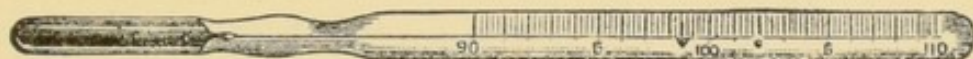

FIG. 138.—Clinical Thermometer.

first time must be enjoined to keep quite quiet, and it should be pointed out to them that the thermometer is a fragile and easily broken instrument. When a high temperature is recorded, or a great fall takes place, it is necessary to confirm the observation by taking the temperature in another part of the body, or to make use of another thermometer, and compare the readings. On each occasion after using the thermometer the quicksilver should be shaken down below the normal. After use the thermometer should be dipped in a glass containing a weak antiseptic solution. Before being used again they must be cleansed and dried. The temperature should be recorded once daily or oftener as occasion requires.

The temperature ought not to exceed 99·5° as a general rule, and when it is over 100° the midwife should be on the look-out for something being wrong. If it reach 101° she should send for the doctor.

In taking the temperature in the mouth see that the bulb is well under the tongue and that the lips are kept closed; when taken in the armpit tell the patient to keep the arm close to the chest, and take care that the skin surfaces are in contact.

3. *Changes in the Uterus.*—We have seen how the uterus grows during pregnancy. After labour it continues to contract as it did during pregnancy and labour, but it also retracts to a greater extent than it did during labour; that is to say, that after each contraction it does not return to quite the same size as it was before the contraction sets in, but becomes smaller. To this phenomenon after labour the term " involution " is applied. Just after labour the uterus is more or less spheroidal and firm. It weighs about two pounds; it has a vertical diameter of between four and a half and five inches, and measures transversely from three and a half to four inches. For the first few hours it increases somewhat in size as retraction is imperfect, and it then begins to get smaller. This diminution goes on steadily till at the end of a week it weighs about one pound and is one and a half inches above the pelvic brim. By the twelfth or thirteenth day it has disappeared behind the pubes and in from six to eight weeks it returns nearly to its original size; it remains larger, however, than the virgin uterus. When the uterus does not shrink to its normal size after labour, but remains too large, the condition is known as subinvolution. This is a common condition and a fruitful source of ill-health after confinement. The opposite condition is known as superinvolution; this is very rare.

Changes also take place in the interior of the uterus. When the contents are expelled the decidual membrane is shed, comprising as it does the superficial layer of the mucous membrane of the uterus. The placental area projects into the uterine cavity and remains thickened and irregular for a fortnight.

The discharge which comes away from the vagina for from twelve to fourteen days after labour is the lochia. It consists almost or entirely of pure blood for the first twelve hours, and during this time four to six diapers are required. For the first three or four days the lochia is reddish or pinkish red, it then gradually diminishes in amount and becomes lighter in colour. After the end of a week there should be no blood in the lochia, and after the first twenty-four hours the quantity should not be much more than that lost at any ordinary " period ". There are four conditions of the lochia which necessitate a

doctor being called in : (1) offensive smell [1]; (2) profuseness
of the discharge, necessitating more than four diapers a
day; (3) the presence of blood after ten days have elapsed
since the confinement; and (4) persistence of the lochia
for a longer period than three weeks. We shall have
to refer to some of these points when we speak of fever
following confinement. Some people talk of the lochia
after the first week as "the green waters". In non-
nursing women the lochia is apt to be more profuse and
to last longer than in those who are suckling. It lasts
longer, too, when patients are not looked after well
during the lying-in period.

4. *Changes in the Breasts.*—The breasts now begin to
take on their function. After the first twenty-four hours
they become harder, larger and more swollen. They are
sometimes painful and generally tender. Milk is generally
secreted in quantity by the third or, at any rate, the
fourth day, and the swelling is reduced after the child
has been put to the breast. The milk secreted during
the first day or couple of days after confinement is called
colostrum. We shall speak of the constitution of milk
in a later chapter.

The Management of the Puerperal Woman.—Having
studied the chief phenomena of the lying-in period we
have now to consider the management of the mother and
the baby. If the midwife is visiting the patient periodi-
cally, she will have to give her instructions to a
competent attendant, but she will as a general rule
attend to the washing and dressing of the baby herself
until the patient is able to get up. She will visit her
patient every morning as early as she conveniently can,
and it may be advisable for the first few days to pay
evening visits too; this must be done in all cases where
there is any reason to believe things are not perfectly
normal, and, of course, in all cases where it has been
necessary to call in a doctor. We have already referred
to the midwife's duties after the confinement is over (see
p. 165), as to douching, washing the external genitals and
thighs, the removal of soiled linen, the application of the
binder, the administration of nourishment and the chang-
ing of the diaper. We shall consider the management of
the baby separately. If the patient has not passed water

[1] Note that the lochia has a peculiar characteristic smell, but it should never be
fœtid. But as soon as it is exposed to the air it becomes septic, so that a soiled
diaper which has been put aside, it may be for the doctor's inspection, may be

by the time the midwife pays her first visit, within twelve hours of the completion of labour, it will be necessary to help her if she cannot now pass it lying down. She should gently kneel up in bed with the midwife's help, and if she cannot manage to pass it then, some hot water should be put in the utensil, the steam from which may assist micturition, especially when the urethra and sur-rounding parts are bruised and swollen. When the trouble is due to weakness of the abdominal walls, it may suffice to undo the binder and compress the bladder. If the retention of urine cannot be relieved then the catheter must be passed (see p. 157). Especially may this be necessary in cases where the perineum has been sutured after being torn. Here the patient cannot be allowed to get on her knees, but it may be permissible to turn her over on her face.

The pulse, temperature and respirations are next taken and recorded. Inquiry is made respecting after-pains. These are simply painful uterine contractions and they are more severe and last longer in multiparous women.

The uterine contractions do good by expelling clots from the womb. If they are severe enough to keep the patient awake or to make her sick, give a one grain opium pill, or a quarter of a grain morphia suppository. If the pains are continuous they are not "after-pains" and a doctor should be called in. The diaper is examined and the midwife satisfies herself that in her absence there has been no undue discharge. The binder is tightened regularly. The diet consists for the first two days of slops, such as gruel, bread and milk and beef-tea; a little bread and butter may be allowed if the patient is going on well and desires it.

On the third morning it is customary to give an aperient, and we always recommend castor oil in from half an ounce to one ounce dose. It is seldom that a patient cannot take it if it is carefully prepared. A good plan is to give it between water (below) and brandy (above), but there are other ways which answer as well. It may be necessary to follow the dose of oil by an enema later on (always when the perineum has been stitched).

After the bowels have acted well the patient can

more or less fœtid, whereas there may have been no fœtor when it was removed from the patient.

have her usual diet. The midwife will see that the room is kept fresh and clean, and that all soiled linen and other articles are at once removed. She will keep her patient as quiet as possible and allow no visitors except close relatives. The patient is to be kept in bed for at least ten days and in her bedroom for a fortnight. There is no need in cases such as the midwife undertakes alone to give douches during the puerperium. The daily or bi-daily bathing of the external genitals with cotton-wool or clean diapers wrung out of a warm antiseptic solution is quite sufficient. It is better not to use sponges, as they may be a source of infection. Be careful that the diapers which are applied to the vulva are perfectly clean and warm, and that they are changed sufficiently often. Before changing them, wash the hands and dip them in perchloride of mercury lotion (1-1,000).

Pads of wood-wool or absorbent wool are better than diapers for use after confinement; they are soft and cleanly, and are simply burnt after use; but for very poor women, who cannot afford such luxuries, the ordinary clean diapers answer perfectly well. The question of breast feeding will be discussed as part of infant feeding generally in a later chapter, together with the constitution of human and cow's milk.

Management of the Infant.—We have said that the infant, after the cord has been ligatured and severed, is to be wrapped in a flannel or a blanket, handed to an attendant and laid in a cradle; or, when there is no cradle, at the foot of the bed (see p. 161). If the eyes have not been well bathed before the confinement is completed, this should be done at an early date; and if there is redness of the eyes, swelling of the lids and a yellowish discharge, send for a doctor, as, if neglected, the child may lose its sight from purulent ophthalmia, the result of infection received during its transit through the vagina. When the mother has had a profuse creamy discharge from the vagina prior to labour, at the end of the first stage, wash out the genital canal with a warm solution of biniodide of mercury (1-2,000). And when the child is born dip the corner of a clean handkerchief into the solution and wipe out the child's eyes with it.

It is presumed that the midwife has satisfied herself, during the time she is attending to her patient, that the infant is breathing well and that its heart is beating properly. It must be remembered that the newly born child requires much warmth, and is very susceptible to cold ; and especially is this the case in delicate and premature children. For such it may be necessary to use an incubator to keep up a fixed temperature until the child has sufficient vitality to breathe the ordinary air. Before she begins to wash the infant the midwife must see that she has everything she wants close at hand.

The body is covered after birth with a whitish material, known as the vernix caseosa. To remove this, first oil the body and then give a warm bath in front of the fire, the temperature of the water being 98°. If the child is too feeble to stand this it must be simply wiped with a soft towel. Pay special attention to the mouth, nose and ears (the eyes have been attended to ere this). Use ordinary yellow soap of a good quality, with a soft flannel or sponge to wash off the oil. Rinse off the soap by carefully dipping the child in the water. Be careful to support the back with the left hand and the neck with the left forearm so as not to let the head fall backwards into the water. After the bath the infant is carefully dried and all creases and folds of the skin are well dusted with fine Fuller's earth. Do not use the "violet powders" that are often sold as dusting powders.

Now a more detailed examination should be made for any injuries received during birth, and any deformity or abnormality, as hare lip, cleft palate, imperforate anus or urethra. See that there is no oozing from the cord and then proceed to dress it. The cord should be powdered with boric acid, subnitrate of bismuth or a mixture of salicylic acid, one part, and starch, nineteen parts. It is then to be wrapped up in clean absorbent wool or lint and kept dry, being disturbed as little as possible until it falls off. This usually happens on the fifth day, but it may occur earlier or be delayed for a fortnight. The common practice among the poor of wrapping up the cord in a piece of rag which has been scorched is good, because this ensures its being dry. Some prefer not to give the full bath until the cord is

completely separated, in which case the dressing must be kept quite dry; others give the bath every day and apply on each occasion a clean dry dressing to the cord. After the cord has separated the stump is powdered and a band of soft lint or muslin applied and kept in position for about a month to prevent umbilical hernia.

Bleeding from the stump must always be regarded as a serious occurrence and requires medical advice. Oozing from the cord itself demands the application of a fresh ligature between the first ligature and the umbilicus. If the umbilicus has not healed in three weeks obtain medical advice.

As soon as the cord has been dressed the flannel binder is applied firmly, but not too tightly, and the remainder of the clothing in order. The three points to observe in clothing an infant are warmth, lightness and looseness.

The child may now be laid beside its mother and, unless she is asleep or be exhausted, it is put to the breast. By this time the mother will have had a rest and perhaps a sleep. If the uterus is retracting well there need be no hurry for a couple of hours in putting the child to the breast. If it is not retracting well put the child to the breast as soon after labour is over as possible to stimulate the uterus to contract.

After the child is born and it has begun to breathe it cries, partly because of the contact of its body with the cold air. The midwife should be able to distinguish between a healthy and an unhealthy cry. Do not let the infant go on crying as this may do harm to the lungs, but try and find out the cause.

During the first few days the infant will as a rule lose weight. An average weight at birth is about seven pounds. The loss of about six ounces to half a pound is, however, in a healthy child soon made up again.

It is natural for the infant to sleep almost continuously during the first month; and when the baby wakes it is due generally to hunger or cold. After feeding it goes to sleep again, but if cold, feeding does not pacify it. Whenever it is possible for the child to have a cradle, however humble it may be, always recommend this, as it is a bad practice for the mother to take the infant into

her bed. She may suffocate the child during sleep and, again, a bad habit is induced, which it may be hard to get rid of. See that the baby has, then, its own bed and that it is kept warm in it by a sufficiency (but not an excess) of clothing and a hot water bottle, if necessary, which must be well protected by being wrapped up in flannel.

We have already had to refer to the contents of the bowel at birth as meconium. This thick, dark-greenish material may be passed during labour, and often is in breech presentations, but generally the bowels do not act until about eight hours after birth. If at the end of twenty-four hours no motion has been passed examine the bowel to see if any malformation, such as an imperforate or shut-up anus, be present; and if in any doubt send for medical advice. After about four days the motions change in character, becoming more yellow. A healthy infant passes about three motions a day. Look out for the motions becoming green, curdy, due to undigested milk or artificial food, or having a bad smell, and see that the feeding is not at fault. Lastly, ascertain that the infant is passing water properly, and, in the case of a male child, draw back the foreskin every day carefully and cleanse the parts underneath. If the child strains very much in passing water consult a doctor as this often causes a rupture.

CHAPTER XXVI.

INFANT FEEDING.

THIS is a very important subject, which we cannot discuss in all its details in this chapter. There are three methods, namely, breast-feeding, either by the mother or the wet-nurse, artificial feeding and a combination of both. To decide which method to adopt requires a consideration of the mother's health and the condition of the infant. The first method must always have preference, unless there is some special reason against it, as this is the natural food, and the best of all foods for young infants.

I. *Breast-feeding.*—The advantages of breast-feeding may be summarised as follows :—

1. It promotes uterine retraction.

2. It has a slightly purgative effect on the child, thus removing the meconium from the bowels.

3. It is exactly the food which is best suited for the infant.

4. It is free from germs.

5. It is received by the infant at the right temperature and in proper quantity.

It is most important that regularity be observed in nursing, as the child is thus early trained to good habits and the mother is not unduly disturbed. The child should be nursed once every six hours on the first day, once every four hours on the second ; the reason of this is that during the first two days very little milk is secreted. It is seldom necessary to feed the child at this time artificially. On and after the third day, for the first month, ten nursings during the twenty-four hours should be allowed and no more. The child should be awakened during the day at regular intervals, but at night it should be allowed to sleep, two nursings being given between

the hours of 10 P.M. and 7 A.M. Twenty minutes is usually long enough for a nursing.

In a few weeks a child can thus be trained to sleep for four or five hours or longer at night, and to take the breast with regularity. Needless to say, this cannot always be accomplished, but the midwife must aim at obtaining this result in every case of breast-feeding.

After each nursing the nipples and breasts should be washed with warm water and kept thoroughly clean and the child's mouth wiped. When the breasts are full and much swollen, they should be gently rubbed from the circumference towards the nipple. If there is too much milk in the breasts it must be removed with a breast-pump, as otherwise signs of fever and constitutional disturbance may supervene. Again, a breast-pump may be required when the nipples are shrunken and cannot be drawn out. If there is cracking or eczema of the nipples, a nipple shield will be necessary.

Unless the quantity of milk in the breasts be very scanty each breast should be used alternately.

The child should not be put to the breast each time it cries, as this not only interferes with the mother's rest, but causes the infant to suffer from indigestion. After nursing, the child should be put down in its cot or cradle and it will then generally drop off to sleep. The infant should not be allowed to go to sleep on its mother's breast.

The child may not be able to take the breast, or it may be fretful and peevish while it is suckling. This may be due to various causes; either the nipples, through previous inattention during the latter two months of pregnancy, have not been drawn out as they should have been night and morning, or the fault may be on the part of the infant. The mouth may be deformed, as in cleft palate, or it may be sore from thrush or inflammation. What is popularly known as "tongue tie" is a delusion. When the baby refuses the breast and at the next feeding time again refuses it, a doctor should be consulted.

How is the midwife to know whether the mother's milk is doing the infant good? If the child sleeps well after suckling, cries healthily, gains in weight (after the first five or six days), is contented and comfortable when awake, has

a good colour and satisfactory and regular motions, we may be sure it is thriving on its mother's milk. If, on the other hand, it sleeps irregularly and is constantly waking up, cries frequently, loses in weight, suffers with colic as evidenced by drawing up of the lower limbs, vomits its food, is very pale and, perhaps, blue about the lips, and if the motions contain undigested milk, we have no difficulty in deciding that the mother's milk is not suiting it. But, as a rule, it is better to let a doctor settle this point as it is a responsible thing to advise the mother to wean her child at this tender age.

The midwife must distinguish between actual vomiting of and regurgitation of milk. The former is unnatural, the latter quite natural. Regurgitation is simply the overflow from an already full stomach. It takes place immediately after the meal, is unaccompanied by any symptoms of disorder, does not upset the child, and the milk is not sour, but is brought up as it was swallowed. It does good by relieving the over-filled stomach.

Vomiting may occur at any period; it is not connected with the taking of the breast, the infant cries and shows signs of nausea, it becomes pale and may have a bluish tinge about the lips, and the milk brought up is usually sour smelling and curdled.

The diet of a nursing woman must be carefully regulated. If she can take milk, she should drink plenty, especially if she is inclined to be thin and if she have a small appetite. Her food should be simple but nutritious and she should have her meals at regular times. Consult a doctor before recommending stout. Caution the nursing woman against taking an excess of strong tea and vinegar; coffee should be avoided. She should keep herself as quiet as possible, avoiding fatigue and excitement of all kinds, otherwise her milk will upset the infant.

There are many conditions which influence the amount and the quality of the milk secreted by the mother. Some women, without any apparent cause, will secrete more milk and better milk than others, and it cannot be foretold with certainty what kind of milk and what quantity a healthy woman is going to secrete. Some of these conditions we shall now discuss.

(a) *Health.*—It stands to reason that a healthy woman

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will secrete better milk and more milk than one who is unhealthy (even though not necessarily diseased). Therefore the influence of good living has to be kept in mind.

(b) *Age.*—Before twenty and after thirty-five the milk is not so good as it is between these periods.

(c) *Menstruation.*—A woman who is nursing is usually amenorrhœaic. If she menstruates it may affect her milk by lessening its amount, and the child may also be fretful and lose ground. It may happen that the mother becomes pregnant while she is nursing and she may go on nursing till the end of pregnancy.

(d) *Drugs.*—There are many drugs which, taken by the nursing woman, may affect the child. Beyond small doses of mild aperients the nursing mother must not take drugs except by a doctor's orders or with his sanction.

(e) *Disease.*—When a nursing woman has disease or symptoms pointing thereto she should consult a doctor as to whether she is to go on nursing or not.

The contraindications to nursing are, briefly, (1) delicate health; (2) tuberculosis of the lungs or of any other part of the body; (3) other serious bodily disease; (4) dangerous complications of labour such as convulsions or hæmorrhage; (5) those cases where there has been inability to nurse, even under suitable conditions, after previous confinements; (6) absence or deficiency of milk; and (7) misshapen or otherwise abnormal state of the nipples which cannot easily be remedied.

In the absence of any of the abnormal conditions we have enumerated, a woman may go on nursing and yet it may be too much for her; her health may gradually begin to suffer, she may lose flesh, become nervous and irritable, have pains in her back, suffer from loss of appetite, loss of sleep and depression of spirits. Then it is obvious that the nursing must be stopped; but it is better to wean the child gradually.

If for any reason the mother is not to nurse, the secretion of milk must be stopped. The natural stimulus to the secretion is the sucking of the child; so when the child is not put to the breast milk will no longer be secreted. But we are in the habit of using belladonna to drive away the milk. It is sometimes given internally, but

is more often applied to the breasts as a plaster or oint-
ment or as a paint mixed with glycerine.

When the nipple is cracked or sore it must be healed
up with glycerine and borax or other suitable remedy and
the child nursed with the other breast.

Weaning.—The usual time to stop nursing and wean
the infant is at nine months, but many mothers continue
nursing for a year or more. A safe rule is to consider
the child's weight. If, at this period, the weight remains
stationary or only advances very slowly, it is certainly an
indication to commence weaning. Again, the mother's
health is an important element. Many women cannot
nurse after six months without their health failing.
Weaning should be performed gradually, and, if possible,
when the weather is neither very hot nor very cold.
Commence by giving one artificial feeding a day instead
of the breast; then substitute two feedings for two nurs-
ings and so on until weaning is completed.

Wet-Nursing.—If it be decided that the mother is not
to nurse her baby the question arises, Are the services of
a wet-nurse to be requisitioned or is artificial feeding to
be employed? In the first place it is to be understood
that even when it is decided to bring up the child by
hand, it is always advisable to put it to the breast for
the first two or three days of life to aid the uterus to
contract and to remove the colostrum.

Now, wet-nursing has many objections; but in a cer-
tain small number of cases it is not only valuable, but
even necessary, if the child is to be reared. An eminent
authority avers that of 100 children who cannot be nursed
by their mother, 90 will thrive on artificial feeding,
whereas the remaining 10 will require a wet-nurse, these
latter including prematurely born infants and those living
in large cities. This method of rearing children is, how-
ever, never likely to become at all popular with us, and is
seldom considered except when other means prove in-
efficient.

If a wet-nurse is required, the midwife must see to it
that a suitable woman is procured; and this is often a
difficult matter. She must be a perfectly healthy woman,
respectable whenever possible (but this must not be a
prime consideration if she is otherwise suitable), with

plenty of milk, and her child should be about the same age as that which she is to nurse, or the milk is apt to disagree. A wet-nurse must not live too well, otherwise her milk will contain too much fat, and will become deteriorated. A good plain simple diet is all that is required, and will be found to answer best.

Before considering the question of artificial feeding it will be necessary to say a few words about milk. Milk is an emulsion which, when examined under the microscope, is seen to consist of fat globules in a fine state of subdivision, floating in a watery fluid. It is thus composed of two parts, solids and water, the former being in the proportion of 13 and the latter 87 per cent. (in 100 parts). It has a sweet taste.

The solids are made up of four constituents: (1) fat; (2) proteids or nitrogenous substances; (3) sugar; and (4) salts, all of which are necessary for the child's nourishment. The first three are the most important.

Human milk differs from that of the cow, the ass, the mare and the goat in the proportion of these solids. It will be sufficient if we compare human milk with cow's milk, leaving out the comparison of the salts which does not materially differ.

The following table shows the differences :—

Constituents.	Woman's milk.	Cow's milk.
Proteids	2 per cent.	4 per cent.
Fat	3·5 per cent.	3·5 per cent.
Sugar	7 per cent.	4 per cent.

It will be seen, then, from this table, that human milk contains less proteids, the same amount of fat (roughly speaking) and more sugar. It would seem then that, to modify cow's milk for infant feeding, by diluting the milk with an equal quantity of (boiled) water and then adding, say, 2 per cent. of fat and 5 per cent. of sugar we should have a milk corresponding to human milk. But this is

not so in reality, because the proteids of cow's milk are
not so easily digested as those contained in human milk.

The proteids in milk are two, namely, caseinogen and
lactalbumin. It is the former which forms a curd when
it enters the stomach, where it meets with the acid in the
gastric juice (the digestive fluid of the stomach). The
caseinogen is present in human milk to the extent of less
than 1 part in 100 (0·6 per cent.). The amount in cow's
milk is 3¼ parts in 100 (3·25 per cent.). When cow's milk
is diluted with an equal quantity of water we get casein-
ogen to the amount of $\frac{3\cdot25}{2}$, that is to say, more than 1½
parts per cent., instead of little more than ½ per cent.
Briefly, then, cow's milk diluted to half its strength still
contains 1 part of caseinogen in 100 parts of milk more
than does human milk.

The proteids of milk are needed for the growth of the
tissues of the body, as are also the salts which are
especially concerned in the formation and nutrition of
bone.

The sugar in milk is of a special kind. It is called
milk sugar or lactose. By it heat is produced and also
fat.

The fat, too, serves to produce heat and is also con-
cerned in the building up and the nutrition of the body.

II. Having considered the composition of milk we have
next to speak of artificial feeding. This is a large and
by no means an easy subject to write upon. It is made
more complex by the large number of patent foods which
are now for sale. All these patent foods claim to be
ideal, and marvellous results in rearing infants are at-
tributed to them. They have their value undoubtedly,
but it has been well said that there is not a single patent
food or condensed milk in the market which can adequately
replace fresh cow's milk in the feeding of an infant who
is deprived of the mother's milk.

It must always be remembered that there are infants
who will thrive on milk or patent foods alike, but there
can be no doubt that much infantile suffering and disease
and even sacrifice of infant life are caused by the indis-
criminate use of these foods. Many of these foods and
condensed milks contain too much sugar and starch and

too little fat. It is true that infants often get fat on these foods, but it must be remembered that sugar makes fat.

The general healthiness and vigour of these children is often more apparent than real, as is evidenced by the small amount of vitality they possess when attacked by serious disease, and the liability there is for them to break down on slight provocation.

Cow's milk should be fresh and clean and taken only from cows which are healthy, which are under veterinary supervision and which have, if possible, been subjected to the tuberculin test. The idea of having milk from the same cow for the regular use of any particular child is not to be recommended, as the milk from one cow often varies considerably from day to day, whereas the mixed milk of a herd of cows alters little if at all in its composition. It would be out of place here to explain, for the midwife's practical work, how the special milk formulæ are prepared; how, in fact, the difficulty is got over of making up the proper proportion of fat and sugar in cow's milk, after diluting it say four or five times to lower the amount of the curd, that is, the caseinogen.

Suffice it to say that after the milk is diluted, cream and milk sugar are added in suitable quantity to make up the proper proportion. This is the ideal method of infant feeding with cow's milk, and on these lines is based the preparation of humanised milk which is now so largely used and recommended.

Probably the midwife will have to content herself with simply diluting the milk once or twice according to the infant's age in order to lessen the amount of curd, and adding a little sugar; milk sugar is best for those who can afford it, but cane sugar will do. Take a box holding exactly one ounce of sugar of milk, dissolve the sugar in a pint of boiling water, and add one part of this to every part of milk used. The following dilutions are those we recommend. Up to three months old give one part of milk and two of water; up to six months old two parts of milk and two of water, and between six and twelve months two parts of milk and one of water. In addition to adding a little sugar, when it can be afforded a little cream should also be added to increase the fat.

It is easily digested and may be added in the proportion of one part to four or five parts of the food.

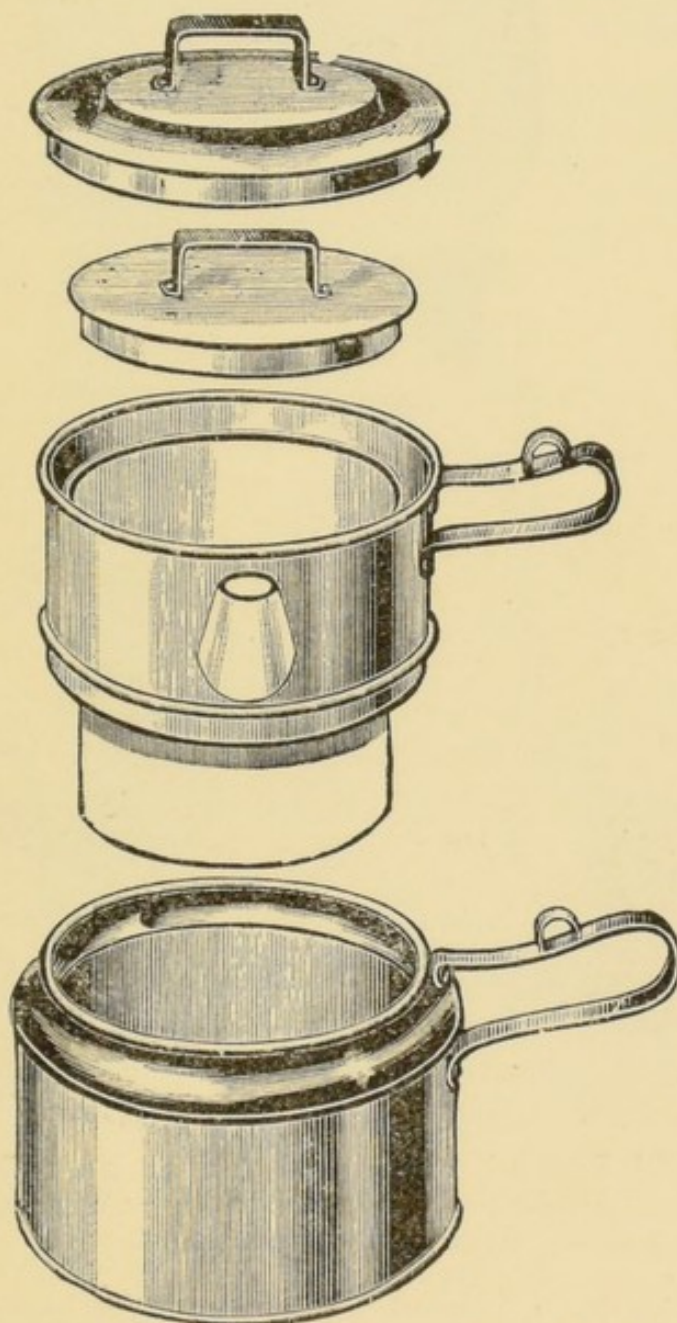It is a good plan also to add some lime-water to the food as this does away with the acidity of cow's milk

FIG. 139.—Milk Steriliser (Aymard's) to hold one pint.

and reduces the formation of curd. The amount of lime-water to be used is in the proportion of one ounce for every sixteen ounces of the food. Barley water, made by pouring boiling water on the barley, also has the same effect, and may be used to replace, in whole or in part,
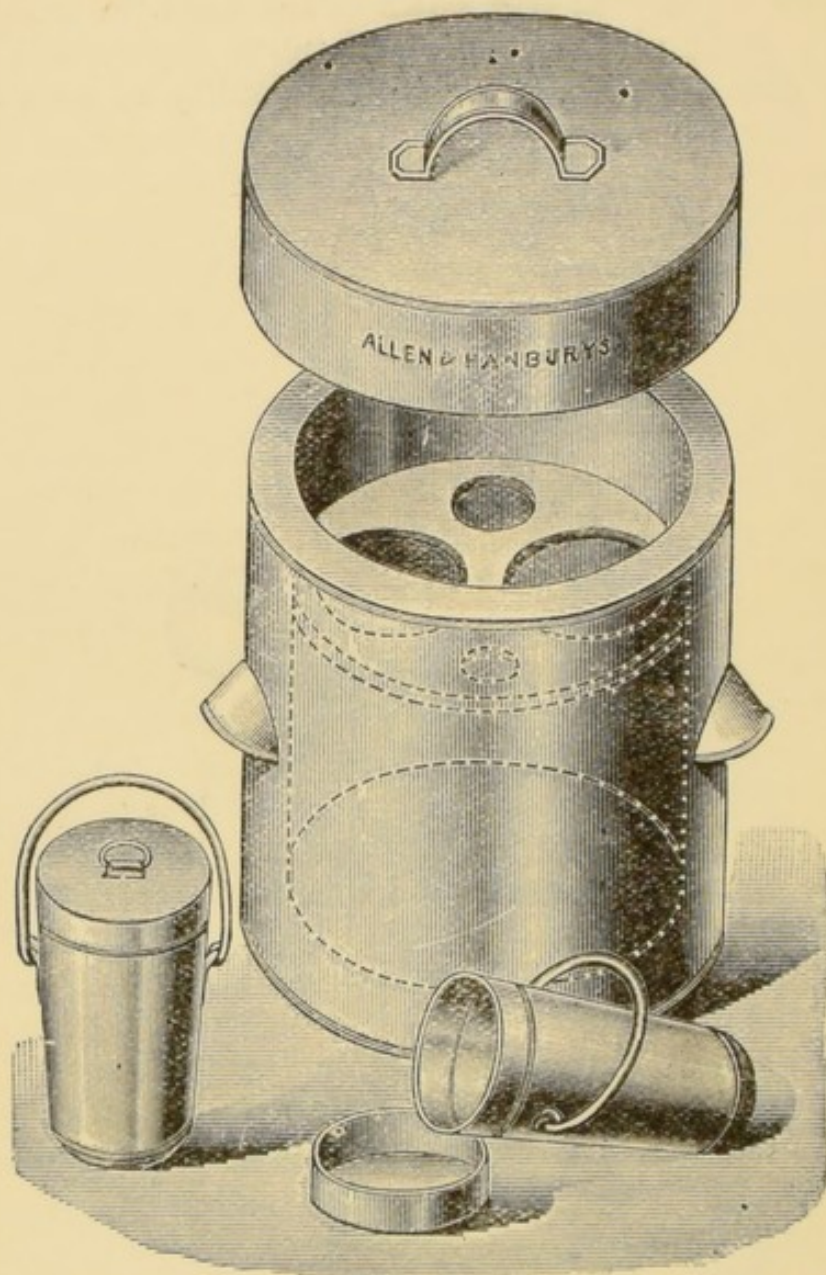
Fig. 140.—Milk Pasteuriser, the "Allenburys" No. 1 (Dr. Hewlett's patent), a perfectly reliable, efficient, simple and inexpensive milk steriliser, plain polished tin, complete, to hold one pint.

Directions for using No. 1. Pasteuriser (pint size).—The apparatus consists of a jacketed vessel, or "container," with a supporting plate for the milk-cans. The apparatus is placed on a table, for convenience, with the oval hole in the supporting plate to the right and away from the operator. The milk-cans are filled with the milk (previously stirred to mix the cream) just up to, but not over, the bead or ridge on the side of the can near the top ; they are covered with the lids and then lightly placed in position in the holes in the supporting plate. *Boiling water* from a kettle is next poured into the "container," through the oval hole, until the vessel is filled up to, and the water begins to flow over the supporting plate, as can be readily seen by watching the small round

hole. (In *cold weather* the addition of boiling water may be continued until the supporting plate is just covered.) The lid is placed on the apparatus, and the whole is allowed to stand undisturbed for 25-30 minutes. The milk is then ready for use ; it may be cooled, if desired, by filling the "container" once or twice with cold water. The water in the kettle must be *quite boiling*, and the kettle should contain, for the pint size, not less than three pints. Each milk-can contains half a pint, and, if desired, one half-pint only of milk may be pasteurised, provided the other can or cans be filled with cold water up to the mark. After use, the "container" should be emptied and placed upside down to drain and dry. The milk-cans and lids should be washed out with cold water, then well scalded, and finally placed upside down until dry. The apparatus may be used to keep infants' or invalids' food warm during the night, etc., by filling with hot or boiling water. It may be also employed as a cooler by filling the "container" with cold or iced water or with ice.

Directions for using No. 2 Pasteuriser (quart size).—The apparatus consists of a jacketed vessel, or "container," which has a supporting shelf, with notches cut in it, running round its interior, near the top—this supports the milk-can. There are also three large projecting ledges or marking shelves, at different levels, below the supporting shelf. The milk-can has four slight ridges on its interior, which indicate the half, one, one and a half and two pint levels respectively. The milk is poured into the milk-can until it comes up to, but not over, the ridge, which corresponds to the quantity to be pasteurised. The milk-can, covered with its lid, is then lightly placed in position within the "container". The "container," standing on a level table, is so arranged that the marking shelf, corresponding to the amount of milk to be pasteurised, can be viewed through the notch above it in the supporting shelf, and *boiling* water from a kettle is then poured into the "container" until it flows over the marking shelf, as can be readily seen if the steam is blown away whilst the water is being poured in. The lid is placed on the apparatus, and the whole is allowed to stand undisturbed for half an hour. The lowest marking shelf indicates the amount of boiling water requisite to pasteurise half a pint ; the intermediate marking shelf, one pint ; the upper marking shelf, one and a half pints ; and the supporting shelf itself, two pints of milk. When pasteurising one and a half or two pints, it is desirable to stir the milk ten minutes *after* the boiling water has been poured into the "container". In *cold weather* a slightly larger amount of boiling water should be used than that indicated. The milk, before being placed in the milk-can, should be well stirred to mix the cream. The milk is, after treatment, ready for use ; it may be cooled, if desired, by filling the "container" once or twice with cold water. The water in the kettle must be *quite boiling*, and the kettle should contain, for one quart of milk, not less than five pints.

The "Allenburys" Milk Pasteuriser (Dr. Hewlett's patent) has been devised to carry out the somewhat delicate process of pasteurisation with certainty and without the use of a thermometer or any complicated apparatus. This Pasteuriser is inexpensive, is of the simplest construction, and cannot get out of order, and, provided the simple directions supplied with each apparatus be carried out, the milk must be efficiently pasteurised.

the water which is used to dilute the milk. The water must invariably be boiled before being used.

Milk as it comes from the cow contains many germs. Some are harmless; some, in course of time, turn the milk sour, especially in hot weather; others are apt to cause indigestion, and, lastly, the germs of typhoid, diphtheria, scarlet fever and tuberculosis may be present and communicate the disease through the milk. Therefore, milk, unless its source can be absolutely relied upon, must be sterilised in order to kill these germs. There are two ways of doing this; the first, the older method, is by boiling the milk. This method has two disadvantages: (*a*) it alters the taste and the smell, and thus renders it less palatable; and (*b*) it renders it less digestible, partly because of its effect on the caseinogen (what this effect is we do not precisely know). But these disadvantages are not very serious as compared with the ease with which milk can be boiled. Where people are sufficiently intelligent, however, and can be relied on to take the trouble, the second method of sterilising milk is to be preferred. This method, which is known as pasteurisation,[1] consists in heating milk, not to its boiling-point (or to that of water), which is 212° (on Fahrenheit's scale), but only to 160°. This heat scarcely alters the digestibility of the milk nor does it affect its taste, but it is sufficiently high to kill the germs. A special apparatus is necessary, namely, a bottle or tin to hold the milk, with a plug of wool or a metal lid, a frame for it to stand on or fit into and a container or kettle to hold the water. There are various pasteurisers sold. The one sold by Allen & Hanburys (the "Allenburys") is efficient and cheap, as is also Aymard's. These can be got with full instructions for use from or through any good instrument makers.

It has been said that sterilised milk need not be diluted as ordinary milk requires to be. Of this we have had no experience. The following table drawn up by Dr. Holt will prove useful as a guide for the feeding of infants during the first year.

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[1] After the well-known French scientist Pasteur.

Schedule for Feeding Healthy Infants during the First Year (Holt's " Diseases of Infancy and Childhood ").

Age.	Number of feedings in the 24 hours.	Interval between meals by day.	Night feedings, 10 P.M. to 7 A.M.	Quantity for one feeding.	Quantity for 24 hours.
		(Hours)		(Ounces)	(Ounces)
3rd to 7th day .	10	2	2	1 to $1\frac{1}{2}$	10 to 15
2nd and 3rd weeks	10	2	2	$1\frac{1}{2}$ to 3	15 to 30
4th and 5th weeks	9	2	1	$2\frac{1}{2}$ to $3\frac{1}{2}$	22 to 32
6th week to 3rd month . .	8	$2\frac{1}{2}$	1	3 to $4\frac{1}{2}$	24 to 36
3rd to 5th month	7	3	1	4 to $5\frac{1}{2}$	28 to 38
5th to 9th month .	6	3	0	$5\frac{1}{2}$ to 7	33 to 42
9th to 12th month	5	$3\frac{1}{2}$	0	$7\frac{1}{2}$ to 9	37 to 45

The food should be given at a temperature of 98°. The nurse must pay special attention to the cleanliness of the feeding-bottles and tubes. And here we must enter a strong protest against the type of feeding-bottle in common use, which has a glass tube passing down to the bottom of the bottle and a rubber tube connecting the bottle with the teat. Now, there is no fault to find with the bottle. It is the tubes which cause the trouble; they are hard to clean, and germs are very apt to congregate in them; these, when taken into the stomach with the milk, multiply under the favourable conditions of warmth found there, and set up fermentative changes in the milk, which give rise to the diarrhœa one so often encounters in young infants. The best kind of feeding-bottle is a more or less cylindrical one, with a wide mouth, over which is slipped a plain rubber teat. There is nothing complicated about this, and nothing which

cannot be easily kept scrupulously clean. If the bottle be graduated in tablespoonfuls (half ounces) it will be an advantage.

At least two bottles and two teats should be in regular use. To clean bottles rinse them in cold water, and wash with soap and hot water and a brush kept for the purpose. Teats should be well soaked in borax or Condy's fluid.

Before using a bottle let it lie for several minutes in boiling water.

The following rules for the artificial feeding of infants should be observed :—

1. Not more than twenty minutes should be allowed for one feeding.
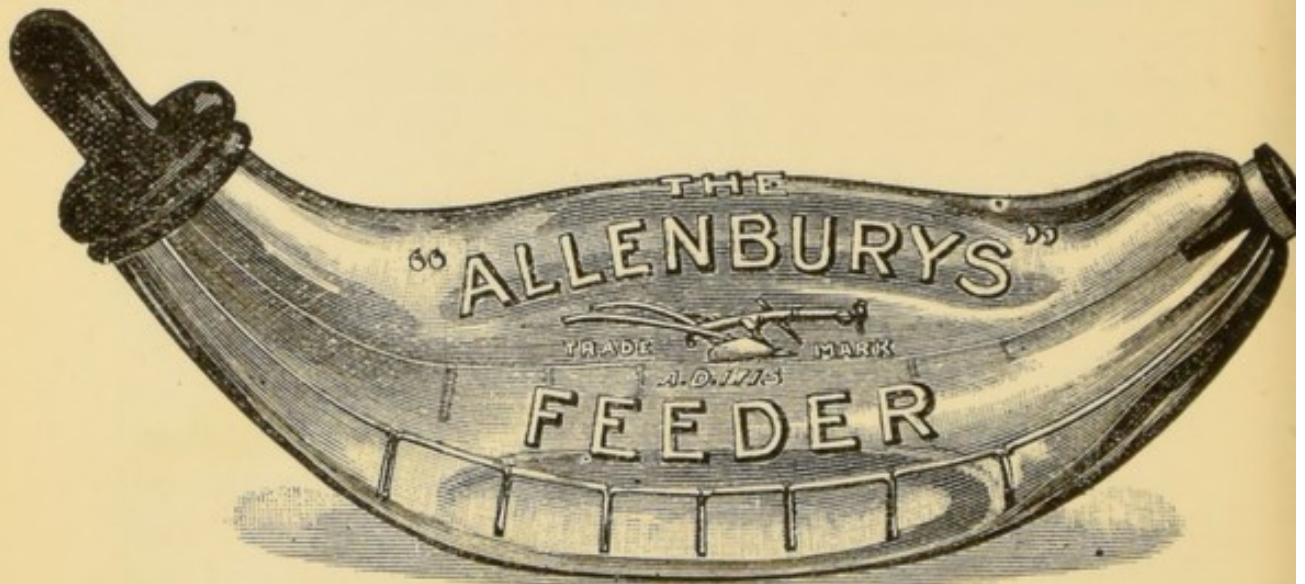
FIG. 141.

2. Never let the child go to sleep with the teat in its mouth.

3. Attend to regularity in giving food.

4. Hold the child in the arms while feeding.

5. Do not warm milk up a second time for a subsequent feeding.

6. See that the opening in the teat is not too large and that the milk escapes only drop by drop.

7. Wipe out the child's mouth very gently after each meal, and if any white patches (thrush) appear on the inside of the mouth or on the tongue, apply some glycerine and borax to them with the finger.

8. After every feeding lay the child down in its cot,

and on no account play with the child immediately after its meal.

Before leaving the subject of artificial feeding we would like to refer briefly to milk depôts for the supply of properly prepared milk to the children of the district. The author had the opportunity last summer of inspecting such a depôt in full-working order at Battersea under the courteous guidance of the Medical Officer of Health, Dr. G. F. McCleary. It would take too long to describe the whole process in detail, but the chief points are as follows: (*a*) the fees are small; (*b*) the milk is sterilised;
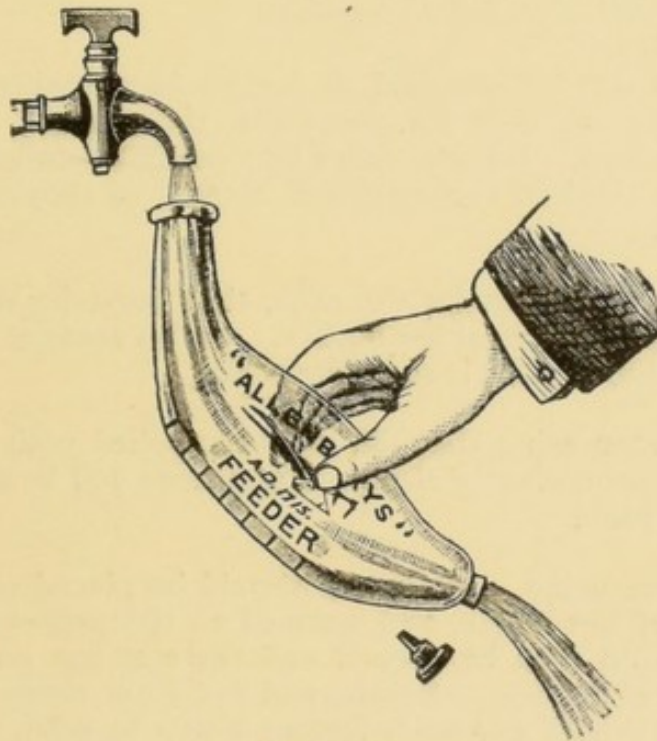
FIG. 142.

(*c*) the milk is humanised; (*d*) the bottle, in which enough milk for only one meal is contained, "is not opened from the time it enters the steriliser until the baby is ready to take his meal from it direct (no feeding-bottle is used)," and thus contamination of the milk in the home is avoided. What a boon this is to the working-classes in their small crowded homes in our large cities, especially in the hot weather, can easily be realised. By means of these depôts the infantile mortality has been materially diminished and will, in the future, be still more so.

We append a copy of the instructions, as drawn up by Dr. McCleary, for the use of humanised milk. "A Lady

Sanitary Inspector visits the homes of the children who are using the milk and endeavours to get the instructions properly carried out."

Instructions for the Use of Humanised Milk.

1. The charge for the full weekly supply of Humanised Milk for infants under six months is 1s. 6d., payable in advance. If a day's supply only is taken, the charge is 3d. For infants aged from six to eight months, who receive 6 oz. per bottle, the charge is 1s. 9d. per week, while for older children receiving 7 oz. per bottle the charge is 2s. per week or 4d. per day. The Depôt is open from 11 A.M. to 6 P.M. on week-days, and is closed on Sundays.

2. The milk will be supplied in bottles in a basket, each bottle containing sufficient milk for one meal, the amount varying with the age of the child. Infants under two months receive nine bottles per day; older children receive fewer bottles, as they should be fed less frequently.

3. If children are sent for the milk, they must be warned not to tamper with the stoppers of the bottles. On no account must a bottle be opened until the infant is ready to be fed.

4. Every person using the milk will be supplied with a teat, which should be kept scrupulously clean. Extra teats will be charged for at the rate of 3d. each.

5. Just before using, each bottle should be placed unopened in a basin, or jug of hot water, and warmed to the proper temperature. The bottle should then be opened and the teat put on. The child should be fed at regular intervals, and fed from these bottles only. On no account should any other feeding-bottle be used.

6. When all the milk in one bottle is not used, the remainder must not be warmed up again, but a fresh bottle opened for the next meal. Where there are other children this milk need not be wasted.

7. On no account should bread be given with the milk. The milk will be found quite sufficient if given regularly.

8. After using, the bottle should be thoroughly rinsed in cold water.

9. Breakages will be charged for at the rate of 1d. per bottle, and damage to baskets must be made good. All bottles, baskets and rubber rings not returned to the Depôt will be charged full value.

10. The child should be brought once a fortnight to be weighed.

11. The presence of infectious disease in a house must be at once notified to the Medical Officer of Health.

N.B.—The milk should never be used in preference to mother's milk, which is the best of all foods for young infants.

III. Mixed feeding denotes a combination of breast and artificial feeding. This is often practised when the mother's milk is good but insufficient, and when it is desired to relieve her of part of her nursing, especially at night time.

PART VII.

DISEASES OF THE PUERPERAL WOMAN AND NEWLY BORN CHILD.

CHAPTER XXVII.

PUERPERAL FEVER.

THE most serious complication to which the lying-in woman is liable is puerperal fever. This disease is undoubtedly contagious, inasmuch as it may be transmitted from one lying-in woman to another by actual contact; but it is also, under certain circumstances, infectious, that is to say, it may be conveyed from one woman to another without actual contact, but simply by the air. This has been proved over and over again in the case of the various maternity hospitals, where the disease used from time to time to become so prevalent as to necessitate the temporary closure of these institutions.

Puerperal fever is a form of blood-poisoning, which results from the absorption of septic material from some part of the genital tract, either from the interior of the uterus (which, as we have already said, is to be regarded as an open wound), or through a laceration of the cervix, the vagina, or the vulva.

The poison may be derived from decomposing material in the canal itself, for example, a retained piece of placenta; or it may be introduced from without, for example, by the midwife's or doctor's person or dress, by sponges, instruments, bedding, or diapers. Thus we are accustomed to speak of auto-infection (Grk. *autos*, self) and hetero-infection (Grk. *heteros*, other), according to the source from which the poison is derived. Now, al-

though these two sources have both to be reckoned with, the latter is by far the commoner, except when a portion of placenta remains in the uterus. In other words, the midwife must remember that the poison is nearly always brought to the patient (with the above-mentioned exception), and this will impress upon her the fact that the disease is a preventable one in almost every instance.

As we should expect, the time when this disease is especially likely to occur is during the first three days after confinement, when the interior of the uterus and any wounds in the canal present open and absorbing surfaces, ready to take up any poison which may come in contact with them. After this period the absorptive powers quickly diminish, and the risk of the disease diminishes accordingly.

We have said that the absorption of septic matter is the actual cause of puerperal fever, but in certain cases the liability to it is greater than in others. These are tedious labours, where the woman is exhausted; instrumental labours; and first labours, owing to the frequency of tears in the genital canal.

The symptoms commence as a rule on the second or third day. There is often a rigor at this time, the pulse becomes rapid and weak, and the temperature may even now be 103° or higher. Upon the intensity of the poison will depend the rapidity of onset and the severity of the disease. There are sometimes a peculiar earthy appearance of the skin and odour of the breath, which are very ominous signs. The patient looks extremely anxious and ill. Other symptoms which are generally present are vomiting, diarrhœa, and a dry, glazed, coated tongue. The lochia are probably very offensive, but on the other hand, they may not smell at all, so the midwife must not think that her patient cannot have puerperal fever because the lochia are not offensive. In the same way the lochia may be offensive, and yet there may be no symptoms of blood-poisoning; but offensive lochia generally show that the patient has not been well attended to.

The lochia may be entirely suppressed. There is often a complaint of pain in the abdomen, and tenderness over the uterus, but by on means invariably so. The patient

usually retains her consciousness unimpaired, until perhaps shortly before death. The disease is a very fatal one, the patient often sinking in the course of a week from exhaustion.

Whenever the temperature remains at 101° for over twenty-four hours after a confinement send for a doctor.

The treatment of this malady resolves itself into general and local, but what is of more importance than either of these is its prevention, which we shall first consider.

Now, the prevention of puerperal fever may be summed up in one word, cleanliness, which must include what we understand as surgical cleanliness, namely, asepsis and antisepsis.

Not only must the midwife keep her patient clean, the bed and bedding, and the room itself, but she must be most particular about her own person. Remember that the lying-in woman is peculiarly susceptible to any poison, especially that of scarlet fever, and that she has a large raw surface ready to absorb any poison which may gain admission to the genital canal. Now, by free ventilation, thorough attention to antiseptics, and the careful management of every labour in all its details, we may reduce to a minimum the chances of septic absorption.

What applies to the midwife applies quite as much to the doctor, who endeavours to avoid all sources of sepsis in visiting the puerperal woman.

And here let us point out that on no account must a midwife attend another confinement in any capacity, after she has had to do with a case of puerperal fever, until she has had distinct leave from a doctor who knows all the facts of the case. A violation of this rule should be regarded as absolutely criminal.

The management of the disease itself only concerns the midwife in so far as the actual nursing is concerned.

The first thing the doctor does is to attack the source of the disease by at once washing out the uterus with a strong antiseptic solution, such as perchloride of mercury (1-4,000) or carbolic acid (1-40). This may require to be done perhaps three or four times daily until the temperature falls. If there is reason to believe that a fragment

of placenta remains, the uterine wall is scraped before its cavity is washed out.

Next, efforts are made to lower the temperature by drugs, especially quinine, and other measures, such as tepid or cold sponging. Above all the strength must be maintained by large doses of brandy and champagne, together with strong beef-tea, beef-jelly, meat-juice, eggs and milk, for the disease is a most exhausting one.

For pain and sleeplessness an opiate will usually be necessary. Locally, hot stupes or poultices, applied to the abdomen, on which a few drops of laudanum or turpentine have been sprinkled, will give relief, and tend to remove the accumulation of wind (tympanites), which is usually present. The bowels should be freely moved by an enema if they have not acted. Rectal feeding may be required if there be persistent vomiting. Good results have recently been got in a few cases by injecting into the tissues a special serum antitoxin, prepared on the same lines as those used for the treatment of diphtheria and tetanus (see author's *Handbook for Nurses*, page 257).

If peritonitis have supervened, abdominal section may be called for. Occasionally puerperal peritonitis occurs independently of puerperal fever.

CHAPTER XXVIII.

AFFECTIONS OF THE UTERUS AND OF THE BREASTS; WHITE LEG; PUERPERAL INSANITY.

THE terms subinvolution and superinvolution have already been explained (see p. 278). The latter condition is so rare that it can be dismissed; but the former is by no means uncommon, and it is as well that the midwife should know something about it, as she is sure, sooner or later, to meet with it. Subinvolution cannot, strictly, be classed as a disorder of the puerperium as its symptoms are not generally complained of for several weeks after the confinement; but it will be convenient to speak of it now. The causes are in great measure those which bring about uterine inertia; these need not be repeated. We would, however, draw attention to two of these causes, namely, the too rapid emptying of the uterus and the absence of the natural stimulus to uterine retraction, namely, lactation, which is absent in non-nursing mothers. Other causes which hinder involution are incomplete emptying of the uterine cavity, and this is a fruitful source of subinvolution after abortion. Again, a rapid succession of pregnancies, too early rising after confinement, and pelvic inflammations following upon child-birth are all liable to produce subinvolution.

When the puerperal woman gets up too soon the heavy uterus falls down in the pelvis, and the want of support it receives hinders its proper retraction. There is usually associated with subinvolution a chronic inflammation of the uterus both as regards its walls (metritis) and its cavity (endometritis).

The symptoms are general and local. The usual history the patient gives is that she has never felt well nor regained her strength since her confinement. On questioning her it will generally be found that there has been

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some trouble either during pregnancy or labour, or during the early days of the puerperium. The heavy uterus by its pressure on the rectum and bladder, and in fact on the contents of the pelvis generally, will give rise to constipation, perhaps, too, increased frequency of micturition, and neuralgic pains in the lower part of the back and the hips, shooting down the legs. In addition to these symptoms there is a general sense of " poorliness," or, as we say, malaise, depression of spirits and indigestion.

Locally, there are complained of bearing-down pains, increased menstrual flow (menorrhagia), which may amount to flooding, and a white discharge (leucorrhœa). These are the more important symptoms met with. When the midwife is confronted with such a picture as this she should suspect the presence of subinvolution and recommend a doctor being consulted. The physical signs which he finds on examination need not be entered into. The uterus is found to be larger than it should be according to the time which has elapsed since the confinement; but this enlargement may be due to causes other than subinvolution, for example it may be caused by a fibroid tumour. Not uncommonly cases of subinvolution are accompanied by an unhealthy state of the cervix, the lips being split, turned outwards (everted) and inflamed.

The treatment of subinvolution is preventive and curative. It is largely the former that concerns the midwife. She must be careful to avoid hurry in delivery, and, as far as she is able, all those conditions which we have seen are liable to cause uterine inertia. She must, too, encourage her patient to nurse, even if it be only for a few days, remembering the great value of lactation as the natural stimulus to uterine retraction. Lastly, she must be careful to keep her patient in bed for a sufficient time, ten days at the least, and if there is any indication to do so, for a still longer time.

As to curative treatment, the most important is rest; rest bodily, mentally and sexually. The rectum must be kept emptied, often it is full of hard fæcal masses and this aggravates the condition. The doctor will replace a displaced uterus, and, if he thinks necessary, use a pessary to keep it in position. He will probably, too, prescribe ergot in some form, the most useful drug in

treating subinvolution. We have seen what the action of ergot is on the uterine muscles. A good nourishing diet, generally without alcohol, is indicated, and, when possible, at a later stage, a change of air. It is the practice of many to recommend hot vaginal douches, and undoubtedly these act beneficially. A teaspoonful of iodine in a pint of hot water (105° to 108°) makes a good douche in such cases, and this should be given night and morning with the patient lying on her back and her hips raised. Vaginal tampons or plugs are used, too, in such cases with advantage.

Where it is evident that the subinvolution is due to imperfect emptying of the uterus means are taken to empty the uterine cavity by the finger or the curette.

The "after-pains" may be severe. This may be due to a full bladder or, more rarely, a loaded bowel. If the pains are not relieved by emptying the bladder and rectum, a one grain opium pill may be given, or a morphia suppository (a quarter of a grain) placed in the rectum. See that the fundus is well compressed and the binder tight and comfortable. After-pains are more severe in multi-paræ. It is said by some that they should never occur normally in primiparæ, but this is not our experience.

It is hardly necessary to refer again to abnormalities of the lochia. They may be arrested in cases of sepsis or where there is some obstruction to their escape. They may be and often are excessive where uterine retraction is imperfect, and they become fœtid where there is putre-faction of retained products. In any of these cases call in a doctor. The consideration of the disorders of micturi-tion following confinement are hardly within the scope of this work, except in so far as the midwife has to deal with retention of urine; this has been already considered.

Fig. 133 shows various forms of fistulæ, where one cavity or canal communicates with another abnormally. A vesico-vaginal fistula where the urine passes from the bladder into the vagina is not nearly so commonly met with now as it used to be. As a well-known obstetrician has said, it is not the forceps, as it was at one time believed to be the case, which produces it, but the want of the forceps; that is to say, it is brought about by sloughing of the anterior vaginal wall, the result of the long-con

tinued pressure of the child's head in cases of long-delayed labour. Frequency of micturition may be due to inflammation of the bladder (cystitis) or to simple irritability of the bladder.

As to disorders of the breasts, we have already touched on this. The nipples may be cracked or simply sore, and this is more likely to occur when the nipples have not previously been taken care of, when they are not washed and dried after each nursing, when the mother is delicate and the milk scanty, and the child strong and not easily satisfied.

The nipple may be affected at its tip or at its base. Let the child take the breast by means of a shield, and, where only one nipple is affected, keep the child to the other breast as far as possible till the sore nipple is healed. Unless quite trivial and causing little inconvenience a doctor should be consulted. It is as well for the midwife to apply nothing more than glycerine and borax to the affected nipple. She should keep the nipples as clean and dry as possible.

The breasts may not be completely emptied, owing either to more milk being secreted than the child can take, or to some condition which interferes with the infant taking the breast properly. The breasts then become swollen, hard, tender, and there may be a knotted feeling. All this gives rise to more or less constitutional disturbance, and this is what used to be called " milk fever," a term which is best not used. It is a common cause of a slight rise of temperature during the puerperium, and its chief importance rests in distinguishing a rise of temperature due to this condition from that ushering in puerperal fever in one of its varieties. It is best in such cases to empty the breasts with a breast pump, and if from any cause the mother is not going to nurse, the milk will soon cease to be secreted if this is repeated, as the natural stimulus to milk secretion is now absent. This may be supplemented by the use of belladonna and by saline aperients, such as white mixture (magnesium carbonate ten grains, magnesium sulphate a drachm, and peppermint water one ounce), or a seidlitz powder given every morning for three or four days. When the breast is hot, throbbing, knotty and much

swollen there should be no delay in emptying it, other-wise a slight rise of temperature, such as 100° to 101°, may change into a temperature of 103° and an abscess of the breast may result. The swollen breast should be supported by being " slung ". This is done by fixing a folded handkerchief under the breast and tying the ends round the neck. This must be frequently adjusted or else the breast, especially if it be pendulous, will hang down over the handkerchief. Strapping the breast is useful, but it is often objected to on account of its stickiness and the discomfort entailed in its removal. Supplementary measures to these are fomentations applied every few minutes for half an hour or longer, and saline aperients such as we have mentioned. It may be that an abscess has actually formed and then an incision will be made by the doctor to evacuate the pus. Such a condition will be suspected if these remedies do no good, if the tempera-ture keep up, the breast continue full, exquisitely tender, throbbing, the pulse remain accelerated, and there be a rigor. Needless to say, with such symptoms as these no time will be lost in obtaining medical advice. Opium will often be required to relieve the pain and procure sleep.

Phlegmasia alba dolens, commonly known as " white leg," is a complication of the puerperium requiring brief mention. The disease consists in a swelling of the lower limb, generally the left, which is often associated with, if not caused by, a clotting of the blood (thrombosis) in the large vein of the thigh (femoral vein) which obstructs the return of venous blood from the lower limb.

It most commonly occurs in the second week of the puerperium, although it may occur in pregnancy, and indeed apart from child-birth altogether.

There are usually some signs of slight fever for a few days before the leg becomes actually affected—symptoms, in fact, of mild septic absorption. This is followed by an attack of pain down the front of the thigh or in the calf of the leg, and sometimes the inflamed vein can be easily felt : the vein should, however, be handled very carefully, or else a fragment of clot may be separated, and be carried by the circulation to other parts and set up mischief else-where (embolism). As the leg swells the skin becomes tightly stretched and white in colour, and has a shiny

appearance like marble (marble-leg). The disease lasts from three to six weeks, and may be complicated or followed by various affections, one of which we have already mentioned.

The treatment is both local and general. The leg must be kept at rest, lying on a pillow, with the lower end raised, either in the bent or straight position, as is most comfortable. The weight of the bedclothes must be removed by means of a cradle. The limb may be wrapped up in hot fomentations or in cotton-wool, on which is sprinkled lead-and-opium lotion when the pain is severe. Later on, when the acute symptoms have subsided, as evidenced by a lessening of the swelling and a diminution of the pain and tenderness, gentle friction and massage, stimulating liniments, and bandaging with a light flannel bandage are prescribed. The patient must he content to rest entirely for some considerable time after acute symptoms have disappeared, and the swelling does not entirely go away for six weeks and often longer than this. A relapse is by no means uncommon.

General treatment includes the relief of constitutional symptoms, such as pain, fever, and the general debility which is so often present. At a later stage tonics are prescribed. A nourishing diet is necessary, and alcohol is often ordered to support the strength.

Puerperal insanity is a subject we can only very briefly touch upon. It is usually made to include the insanity of pregnancy, of the puerperium and that connected with lactation. In a series of cases of insanity connected with child-birth tabulated by Sir Batty Tuke, out of 155 cases 73 occurred a week after labour, 54 during the first three months of lactation, and 28 during pregnancy.

This kind of insanity is stated to form about 10 per cent. of all the forms of insanity in females. In many cases there is a hereditary predisposition. Many of the cases occur in primiparæ, because the nervous system in such is exposed to a greater strain. Other predisposing causes are excessive loss of blood, kidney disease or disturbance, serious shock, especially death of the child.

Mania is the commoner form of insanity shortly after labour; during pregnancy and lactation melancholia is more common.

The symptoms may come on suddenly or more gradually; wakefulness and restlessness should be especially noted. A patient who has not slept for the three nights following her confinement should be carefully watched, as she is probably on the borders of a serious nervous breakdown. It is on the fourth day that the symptoms most commonly develop. If the patient be sulky, suspicious and does not nurse her child properly, and especially if she show no affection for it suspect puerperal insanity.

There is generally a rapid pulse and a rise of temperature. There may be noisy delirium or a condition of great depression with various delusions, sometimes suicidal, according to the type of insanity present.

Recovery more often than not takes place within six months and is generally complete. Out of 1,000 cases analysed it was found that 688 recovered within six months.

Melancholia, commencing in the lactation period, that is to say a month after delivery (puerperal insanity refers to insanity developed within a month of delivery), is more likely to become chronic, and here the outlook is not so hopeful.

Management.—The patient must not be left alone, constant watching is necessary; but the attendant must not let the patient think that she is being watched, and no restraint must be used towards the patient, except in so far as it may be necessary to prevent her damaging herself or her child. The child should be taken away without delay. The patient is to be removed from her friends, and in cases of melancholia it is generally necessary to put her in an asylum. Artificial and forcible feeding is often necessary and this is hard to do at home.

The general puerperal condition is noted, such as lochial disturbances. The most important point, however, is to procure sleep and relieve the restlessness.

Such drugs as chloral (which is best given in an enema), hyoscin, morphia, sulphonal and trional are all of value; in mania, probably, chloral is the most useful of all.

A large amount of easily digested food, especially milk, is indicated. Stimulants are required in melancholia, in

mania they are usually withheld, unless there are signs of heart failure.

The bowels are kept freely opened. In cases of melancholia cheerful surroundings are of importance and also plenty of outdoor exercise.

CHAPTER XXIX.

VARIOUS DISORDERS AND DISEASES OF THE NEWLY BORN CHILD.

SOME of the disorders and diseases of the newly born child have been already referred to, for example, asphyxia and ophthalmia. It will only be possible here to refer very briefly to some of the other affections of the newly born child.

Umbilical Hernia.—This is not at all uncommon. It is usually more annoying than actually serious. It is commoner in female than in male children, and in those who are weakly and poorly nourished. The swelling is usually not larger than half an inch in diameter, but it may occasionally be much larger and may become strangulated and require operative treatment. The midwife must try to prevent umbilical hernia, as it is only rarely that it is present at birth. If the protrusion at the navel, after healing has taken place, be larger than a nut, call in a doctor to give his advice regarding it. After the cord has separated place a firm pad over the navel and use a firm binder for from two to three months. In cases occurring after this period the pad and binder are not sufficient, and a better plan is to apply two strips of adhesive plaster obliquely to the abdomen, crossing at the navel, the skin on each side of the umbilicus being folded in so as to overlap the swelling. Other methods include a leaden disc or a firm piece of cork considerably larger in circumference than the navel, so as to overlap it freely, wrapped in a piece of lint or other material, and placed over the umbilicus and fixed with strapping or covered with the flannel binder. Care must be taken to prevent chafing of the skin around the navel. Where there is a large umbilical hernia (exomphalos) present at birth the child does not usually live long.

The infant may become infected through the mother's blood, before birth, or immediately after birth, with any infectious disease from which she may be suffering. Small-pox has, perhaps, been the infectious disease most frequently observed. But infection may be conveyed to the child, after birth, by means of the umbilical cord, or, more commonly, the wound left after separation of the cord. Hence the care of the cord and the umbilicus after birth are not to be lightly regarded, since in four-fifths of the cases of septic poisoning of the infant, the infection has been shown to have taken place through this channel. If an unhealthy wound remains after separation of the cord, or if the cord become inflamed from the access of germs and neglect of antiseptic precautions, the inflammation may spread from the unhealthy tissues into the abdominal cavity and lead to fatal blood-poisoning.

Hæmorrhage from the cord may occur when its separation is in progress, when it has dropped off or subsequently. Generally there is jaundice (icterus) or some unhealthy condition of the blood. It must be regarded as a grave occurrence and, as in the case of inflammation of the cord and the skin surrounding it, a doctor must be consulted. In the meantime, if medical aid is not readily at hand, some powdered persulphate of iron may be sprinkled over the bleeding surface and a firm pad and bandage applied. The hæmorrhage is liable to recur.

Tetanus of the newly born is, fortunately, a rare disease, but it merits a brief reference. The cause of the disease is the same as in the adult, namely, a germ which gains access to the blood, generally through a wound. In the case of the infant, the germ enters through the umbilical wound. In some parts of the world its occurrence is common, but here we may say that it almost never occurs, except where dirt and filth prevail, which favour the presence and virulence of the tetanus germ. The symptoms generally begin at the time of separation of the cord, rarely later than the tenth day. Generally the first thing noticed is difficulty in feeding owing to the jaws being rigid, a condition known as trismus. This is followed by a slight stiffening of the body ; the back is straightened out and after a moment this passes off ; but as the paroxysms become more severe

and increase in frequency the body becomes more arched, until the child may come to rest on the back of the head and the heels; this is known as opisthotonos. Death, which is generally due to exhaustion, occurs as a rule within forty-eight hours. The disease is a very fatal one.

The midwife need only concern herself with the preventive treatment, and this is summed up in one word —cleanliness; and we include under this the hands, the dressings, the ligature, the scissors and, indeed, everything which comes in contact with the umbilicus.

We have already referred to purulent ophthalmia (inflammation of the covering of the eye and eyelids) which may, if neglected, destroy the infant's sight. Here, again, the disease ought never to be allowed to occur by seeing to it that the eyes are carefully bathed and cleansed with a weak antiseptic lotion after birth. When the mother has suffered from a white discharge during pregnancy especial care is necessary, and here a solution of 1 in 2,000 biniodide of mercury should be used for bathing the eyes. If there is no doubt that pus has got into the child's eyes then a solution of nitrate of silver, ten grains to the ounce, should be used for dropping into the eyes; but, before using this, it is always better, when possible to consult a doctor. The treatment of an actual case of purulent ophthalmia, where the lids are red and swollen and thick yellow pus exudes from the eyes, must be in the hands of the doctor. It must be remembered that the pus from such a case is contagious; that is to say, if it come in contact with the eye of an attendant it is capable of setting up the same disease. Therefore, the strictest antiseptic precautions must be used to prevent its spread, and all material used for wiping the eyes must be burnt immediately after use. The eyes must be kept clean, in severe cases they must be bathed every twenty minutes night and day, care being taken that the conjunctival sac is thoroughly cleared out in the manner which the doctor, who is looking after the case, recommends. We prefer for this purpose a saturated solution of boracic acid, that is to say, as much boracic acid as a given amount of distilled water will take up.

We have already considered asphyxia

When there is a yellowish colour of the skin in an infant just born or during the first few days of life, in most cases it is not true jaundice, but is spoken of as physiological icterus. The motions are generally natural, and, unless the icterus persists after a few days and the motions are unhealthy, little attention need be paid to it. It is quite a common condition; in one institution out of nearly a thousand babies born, one in every three was found to be icteric. The cause of this condition is not yet agreed upon. It requires no treatment. If the motions become white, consult a doctor at once.

We cannot enter into the subject of convulsions in infants here. All that is necessary for the midwife is to know what to do until the doctor arrives. It is a good plan to put two tablespoonfuls of mustard into a quart of warm water and roll the body in towels which have been dipped in it. Put a cold cloth, or preferably ice wrapped in flannel where it is at hand, to the child's head. Have everything ready for a hot bath so that it can be given at once if the doctor orders it, and, above all, keep the child perfectly quiet. A fruitful source of convulsions in young infants is indigestion, and the quantity and kind of food that is being given should always be inquired into in such cases and also the character of the motions.

It sometimes happens that there is a swelling on the head of the newly born child other than the caput succedaneum. This is due to an outpouring of blood between the skull itself and the membrane (pericranium) which covers it. It is known as a cephalhæmatoma and is due to the bursting of the small blood-vessels in the pericranium, as a result of undue pressure on the head during birth, from the application of the forceps or other cause. It is distinguished from the caput succedaneum by the following points: it is limited to one bone and does not pass over a suture, being usually over one parietal bone; it gets larger, instead of smaller, during the first two days after birth; it is firmer and more elastic than is the caput succedaneum.

The blood in the swelling coagulates, and this results in the centre of the swelling being soft, while the margins are hard, giving one the impression of a crater with a

firm rim and a soft centre. The fluid part of the blood gradually becomes absorbed and by-and-by the solid part disappears, and in about six weeks the swelling is usually inappreciable. Note that it does not increase in size when the child cries and it is not tender to pressure. It seldom requires any treatment. Occasionally there may be two or more such swellings. It is more common in first labours and in male than in female children, because the male head is bigger than the female.

APPENDIX A.

GYNÆCOLOGICAL CASES.

WE have thought that it would be helpful to the midwife if the short chapter dealing with gynæcological cases, taken from the author's "Handbook for Nurses," were inserted at the end of this work, since the connection between midwifery and gynæcology is so close.

Many of the illnesses to which women are liable are referable, directly or indirectly, to the reproductive organs; and the midwife cannot fail to meet with these cases frequently in her work.

It will be advisable to point out the commoner symptoms to which these diseases give rise before considering the methods employed for their detection and treatment.

For the consideration of the subject of menstruation, the midwife is referred to page 23.

Pain in the back is a frequent complaint in many gynæcological cases, also a sense of bearing down or weight in the pelvis.

Another common symptom is vaginal discharge, commonly known as "whites". This the midwife must pay attention to, so as to be able to explain to the doctor its character. Any vaginal discharge except that which occurs during menstruation is abnormal, although women frequently pay little or no attention to it.

We shall mention three varieties: (1) A white mucous discharge, which comes from the upper part of the uterus, and is very profuse in uterine inflammations. It is alkaline in reaction. (2) A gelatinous, sticky, transparent discharge, which comes from the cervix, and which normally is only sufficient in amount to block up the mouth of the uterus. It is also alkaline, but, unlike the uterine secretion, it is sticky. (3) A mucous discharge, which is acid in reaction and not sticky: this comes from the vagina itself, and is seen covering pessaries and all applications put into the vagina. Note, then, that the sources of vaginal discharge may be (1) the uterus; (2) the cervix; and (3) the vagina.

Lastly, there may be complained-of troubles referred to the rectum and bladder, arising frequently from pressure of the

displaced uterus.   For the detection of this class of diseases a vaginal examination is often necessary.

The midwife must understand how to prepare the patient and what to get ready for the doctor's use.   When opportunity offers, the rectum must be emptied and the external genitals cleansed.   She should always remain in the room unless requested by the doctor to withdraw.

It is usual to examine patients in one of two positions in this country, namely, either on the left side (left lateral) or on the back (dorsal).

The midwife must see that access is made easy.   In the former position the patient lies on her left side, with the legs drawn up, near the edge of the bed.   A modification of this position is that known as the semi-prone or Sims' position, which is used when the duckbill or Sims' speculum is introduced. The patient lies almost on her chest; the left arm hangs behind her over the edge of the bed or couch, while the right knee is brought well over the left, so that its inner surface touches the couch.

For the dorsal examination the patient lies on her back, with the knees bent and the legs separated, the clothes being loosened as before.

The midwife must be careful to avoid all unnecessary exposure.   A good plan to adopt is to cover the body from the hips downwards with a single sheet.   In the dorsal position each leg should be covered separately when it is required to inspect the external genitals.   When the left lateral position is used, the patient is turned on to her back after vaginal examination, so that the combined abdominal and vaginal examination (bimanual) may be made.   After vaginal examination, or it may be instead of it, a rectal exploration is sometimes made.

Occasionally another position is made use of: this is the knee-chest or genu-pectoral position.   The patient lies with the hips raised and the chest flat on the bed: the weight of the body falls on the knees.   In this posture the contents of the abdomen gravitate downwards towards the diaphragm.   (See Fig. 61.)

For a digital examination nothing more than a little vaseline, oil, or other lubricant will be required.   It is often necessary to obtain a view of the vagina and cervix uteri, and for this purpose a speculum is used.   Those in common use are two, namely, the tubular (Fergusson's) and the duckbill (Sims'). There are, however, many other varieties.   When the speculum is required, heat it by holding it for a moment in warm (not hot) water, and then oil its outer surface.   The duck-bill speculum requires to be held in position by an assistant, while the tubular speculum is self-retaining, or at any rate easily kept in position without assistance.

Other instruments that are commonly required, both for diagnosis and treatment, are the uterine sound, probe, curette, dilators and volsellum, with all of which the midwife should make herself familiar.

Various appliances known as pessaries are used to keep in place a displaced uterus. These are made of india-rubber, vulcanite, or other material. They should be oiled before being introduced.

A sound or a probe may be used to cleanse the interior of the uterus or to apply various substances to its walls or to the cervix. For this purpose they require to be " dressed ". This the nurse must know how to do. It takes a little practice to dress a sound well. Take a thin film of cotton-wool about two and a half inches square, and lay it on the palm of the left hand. Wet the end of the sound as far as the first knob (two and a half inches), and lay it firmly on the wadding. Now close the hand and turn the sound round three times till the wool is tightly and evenly rolled on. In order to remove the wool from the sound it should be unrolled under water. When an application has to be made to the interior of the uterus or cervix, several dressed sounds or probes should be prepared. The first sound, or perhaps more than one, is passed dry, in order to cleanse the parts of mucus or blood. The others should be dipped in the required substance (often carbolic acid, iodine, or a mixture of the two), and handed, one after the other, as required.

After such applications and under other circumstances the vaginal tampon or plug is used. This may be medicated or not. It is made as follows : Take a piece of absorbent cotton-wool about the size of the palm of the hand, and fold up the corners towards the centre. Round its centre tie a piece of thread at least eight inches long. Glycerine is frequently used to saturate the plug. This is done by pouring a table-spoonful into the centre of the wool before wrapping up its corners. The glycerine plug is generally left in about twelve hours. It sets up a watery discharge, so that the patient must wear a diaper. The non-medicated vaginal plugs should be smeared over with vaseline to facilitate introduction.

It may be necessary to plug the vagina in cases of severe hæmorrhage—as, for example, in cancer of the uterus. Under these circumstances the pledgets of wool should be soaked in carbolic oil, and gently but firmly packed into the vagina.

The vaginal douche is much used in gynæcological practice. For this a Higginson's syringe may be used ; but what is more convenient, because the patient can manage it herself, is the douche-can and tube or a modification thereof. (See Figs. 72, 77 and 78.)

The can is filled and hung up on the wall or placed on a

chest of drawers or table at a higher level than the bed. Connected with its lower end is a piece of rubber tubing, having a vaginal tube at its end, on which is placed a tap to regulate the flow. Or else the syphon-tube can be used as shown in Fig. 143. A long piece of rubber tubing has at one end a large hollow sinker, which is dropped into the vessel containing the fluid. A piece of glass tubing, suitably bent, is inserted where the tube passes over the edge of the vessel to make it rigid. The other end of the tubing carries the vaginal tube as before.

The patient should lie on her back, with the hips raised to a level considerably higher than the shoulders. A vessel must be placed underneath her to receive the overflow. In introducing the tube care must be taken that it is not too hot and that it reaches to a point behind the cervix before the douche is commenced. The fluid used may be simply warm or hot
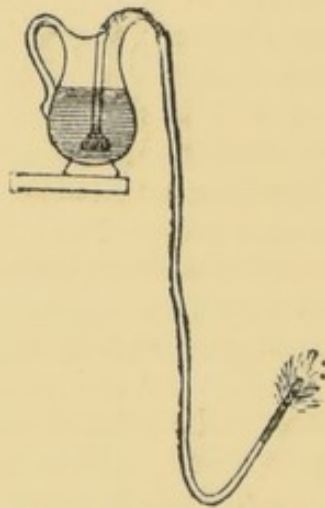
FIG. 143.—Syphon Douche (Hart and Barbour).

water, or it may contain some medicament, such as Condy's fluid, carbolic, perchloride of mercury, alum, or sulphate of copper. As a rule the water should be as hot as the patient can bear it, always so in inflammatory cases. It may be comfortably warm when used for purposes of cleanliness.

The uterine douche has to be used with great care, and this is seldom or never given by the midwife. The reason for this is that the use of any force may send the fluid through the Fallopian tubes into the peritoneal cavity. To avoid this the cervix must first be sufficiently dilated to admit the finger, and the tube used must not entirely fill the cervical canal, so that free exit of the fluid may be ensured.

We may now pass very briefly in review some of the commoner diseases peculiar to women.

The ovaries may be the seat of inflammation (ovaritis), acute or chronic. This is often due to a chill at the monthly period. Other common causes are child-birth and abortion.

Pain is generally complained of, referred to one or both sides, or occasionally to other parts, such as the back, and there is tenderness over the affected parts. Sometimes there is a rise of temperature, together with other signs of moderate fever.

In acute cases hot vaginal douching and blisters or other form of counter-irritation over the inflamed organs are prescribed. It may be necessary to give sedatives to ease pain and procure rest. In chronic ovaritis the glycerine plug is generally used.

The ovaries may be the seat of tumours, fluid or solid in consistence.

One of the commonest of gynæcological affections is inflammation of the lining membrane of the uterus. This may be acute or chronic: in the former case the body of the uterus and the cervix are both affected; in the latter case they are usually attacked separately, the cervical inflammation (cervical catarrh) being far more common than inflammation of the body of the uterus (endometritis). This is due to at least two reasons: (1) the cervix is liable to be irritated by discharges from the uterus or by the spread of inflammation upwards from the vagina; and (2) the damage which the cervix is so apt to receive during labour predisposes it to inflammation.

Among the numerous causes, in addition to child-birth and abortion, may be mentioned exposure to cold, especially just before the menstrual period, tumours, displacements of the uterus, and the incautious use of instruments. Menstruation is irregular, and there is often an excessive loss, pain in the back, vaginal discharge (leucorrhœa), and more or less constitutional disturbance.

The treatment embraces general and local measures. Included under the former are attention to general health, light nourishing food, tonics, and change of air. We have already mentioned some of the local measures, namely, douching, the application of various substances to the interior of the uterus by means of a "dressed" sound or probe, and the use of vaginal plugs. An operation for a laceration of the cervix may be required.

Two tumours of the uterus require mention, namely, (1) the fibroid and (2) cancer.

The fibroid tumour is very common, especially between the ages of thirty and forty-five. It gives rise to various symptoms, depending very much on its position: it may grow outwards from the uterus; or it may remain embedded in the muscular substance which composes its wall; thirdly, it may project into the uterine cavity. The last named is the most important variety, since it is that which causes the most severe symptoms. The most serious symptom is hæmorrhage, which may be very profuse.

The treatment is divided into medical and surgical. Many of these tumours require no surgical interference. Various operations are performed either for their removal or else with a view to arrest their growth. After the menopause, which is, however, usually delayed, they generally tend to shrink.

Fibroid tumours do not endanger life except by the symptoms, especially hæmorrhage, to which they may give rise.

Cancer of the uterus is nearly always located in the cervix, while the fibroid tumour is situated in the body of the organ. Cancer of the uterus is a disease which invariably proves fatal sooner or later unless it be removed, and this can only be done at an early period in its course. Hence the importance of an early diagnosis. The midwife can sometimes be of service in bringing cases of cancer to the doctor early by a knowledge of the symptoms of the disease.

It is a disease which principally affects the married, and frequent child-birth has an important influence on its occurrence. The commonest period is between the ages of forty-five and sixty-five.

There are four important symptoms: these are hæmorrhage, offensive discharge, pain, and loss of flesh with increasing weakness.

Any woman who has hæmorrhage from the vagina after the change of life should at once consult a doctor, as this is a suspicious sign of cancer. The same applies to hæmorrhage between the menstrual periods (irregular hæmorrhage) in middle life.

Sometimes the fœtor of the vaginal discharge is almost diagnostic of cancer. When the growth has begun to ulcerate, this fœtor develops, and the discharge becomes of a reddish-brown colour.

Pain is not usually an early symptom. It is described as a gnawing pain in the back, or as a sharp, shooting pain. It is often periodic, coming on at a particular time each day.

The emaciation and debility become extreme as the disease progresses, and the face often assumes a characteristic care-worn, gaunt expression, and there may be a duskiness of the skin. In course of time the disease may spread forwards to involve the bladder and backwards to the rectum, giving rise to pain on passing water and when the bowels act. If ulceration into the bladder or rectum occur, the urine and fæces will be passed in part or in whole by the vagina.

The treatment depends on whether or not the case is fit for operation. If an operation is to be performed, its extent will be defined—whether, for example, the cervix or the whole uterus be amputated. We shall speak here merely of palliative treatment, the relief of symptoms.

Hæmorrhage is kept in check by ergot, either given by the

mouth or injected under the skin, and by various local measures, such as injections into the vagina of cold or hot water, and ice passed into the vagina. If it be profuse, the vagina must be firmly plugged in the way we have mentioned. A tampon soaked in perchloride of iron is sometimes introduced into the vagina, so as to come into contact with the bleeding surface.

The management of the discharge will often tax the midwife's resources. The various antiseptic and astringent douches are best suited to overcome its offensiveness, which, once experienced, can never be forgotten. The discharge must be made and kept sweet. Keep the skin round the vagina protected by a soothing lotion of olive oil and glycerine from the irritating discharges. A good plan to keep the room sweet in offensive cases is to hang charcoal in bags round the bed, or else to gently heat a few crystals of iodine until a few violet fumes are given off; or, again, cascarilla chips or simply brown paper may be burnt. A plentiful supply of tow will be found both useful and economical in keeping the patient clean and comfortable.

Pain can only be relieved in the later stages by opium or morphia. The patient must be gradually made an opium-eater. Its administration is postponed as long as possible. It is given by the mouth, hypodermically, or as a suppository.

Lastly, the general condition of the patient must be noted: a nourishing dietary, cheerful companionship and surroundings, and well-ventilated rooms are all important.

We always tell a patient she has not cancer when our examination permits us to do so; but it is generally agreed that it is kindest and wisest not to tell the patient when she has the disease—at any rate, the midwife must be careful not to use the word in the patient's hearing.

We have already said (see p. 13) that the uterus is a movable organ in health. This movement may become increased, so that the organ comes to be displaced forwards, backwards, or downwards. Such a condition requires to be remedied by replacing the organ and using some appliance to keep it in its proper position. Especially does this refer to displacements backwards and downwards.

APPENDIX B.

THE CENTRAL MIDWIVES BOARD: THE IMPORTANT SECTIONS.

THE rules framed by the Central Midwives Board have now been considered by the Privy Council, together with the draft and minority reports, and a representation from the General Medical Council. The schedule as approved for a period of three years has now been published.

The important sections are B, C, and D.

B.—REGULATING THE ISSUE OF CERTIFICATES AND THE CONDITIONS OF ADMISSION TO THE ROLL OF MIDWIVES.

1. Candidates must satisfy the Central Midwives Board that they have reached a sufficient standard of general education, and submit the following documents, duly filled in and signed :—

(*a*) A certificate of birth, showing that the candidate is not under twenty-one years of age.

(*b*) Certificates to the effect that the candidate has undergone the training set forth in C, 1 (1) (2) and (3).

(*c*) A certificate of good moral character. This certificate must be in the form prescribed by the Central Midwives Board. The person signing must state in the certificate that he or she has known the candidate for at least twelve months, and must append to his or her signature a statement of his or her calling or position. (Schedule, Form I.)

2. Candidates must pass an examination as hereinafter set forth. (See C below.)

3. A candidate who has complied with the above requirements and has successfully passed the examination shall receive a certificate in the form set out in the Schedule and her name shall be entered by the Secretary on the Roll of Midwives. (Schedule, Form II.)

4. The names of all women admitted to the Roll of Midwives under Section 6 (1) and (2) of the Midwives Act shall be printed in one single list and in alphabetical order.

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C.—REGULATING THE COURSE OF TRAINING AND THE CONDUCT OF EXAMINATIONS, AND THE REMUNERATION OF THE EXAMINERS.

1. No person shall be admitted to an examination unless she produces certificates that she has undergone the following course of training, *viz.* :—

(1) She must have, under supervision satisfactory to the Central Midwives Board, attended and watched the progress of not fewer than twenty labours, making abdominal and vaginal examinations during the course of labour and personally delivering the patient. (Schedule, Form III.)

(2) She must have, to the satisfaction of the person certifying, nursed twenty lying-in women during the ten days following labour. (Schedule, Form IV.)

The certificates as to (1) and (2) must be in the form prescribed by the Central Midwives Board, and must be filled up and signed either by a registered medical practitioner or by the chief midwife, or, in the absence of such an officer, by the matron of an institution recognised by the Board, or, in the case of a poor law institution, by the matron, being a midwife certified under the Midwives Act, or a superintendent nurse, certified in like manner and appointed under the Nursing in Workhouses Order, 1897, and attached to such an institution, or by a midwife certified under the Midwives Act and approved by the Board for the purpose.

(3) She must have attended a sufficient course of instruction in the subjects named below. (See Clause 4 below.)

No period of less than three months shall be deemed sufficient for the purpose.

The above certificate (3) must be in the form prescribed by the Central Midwives Board, and must be filled up and signed by a registered medical practitioner recognised by the Board as a teacher. (Schedule, Form V.)

2. Candidates who intend to present themselves for examination must send notice to the Secretary of the Central Midwives Board at least three weeks before the date fixed for the examination to commence, accompanied by the certificates mentioned in B, 1, and C, 1, and by the payment of the fee of one guinea, or, in the event of the candidate having presented herself on a former occasion and having failed to pass, the fee of fifteen shillings.

3. Any candidate who during the examination shows a want of acquaintance with the ordinary subjects of elementary education may be rejected on that ground alone.

4. The examination shall be partly oral and practical, and partly written, and shall embrace the following subjects :—

(*a*) The elementary anatomy of the female pelvis and generative organs.

(*b*) Pregnancy and its principal complications, including abortion.

(*c*) The symptoms, mechanism, course and management of natural labour.

(*d*) The signs that a labour is abnormal.

(*e*) Hæmorrhage: its varieties and the treatment of each.

(*f*) Antiseptics in midwifery and the way to prepare and use them.

(*g*) The management of the puerperal patient, including the use of the clinical thermometer and of the catheter.

(*h*) The management (including the feeding) of infants, and the signs of the important diseases which may develop during the first ten days.

(*i*) The duties of the midwife as described in the regulations.

(*j*) Obstetric emergencies, and how the midwife should deal with them until the arrival of a doctor. This will include some knowledge of the drugs commonly needed in such cases, and of the mode of their administration. (See E, 16.)

(*k*) Puerperal fever, its nature, causes and symptoms. The elements of house sanitation. The disinfection of person, clothing and appliances.

5. Due notice shall be given of the examinations to be held under the Act.

6. The remuneration of the examiners shall be such as may from time to time be recommended by the Central Midwives Board and approved by the Privy Council.

D.—REGULATING THE ADMISSION TO THE ROLL OF WOMEN ALREADY IN PRACTICE AS MIDWIVES AT THE PASSING OF THE ACT.

1. Applications for admission to the Roll of Midwives under Section 2 of the Midwives Act must be made on the prescribed forms (Schedule, Forms VI., VIII.), and must be forwarded to the Central Midwives Board together with such one or more of the following certificates as may be required.

2. In the case of women claiming admission on the ground of having obtained a Certificate in Midwifery from the Royal College of Physicians of Ireland, the Obstetrical Society of London, the Coombe Lying-in Hospital and Guinness's Dispensary, or the Rotunda Hospital for the Relief of the Poor Lying-in Women of Dublin, (*a*) either the original certificate on which the application is based, or in the event of the original certificate having been lost, a voucher from the accredited secretary or other agent of the certifying body to the effect

that a certificate was granted to the applicant on such and such a date; and (*b*) a certificate signed by a Justice of the Peace, minister of religion or registered medical practitioner, or the secretary of an institution (approved by the Central Midwives Board) of which the applicant is a member, or is or was an employée, stating that the applicant is the person to whom the aforementioned Certificate in Midwifery was granted. The Secretary of the Board shall, by comparison of the handwriting, or by such inquiry as he may think necessary, satisfy himself as far as possible of the applicant's identity. The application must be accompanied by the fee of ten shillings.

3. In the case of women claiming admission on the ground of having obtained a certificate in midwifery from any institution or examining body other than those specified in Section 2 of the Midwives Act, the certificate on which the application is based, together with satisfactory evidence, in the form prescribed by the Central Midwives Board (Schedule, Form VII.), to the effect that before the certificate was granted the applicant had received a proper course of instruction and training (including personal attendance, under competent supervision, upon at least twenty cases during and after labour), and had passed an examination in midwifery and the duties of a midwife, and that the institution or examining body by which the certificate was granted considers the applicant at the present time to be a proper person to be admitted to the Midwives Roll. The application must be accompanied by a fee of ten shillings.

The applicant may be required to furnish other documents or particulars to enable the Board to decide whether the application can be granted.

4. In the case of women claiming admission on the ground of having been in *bonâ fide* practice as midwives for twelve months previous to the 31st July, 1902, a certificate to the effect that the applicant has to the personal knowledge of the person signing been in *bonâ fide* practice as a midwife, for at least twelve months prior to the 31st July, 1902, and that she is trustworthy, sober, and of good moral character. This certificate must be in the form given in the Schedule (Form IX.), must be signed by a Justice of the Peace, minister of religion, registered medical practitioner, or other person acceptable to the Board, and must be accompanied by the fee of ten shillings.

5. The certificates to be issued by the Board under this section will be in the prescribed Forms. (Schedule, Forms X., XI.)

Note.—No application for admission to the Roll of Midwives under Section 2 of the Midwives Act, 1902, can be received after the 31st day of March, 1905.

E.—REGULATING, SUPERVISING AND RESTRICTING WITHIN DUE LIMITS THE PRACTICE OF MIDWIVES.

Directions to Midwives.

1. The midwife must be scrupulously clean in every way, because the smallest particle of decomposing matter may set up puerperal fever.

She must wear a dress of washable material, and over it a clean washable apron.

Note.—It is best to have the sleeves of the dress made so that the midwife can tuck them well up above the elbows.

A midwife who is attending a case in which there are foul-smelling discharges must not go direct to another case without first changing her dress and thoroughly cleansing and disinfecting her hands and forearms and such appliances (2 (*a*) below) as she may have had occasion to use, and is obliged to take with her.

Note.—Unless the cleansing process be thoroughly carried out there will be, even after a healthy confinement, remains of blood, lochia, or liquor amnii on the fingers, and especially under the nails, which will there undergo decomposition, and so become dangerous to the next patient attended. The midwife must, therefore, keep her nails cut short, and preserve the skin of her hands as far as possible from chaps and other injuries.

2. When called to a confinement a midwife must take with her:—

(*a*) An appliance for giving vaginal injections, an appliance for giving enemata, a catheter, a pair of scissors, a clinical thermometer and a nail-brush.

(*b*) An efficient antiseptic for disinfecting the hands, etc.

(*c*) An antiseptic for douching in special cases.

(*d*) An antiseptic lubricant for smearing the fingers, catheters, douche nozzles and enema nozzles before they touch the patient.

3. On each occasion of touching the genital organs or their neighbourhood the midwife must previously disinfect her hands and forearms.

4. All instruments and other appliances brought into contact with the patient's generative organs must be properly disinfected.

5. Whenever a midwife has been in attendance upon a patient suffering from puerperal fever, or from any other illness supposed to be infectious, she must disinfect herself and all her instruments and other appliances, to the satisfaction of the local sanitary authority, and must have her clothing thoroughly disinfected before going to another labour. Unless otherwise

directed by the local supervising authority, all washable clothing should be boiled, and other clothing should be sent to be stoved (by the local sanitary authority), and then exposed freely to the open air for several days.

Duties to Patient.

6. If a midwife has charge of a lying-in case she must not leave the patient after the commencement of the second stage, and she must stay with the woman until the expulsion of the after-birth, and as long after as may be necessary. In cases where a doctor has been sent for on account of the labour being abnormal or of there being threatened danger, she must await his arrival and faithfully carry out his instructions. (See Clauses 12 and 17 below.)

7. Before making the first internal examination, and always before passing a catheter, the midwife must wash the patient's external parts with soap and water, and then swab them with an antiseptic solution. For this purpose, and for washing the external parts immediately after labour and during the lying-in, on no account must ordinary sponges or flannels be used, but material which can be boiled before use and thrown away afterwards, such as linen, cotton-wool, cotton waste, tow, etc.

8. No more internal examinations should be made than are absolutely necessary.

9. On the birth of a child which is in danger of death, the midwife shall inform one of the parents of the child's condition.

10. The midwife must remove soiled linen, blood, fæces, urine, and the placenta from the neighbourhood of the patient and from the lying-in room as soon as possible after the labour, and in every case before she leaves the patient's house.

11. The midwife shall be responsible for the cleanliness, and should give full directions for securing the comfort and proper dieting, of the mother and child during the lying-in period which shall be held, for the purpose of these regulations and in a normal case, to mean the time occupied by the labour and a period of ten days thereafter. (See Clause 17 (c).)

12. A "case of normal labour" in these regulations shall mean a labour in which there are none of the conditions specified in Clause 17 below.

Duties to Child.

13. In the case of a child being born apparently dead, the midwife should carry out the methods of resuscitation which have been taught her.

14. As soon as the child's head is born, and if possible before the eyes are opened, its eyelids should be carefully cleansed with a suitable antiseptic lotion.

General.

15. No midwife shall undertake the duty of laying out the dead, or follow any occupation that is in its nature liable to be a source of infection.

16. A midwife must enter in a book, with other notes of the case, all occasions on which she is under the necessity of administering any drug, whether scheduled as a poison or not, the dose, and the time and cause of its administration.

17. In all cases of abortion, of illness of the patient or child, or of any abnormality occurring during pregnancy, labour, or lying-in, a midwife must decline to attend alone, and must advise that a registered medical practitioner be sent for, as, for example, under the following circumstances:—

(*a*) In the case of a pregnant woman:—
  (1) When she suspects a deformed pelvis;
  (2) When there is loss of blood;
  (3) When the pregnancy presents any other unusual feature (as, for example, excessive sickness, persistent headache, dimness of vision, puffiness of face and hands, difficulty in emptying the bladder, incontinence of urine, large varicose veins, rupture), or when it is complicated by fever or any other serious condition.

(*b*) In the case of a woman in labour:—
  (1) In all presentations other than the uncomplicated vertex or breech; in all cases of breech presentation in primiparæ; in all cases of flooding and convulsions; and also whenever there appears to be insufficient room for the child to pass, or when a tumour is felt in any part of the mother's passages.
  (2) If the midwife when the cervix has become dilated is unable to make out the presentation.
  (3) If there is loss of blood in excess of what is natural, at whatever time of the labour it may occur.
  (4) If an hour after the birth of the child the placenta has not been expelled, and cannot be expressed (*i.e.*, pressed out), even if no bleeding has occurred.
  (5) In cases of rupture of the perineum, or other serious injury of the soft parts.

(*c*) In the case of lying-in women, and in the case of newly born children:—
Whenever, after delivery, the progress of the woman or child is not satisfactory, but in all events upon the occurrence of the subjoined conditions in—
(I.) *The Mother*:—
  (1) Abdominal swelling and signs of insufficient contraction of the uterus.
  (2) Foul-smelling discharges.

(3) Secondary post-partum hæmorrhage.

(4) Rigor.

(5) Rise of temperature above 100° 4′ F. with quickening of the pulse for more than twenty-four hours.

(6) Unusual swelling of the breasts with local tenderness or pain.

(II.) *The Child :—*

(1) Injuries received during birth.

(2) Obvious malformations or deformities, not inconsistent with continued existence.

(3) Concealed malformations—Incapacity to suck or take nourishment.

(4) Inflammation to even the slightest degree of the eyes, eyelids and ears.

(5) Syphilitic appearance of the skin in certain parts.

(6) Illness or feebleness arising from prematurity.

(7) Malignant jaundice (icterus neonatorum).

(8) Inflammation about the umbilicus (septic infection of the cord).

(*d*) In all cases of the death of a woman during pregnancy, labour or lying-in.

When a registered medical practitioner is sent for, the midwife must state in writing the condition of the patient and the reason of the necessity for medical advice, in accordance with Clause 19 (*b*).

18. *Notification :—*

(1) *Deaths.*—In all cases in which the death of the mother or of the child occurs before the attendance of a registered medical practitioner the midwife shall, as soon as possible after the death, notify the same to the local supervising authority.

(2) *Stillbirths.*—In all cases where a registered medical practitioner is not in attendance the midwife shall, as soon as possible after the occurrence of a stillbirth, notify the same to the local supervising authority.

A child is deemed to be stillborn when it has not breathed or shown any sign of life after being completely born.

(3) *Puerperal Fever and other Infectious Diseases.*—These cases are included in the notice required when medical help is sent for. (See 19 (*b*) below.)

19. A midwife shall keep the following records :—

(*a*) A register of cases, in the following form :—

No ....

Date of engagement to attend..

Name and address ....

....

No. of previous labours and miscarriages ....

Age...........................

Date and hour of Midwife's arrival...

Presentation ....

Duration of 1st, 2nd, 3rd stage of labour...

Complications (if any) during or after labour.......................................

....

Sex of infant.........................Born living or dead.................................

Full time or premature—No. of months..

If Doctor called.........................Name of Doctor.................................

Date of Midwife's last visit..

Condition of Mother then   (See Clause 11 above.)..............................

....

Condition of Child then ....

Remarks[1] ....

....

....

....

(b) A record of sending for medical help, in the following
form :—

No ....Date..

Name of Patient ....

Address ....

requires medical assistance at once on account of.............................

....

Signed..(Certified Midwife)

Sent to (doctor) ....

at (address)..

Time of sending message ....

The midwife shall make two copies of the above (b) by means
of transfer paper or otherwise ; she shall preserve one of these
copies for herself, and shall send the other by post to the local
supervising authority within twelve hours. (See Clause 18 (3)
above.)

The midwife is also recommended to keep a Case Book with fuller details.

20. The supervising authority shall make arrangements to
secure a proper inspection of every midwife's case book, bag
of appliances, etc., and, when thought necessary, an inspection
of her place of residence, and an investigation of her mode of
practice.

21. Nothing in this section (E) shall apply to certified mid-
wives exercising their calling in hospitals, workhouses, or Poor
Law Infirmaries under the supervision of a duly appointed
medical officer.

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[1] If any drugs have been administered state here their nature and
dose, and the time and purpose of their administration.

F.—Deciding the Conditions under which Midwives may be Suspended from Practice.

In carrying out Section 8 (3) of the Midwives Act it shall be the duty of the local supervising authority to suspend a midwife from practice who contravenes the directions for the use of disinfectants and for the employment of proper safeguards against the spread of infection, and any other rules for the purpose laid down by the Central Midwives Board, and in the exercise of that duty the local supervising authority shall, after communicating their decision in writing to the midwife concerned, at once report any suspension (with the grounds thereof) to the Central Midwives Board.

G.—Defining the Particulars Required to be Given in any Notice under Section 10 of the Act.

The particulars required to be given in any notice under Section 10 of the Midwives Act, 1902, shall be as follows:—

(1) The number and date of the certificate granted by the Central Midwives Board to the person giving the notice.

(2) Her Christian name and surname in full, and if married since the grant of her certificate, the name under which it was granted to her.

(3) Her usual place of residence, and if she carries on her practice elsewhere, the address also where she practises.

(4) If she practises or acts as a midwife outside the area within which she usually resides or carries on her practice, the date and address at which she commenced to practise or pursue her calling without such area.

(5) The notice shall be in the prescribed Form. (Schedule, Form XII.)

SCHEDULE.

Forms of Applications and Certificates required under the Rules.

APPENDIX OF FORMS.

Form I.—*Certificate of Good Moral Character.*

(See Section B, 1 (c), above.)

I certify that I have been personally acquainted with................
................................for a period of................................years, and that she is trustworthy, sober, and of good moral character.

Dated this................day of................................19..........
Name ....
Address ....
Position and authority ⎰
   for signing   ⎱..
Signature of applicant..

FORM II.—*Central Midwives Board.*

(2 Edw. 7, c. 17.)

No.............................. Date...

We hereby certify that...

....having passed the Examination of the
Central Midwives Board, and having otherwise complied with
the rules and regulations laid down in pursuance of the Mid-
wives Act, 1902, is entitled by law to practise as a midwife in
accordance with the provisions of the said Act and subject to
the said rules and regulations.

.... ⎫ Members
                                                                      ⎬ of the
.... ⎭ Board.

....Secretary.

FORM III.—*Certificate of Attendance on Cases.*

(See Section C, 1 (1), above.)

I certify that...
(to whom this certificate refers) has, under my supervision,
attended and watched the progress of not fewer than twenty
labours, making abdominal and vaginal examinations during
the course of labour, and personally delivering the patient.

Dated this......................day of..19...........
Name ....
Address ....
Position and authority ⎫
    for signing   ⎭ ....
Signature of applicant..

FORM IV.—*Certificate of Attendance during the Lying-in Period.*

(See Section C, 1 (2), above.)

I certify that...
(to whom this certificate refers) has, to my satisfaction, nursed
twenty lying-in women during the ten days following labour.

Dated this......................day of..19...........
Name ....
Address ....
Position and authority ⎫
    for signing   ⎭ ....
Signature of applicant..

FORM V.—*Certificate of having Attended a Course of Instruction.*

(See Section C, 1 (3), above.)

I certify that...
(to whom this certificate refers) has attended, to my satisfac-
tion, a course of instruction given by myself on the subjects
enumerated in the Regulations.

Dated this....................day of...19.............
Name ....
Address ....
Professional Qualifications...
Position and authority⎫
     for signing   ⎰...
Signature of applicant...

FORM VI.—*Application to be certified under Section 2 of the
Midwives Act, on the ground of holding a Certificate in Mid-
wifery from one of the Bodies specified in the Act, or a
Certificate approved by the Board.*

(See Section D, 1, 2 and 3, above.)

I hereby claim to be certified under Section 2 of the Mid-
wives Act, on the ground that I hold a Certificate in Midwifery
from the...
..............................which Certificate I enclose herewith, together
with the fee of Ten Shillings.

Dated this....................day of...19.............
Name in full..
Single, married, or widow..
Full postal address..
....

FORM VII.—*Testimony on behalf of a non-specified Certifying Body
to the effect that its Certificate was granted after a proper course
of instruction and training, and that the applicant is at the
present time a fit and proper person to be admitted to the
Midwives Roll.*

(See Section D, 3, above.)

I hereby testify that before a Certificate was granted to
....by the institution or
examining body of which I am at present the accredited or
recognised representative...had
received a proper course of instruction and training (including

personal attendance under competent supervision upon at least twenty cases during and after labour), and had passed an Examination in Midwifery and the duties of a Midwife.

I further testify that she is at the present time a fit and proper person to be admitted to the Midwives Roll.

Dated this....................day of..19...........
Name ....

^{1}Chairman of the Board or Committee, or Senior Medical Officer of the

....

....

Signature of applicant...

FORM VIII.—*Application to be certified under Section 2 of the Midwives Act, on the ground of having been in* bonâ fide *practice as a Midwife for at least one year prior to the* 31st *July,* 1902.

(See Section D, 1 and 4, above.)

I hereby claim to be certified under Section 2 of the Midwives Act, on the ground that I have been in *bonâ fide* practice as a Midwife since..
I enclose the necessary certificates and the fee of Ten Shillings.

Dated this....................day of..19...........
Name in full..
Single, married, or widow ....
Full postal address ....

....

FORM IX.—*Certificate of having been in* bonâ fide *practice as a Midwife for a period of at least one year prior to the* 31st *July,* 1902, *and of being of Good Moral Character.*

(See Section D, 4, above.)

I certify that..
has, to my personal knowledge, been in *bonâ fide* practice as a Midwife since.., and that she is trustworthy, sober, and of good moral character.

Dated this....................day of..19...........
Name ....
Address ....
Calling or position ....
Signature of applicant..

Strike out such words as do not apply to the person signing.

FORM X.—*Central Midwives Board.*

(2 Edw. 7, c. 17.)

No.......................... Date...

We hereby certify that..
is entitled by law to practise as a Midwife in accordance with
the provisions of the Midwives Act, 1902, and subject to the
rules and regulations laid down in pursuance thereof, by virtue
of holding a Certificate in Midwifery from

      (*a*) The Royal College of Physicians of Ireland,
or (*b*) The Obstetrical Society of London,
or (*c*) The Coombe Lying-in Hospital and Guinness's Dis-
        pensary,
or (*d*) The Rotunda Hospital for the Relief of the Poor
        Lying-in Women of Dublin,
or (*e*) Some other approved body.

                                        } Members
.... } of the
.... } Board.
....Secretary.

FORM XI.—*Central Midwives Board.*

(2 Edw. 7, c. 17.)

No........................ Date...

We hereby certify that...
is entitled by law to practise as a Midwife in accordance with
the provisions of the Midwives Act, 1902, and subject to the
rules and regulations laid down in pursuance thereof, by virtue
of having been in *bonâ fide* practice as a Midwife for one year
prior to the 31st July, 1902.

                                        } Members
.... } of the
.... } Board.
....Secretary.

FORM XII.—*Midwives Act*, 1902, *Section* 10.

To the Local Supervising Authority of [1]the Administra-
tive County of.., [1]*or* the County
Borough of.., [1]*or* the Urban *or*
Rural District of...

I, *A.B.*..[1](*formerly*)
....(*C.*) holding a certifi-

[1] Strike out the words not applicable.

cate from the Central Midwives Board, No............................,
dated the..of...
19............, hereby give you notice [1] (*a*) of my intention to practise
as a Midwife within your area during the year commencing 1st
January, 19.............

 [1]*or*, (*b*) that on the......................day of............................in this
year, I acted as a Midwife at..
...., within your area.

....(Signed) *A.B.*
 Residing at..and pursuing my calling
at...
 Dated this................day of............................19............

[1] Strike out the words not applicable.

THE END

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